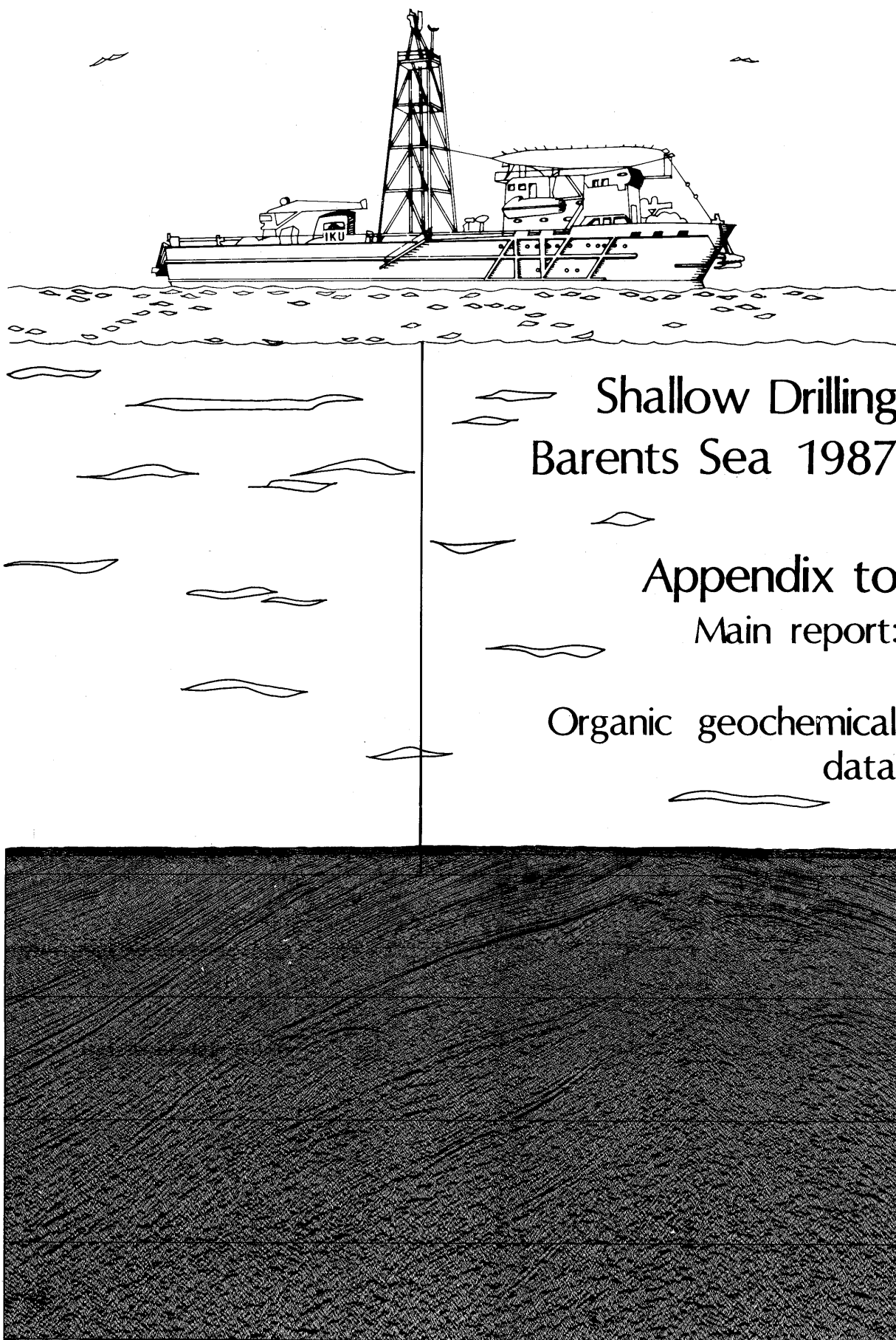




Shallow Drilling Barents Sea 1987

Appendix to
Main report:

Organic geochemical
data



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REPORT

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SHALLOW DRILLING BARENTS SEA 1987

Appendix to Main Report:
Organic Geochemical Data

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88-03-14	553	--	T. Bugge	Tom Bugge

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SUMMARY:

This appendix contains:

- 1) Tables and figures of the geochemical data obtained from the core samples drilled by IKU in the Finnmark East area and the Nordkapp Basin in 1987, (Chapter II).

The data are organised core by core, each section having its own table of contents. The text accompanying the data may be found in the main body of the report.

- 2) Data obtained from the artificial maturation of a claystone sample from core 7230/05-U-02 using hydrous pyrolysis. These data are accompanied by a descriptive text (Chapter I).
- 3) A description of the experimental methods and interpretation levels (Chapter III).

KEY WORDS:	
Barents Sea	Source potential
Finnmark East	Maturation
Nordkapp Basin	Hydrous pyrolysis

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I ARTIFICIAL MATURATION OF A
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II LABORATORY RESULTS

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II.8 Core 7230/05-U-02

III ANALYTICAL METHODS AND
INTERPRETATION LEVELS

A.I ARTIFICIAL MATURATION OF A CLAYSTONE FROM CORE 7230/05-U-02 USING HYDROUS PYROLYSIS

One claystone sample from the organic-rich Unit C (Late Kimmeridgian) of Core 7230/05-U-02 (33.59 m) was artificially matured using hydrous pyrolysis in order to examine the source potential of these rocks in detail. The organic geochemical data of this sample are presented together with the other data from Core 7230/05-U-02 (section 3.8.6 of the main data report and section A.II.8 of the Appendix volume) but are also included in this chapter for convenience of the reader.

The claystone has a total organic carbon content of 22.9 % and a Rock-Eval hydrogen index of 345 mg HC/g TOC, which characterises the kerogen as type II-III (Table A.I.1). The organic matter is immature as indicated by a mean vitrinite reflectance of 0.28 %Ro and a Tmax value of 409°C.

Fifteen grams of rock sample were artificially matured in a bomb (52 ml volume) in the presence of water (15 ml) at a temperature of 340°C for 72 hours. The pressure was equivalent to the water vapour pressure at this temperature. On completion of the experiment, the expelled hydrocarbon gas and fluid were collected and analysed. The pyrolysed residue gave a mean vitrinite reflectance of 1.34 %Ro which indicates that the sample, in conventional terms, has reached late or post-oil window maturity (Table A.I.11 and Figure A.I.9).

The sample yielded 440 ml of gas on hydrous pyrolysis (Table A.I.2). The gas contains 26 vol% hydrocarbons and 74 vol% carbon dioxide, the latter probably containing a significant inorganic contribution (carbonate). The hydrocarbon fraction of the gas consists mainly of methane (52 %), ethane (27 %), propane (14 %) and butane + butene (5 %), while all higher hydrocarbons occur in trace concentrations of less than 0.5 %. The gas has a wetness of 47 %.

An aliquot of the expelled pyrolysate fluid which floated on the water surface was collected directly for gas chromatographic analysis of C₅-C₃₅-hydrocarbons. The rest of the fluid was recovered by rinsing the residual rock and the bomb interior with an organic solvent.

In total, 316 mg of pyrolysate fluid (C_{15+}) were expelled from the rock sample. This corresponds to 2.1 % of the rock weight, or to 92.1 mg/g TOC respectively. The C_{15+} -fraction of this pyrolysate contains ca. 50 % hydrocarbons, of which the saturates account for ca. 40 % and the aromatics for ca. 60 %, respectively (Tables A.I.4-A.I.7). This is in an obvious contrast with the extract of the unpyrolysed rock, which contained only 7 % hydrocarbons.

The gas chromatogram of the whole oil (Fig. A.I.1) shows a unimodal, thermally mature distribution of n-alkanes with a maximum at nC_6 , but also relatively high concentrations of aromatic and naphthenic compounds, among which methylcyclopentane, toluene and the xylenes are most prominent.

As described in the main report (Chapter 3.8.6), the gas chromatogram of the saturated hydrocarbon fraction extracted from the original rock is dominated by the peaks of phytane and pristane and shows a slightly bimodal n-alkane distribution with a strong odd-over-even predominance in the C_{27} - C_{33} range (CPI=1.8). Phytane is more abundant than pristane, and acyclic isoprenoids with carbon numbers between 14 and 18 occur in appreciable concentrations as well.

The respective gas chromatogram of the expelled pyrolysate fluid shows a unimodal n-alkane distribution with a maximum at C_{16} and a much reduced, but still recognisable predominance of uneven-numbered over even-numbered n-alkanes in the heavy molecular region (CPI=1.2). The acyclic isoprenoids are still represented in appreciable concentrations, but pristane and phytane are no longer as prominent as in the rock extract and pristane predominates now over phytane.

The differences in the n-alkane and the acyclic isoprenoid distributions between rock extract and hydrous pyrolysate are visualised in the Figures A.I.4 and A.I.5.

An analogous evolution towards a light-end biased distribution is also indicated for the aromatic hydrocarbon fractions. The gas chromatogram of the extract fraction shows a large 'hump' and one very prominent peak in the aromatic sterane region, and moderate concentrations of alkylnaphthalenes. The corresponding chromatogram of the expelled pyrolysate is characterised by strong peaks of alkylnaphthalenes and less

prominent alkylphenanthrenes. The maximum of the 'hump' is somewhat shifted towards the lower molecular region (Fig. A.I.3).

The composition of the steranes (m/z 217) in the expelled pyrolysate fluid differs from that of the unpyrolysed sediment extract by a strong increase of a $5\alpha(H)$ sterane which elutes early in the chromatogram (peak u), and by a predominance of rearranged over regular steranes (peaks a-i and j-t respectively). The proportion of 20S-diastereomers in the total C_{29} regular steranes in the expelled pyrolysate is twice as high as in the rock extract (32 vs. 15 %), but has not yet reached the equilibrium value of ca. 50 % which is usually observed in mature sediment extracts.

The terpanes (m/z 191) from the expelled pyrolysate contain relatively higher concentrations of tri- and tetracyclics (peaks P-S) but also of C_{34} and C_{35} extended hopanes (peaks L, M) than the terpanes in the rock extract. The ratio 22S/22R of the extended hopanes (G/H, J1/J2) is slightly increased relative to the rock extract, but still far from the equilibrium value of 60% 22S-steranes. The hopane/moretane ratio behaves opposite to the expected trend and is lower for the expelled pyrolysate than for the extract. An additional compound appears in the expelled pyrolysate, eluting between hopane (peak E) and moretane (peak F), while the peaks of bisnorhopane (Z) and $18\alpha(H)$ trisnorneohopane (A) have disappeared.

The composition of the triaromatic steranes is characterised by a rapidly decreasing concentration from the C_{20} peak (M) towards higher carbon numbers, which indicates that side-chain cracking has almost reached completion (89 %). Side-chain cracking of the monoaromatics also is at a fairly advanced stage (45 %).

In conclusion, the artificial maturation of this claystone sample yielded a significant concentration of oil which has a generally mature composition, but shows biomarker ratios which indicate that not all the maturity-specific reactions are completed yet.

APPENDIX A.I: TABLE OF CONTENTS

Artificial maturation of a claystone sample from core 7230/05-U-02

TABLES

Table A.I.1:	Total organic carbon content and data from Rock-Eval pyrolysis.
Table A.I.2:	Yield and composition of hydrous pyrolysis gas.
Table A.I.3:	Amount of asphaltenes and polars in sediment/fluid.
Table A.I.4:	Weight of EOM/fluid and chromatographic fractions.
Table A.I.5:	Concentration of EOM/fluid and chromatographic fractions, related to rock weight.
Table A.I.6:	Concentration of EOM/fluid and chromatographic fractions, related to TOC weight.
Table A.I.7:	Composition of material extracted from the rock/fluid.
Table A.I.8:	Tabulation of data from the gas chromatograms.
Table A.I.9a:	Molecular ratios from sterane and terpane mass fragmentograms. Maturity characteristic ratios.
Table A.I.9b:	Molecular ratios from sterane and terpane mass fragmentograms. Maturity and source characteristic ratios.
Table A.I.10:	Molecular ratios from aromatic sterane mass fragmentograms.
Table A.I.11:	Vitrinite reflectance data.

FIGURES

Figure A.I.1:	Whole oil gas chromatogram of expelled oil.
Figure A.I.2:	Saturated hydrocarbon gas chromatograms of rock extract and expelled pyrolysate fluid.
Figure A.I.3:	Aromatic hydrocarbon gas chromatograms of rock extract and expelled pyrolysate fluid.
Figure A.I.4:	Variation in distribution of n-alkane peaks before and after hydrous pyrolysis.
Figure A.I.5:	Variation in distribution of isoprenoid peaks before and after hydrous pyrolysis.
Figure A.I.6:	Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes) for rock extract and expelled pyrolysate fluid.
Figure A.I.7:	Mass fragmentograms of m/z 217, 218, 231, 259 (steranes) for rock extract and expelled pyrolysate fluid.
Figure A.I.8:	Mass fragmentograms of m/z 231, 239, 253 (aromatic steranes) for expelled pyrolysate fluid.
Figure A.I.9:	Vitrinite reflectance histograms.

Table A.I.1

Core 7230/05-U-02

DATA FROM ROCK EVAL PYROLYSIS

I			:					HYDR.	OXYGEN	PETROLEUM	PROD.	TEMP.	I	
I	IKU	DEPTH	:	S1	S2	S3	TOC	INDEX	INDEX	POTENTIAL	INDEX	MAX	I	
I	No.		:								S1		I	
I			:								-----		I	
I		m	:	(	mg/g ROCK	)	(%)	(	mg/g TOC	)	S1+S2	S1+S2	(C)	I
I			:										I	
I	D	12	:	4.17	78.86	2.25	22.88	345	10	83.03	0.05	409	I	
I			:										I	

DATE : 3 - 2 - 88.

Table A.I.2: Yield and composition of hydrous pyrolysis gas

Sample: D-0012 --> C-7261

	vol % of of total registered compounds (air-free)	vol % of HC
Carbon dioxide	73.6416	---
C1	13.6977	51.9673
C2	7.0870	26.8872
C3	3.7814	14.3460
iC4	.4922	1.8673
C4=	.6720	2.5496
nC4	.1205	.4572
unknown, RI=423*)	.0905	.3433
unknown, RI=432	.0374	.1418
unknown, RI=457	.0026	.0099
unknown, RI=470	.0089	.0340
iC5	.1228	.4660
C5=	.0071	.0268
C5=	.0027	.0104
nC5	.1087	.4123
unknown, RI=506	.0188	.0712
unknown, RI=513	.0088	.0334
neo-C6	.0176	.0668
unknown, RI=542	.0016	.0060
unknown, RI=549	.0039	.0148
CyC5	.0146	.0553
2MeC5	.0205	.0778
3MeC5	.0066	.0252
nC6	.0153	.0580
unknown, RI=609	.0019	.0071
MeCyC6	.0123	.0465
Benzene	.0030	.0115
nC7	.0019	.0071

*) RI = Retention index

Bulk composition:	hydrocarbons	26.4 vol%
	non-hydrocarbons	73.6 vol%
	wetness	47.0 vol%

Total gas recovered:	440 ml
Yield hydrocarbon gas:	7.75 ml/g rock
	33.86 ml/g TOC

Table A.I.3:

AMOUNT OF ASPHALTENES AND POLARS IN EXPELLED PYROLYSATE

7230/05-U-02

=====					
I		:	Asphaltenes	:	I
I	IKU-No.	DEPTH	:	:	I
I		(m)	(mg)	(mg)	I
=====					
I		:	:	:	I
I	C 7261	33.59	3.7	10.5	I
I		:	:	:	I
=====					

Project no.: 21.3427.23
Well ident.: 7230/05-U-02
DATE : 3 - 3 - 88.

Table A.I.4

WEIGHT OF EOM / EXPELLED PYROLYSATE AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	: Rock : Extr. (g)	EOM /Exp. pyrol. (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
D 12	33.59	: 4.7	85.6	1.2	5.0	6.2	79.4	22.88
orig. rock extract		:						
C 7261	33.59	: 12.1	48.4	9.2	15.8	25.0	23.4	22.88
expelled pyr. fluid:		:						

The weights given for sample C 7261 relate to the aliquot separated by MPLC.

Table A.I.5

CONCENTRATION OF EOM / EXPELLED PYROLYSATE AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

IKU-No	DEPTH (m)	: EOM : Exp. pyrol.	Sat.	Aro.	HC	Non HC
D 12	33.59	: 18252	256	1066	1322	16930
orig. rock extract		:				
C 7261	33.59	: 21067	4000	6867	10867	10200
expelled pyr. fluid		:				

The concentrations of expelled pyrolysate relate to the whole expelled pyrolysate fluid (C15+ fraction of free oil plus the portion collected by rinsing the autoclave with solvent).

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Well ident.: 7230/05-U-02
DATE : 3 - 3 - 88.

Table A.I.6

CONCENTRATION OF EOM / EXPELLED PYROLYSATE AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	: EOM	Exp.pyr.	Sat.	Aro.	HC	Non HC	I
I		(m)	:						I
I			:						I
I	D 12	33.59	:	79.8	1.1	4.7	5.8	74.0	I
I	orig. rock extract		:						I
I			:						I
I	C 7261	33.59	:	92.1	17.5	30.0	47.5	44.6	I
I	expelled pyr. fluid		:						I
I			:						I

The concentrations of expelled pyrolysate relate to the whole expelled pyrolysate fluid (C15+ fraction of free oil plus the portion collected by rinsing the autoclave with solvent).

Table A.I.7

COMPOSITION OF MATERIAL EXTRACTED / EXPELLED FROM THE ROCK

I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	: Sat	Aro	HC	SAT	Non HC	HC	I
I			:	---	---	---	---	---	I
I		(m)	:	EOM*	EOM*	EOM*	Aro	EOM*	I
I			:	%	%	%	x 100	%	I
I			:						I
I	D 12	33.59	:	1.4	5.8	7.2	24.0	92.8	I
I	orig. rock extract		:						I
I			:						I
I	C 7261	33.59	:	19.0	32.6	51.7	58.2	48.3	I
I	expelled pyr. fluid		:						I
I			:						I

* EOM = EOM or Expelled pyrolysate

Table A.I.8

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I	IKU No.	:	-----	A = -----	B = -----	-----	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I		:								I
I	D 12 33.59	:	0.7	3.6	5.8	0.6	0.7	1.7	1.8	I
I	orig. rock extr.	:								I
I		:								I
I	C 7261 33.59	:	1.8	1.2	0.7	1.6	1.7	1.2	1.2	I
I	expelled	:								I
I	pyrolysate fluid	:								I
I		:								I

DATE : 11 - 3 - 88.

Table A.I.9a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7230/05-U-02, 33.59 m,
 Rock extract and expelled hydrous pyrolysate fluid

IKU no.	Depth (m)	$\alpha\beta/\alpha\beta+\beta\alpha$ ¹⁾	%22S ²⁾	% $\beta\beta$ ³⁾	%20S ⁴⁾
D-0012	33.59	0.76	34.5	69.7	15.1
D-0012 exp. pyr.		0.69	38.9	74.5	32.0

1) E/(E+F) in m/z 191.

2) Average % distribution between first and second eluting isomers of extended hopanes.

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217.

4) $q/(q+t)$ in m/z 217.

Table A.I.9b

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7230/05-U-02, 33.59 m,
Rock extract and expelled hydrous pyrolysate fluid

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-0012	33.59	0.07	7.44		0.07	0.56
D-0012 exp. pyr.		0.23				0.92

1) Relative abundance of tricyclic terpanes (Q/E in m/z 191).

2) B/A in m/z 191.

3) Relative abundance of unknown (X/E in m/z 191).

4) Relative abundance of bisnorhopane (Z/E in m/z 191).

5) Relative abundance of C₂₇ rearranged steranes (a/(a+j) in m/z 217).

Table A.I.10:

Core 7230/05-U-01, 33.59 m

Expelled hydrous pyrolysate fluid

Molecular ratios from aromatic sterane mass chromatograms.

IKU no.	Depth (m)	$\%C_{20}$ ¹⁾	$\%C_{20}$ ²⁾	$\%C_{21}$ ³⁾	$\%C_{27tri}$ ⁴⁾	$\%C_{28tri}$ ⁵⁾
		$\frac{C_{20}+C_{27}}{C_{20}+C_{27}}$	$\frac{C_{20}+C_{28}}{C_{20}+C_{28}}$	$\frac{C_{21}+C_{28}}{C_{21}+C_{28}}$	$\frac{C_{27tri}+C_{28mono}}{C_{27tri}+C_{28mono}}$	$\frac{C_{28tri}+C_{29mono}}{C_{28tri}+C_{29mono}}$
C 7261	exp. pyr.	88.7	96.6	45.0	24	13

¹⁾ M/(M+P) in m/z 231 (triaromatic side chain cracking)

²⁾ M/(M+S) in m/z 231 (triaromatic side chain cracking)

³⁾ a/(a+h) in m/z 253 (monoaromatic side chain cracking)

⁴⁾ P/(P+h) in m/z 231 and m/z 253

⁵⁾ S/[S+m+k*S/(S+R)] in m/z 231 and m/z 253

The aromatisation ratios (4 and 5) are only approximate as the data were acquired by selective ion monitoring and based on an external calibration of the relative responses of m/z 231 and m/z 253.

Table A.I.11

Core number: 7230/05-U-02
Reference number: 21.3427.23
(1/1)

VITRINITE REFLECTANCE DATA
(Hydrous Pyrolysis Samples)

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-012	-----	33.59	0.28 (30)	F	0.08	2-3
C-7261	-----	33.59	1.34 (17)	F	0.06	---
(Hy-Py)			1.62 (11)	R	0.05	
			1.90 (2)	R	0.07	

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked.

Figure A.I.1:

Whole oil gas chromatogram of expelled oil

Analysis 427C7261T

2,1,1

7230/05-U-02, HY-PY

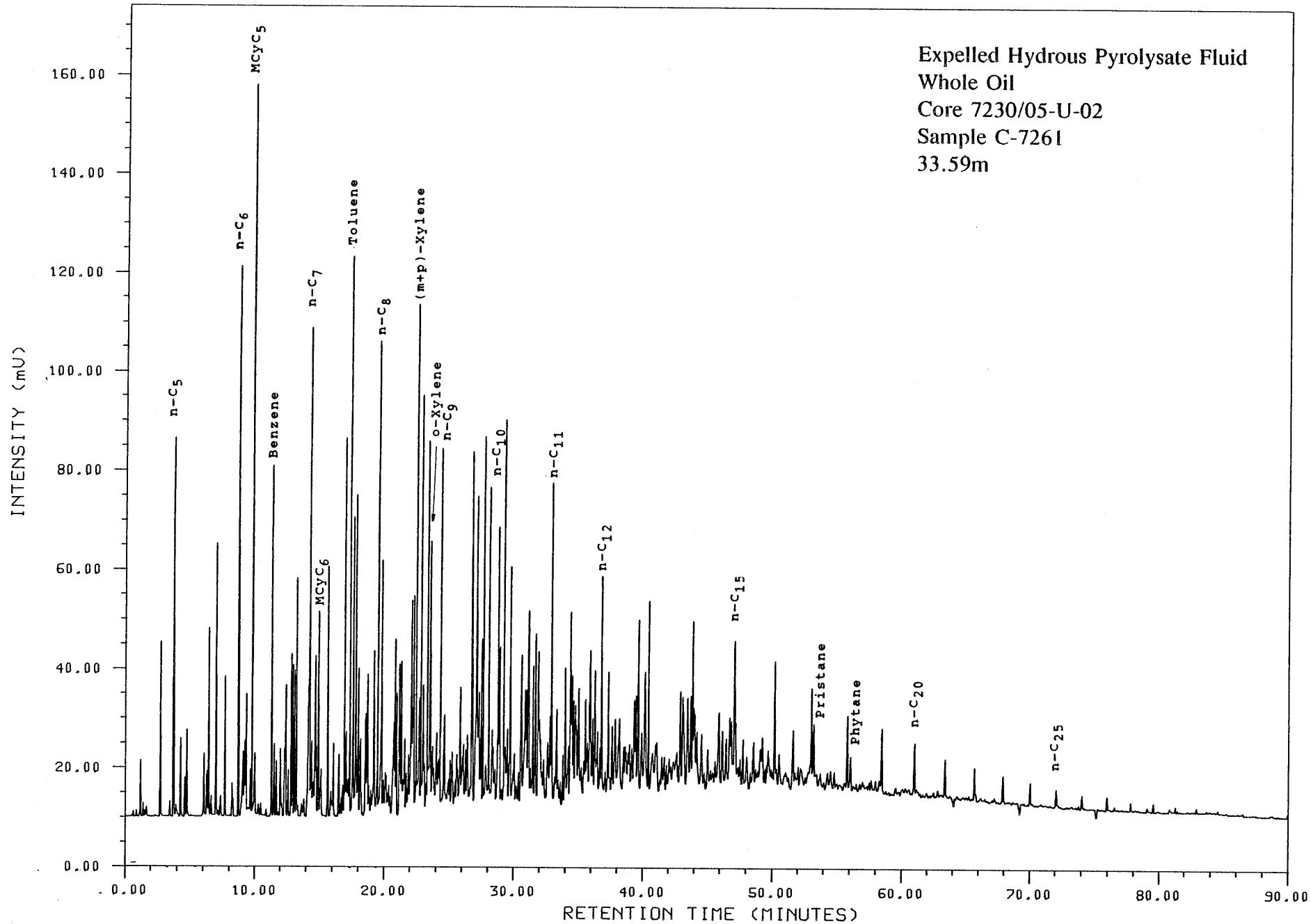
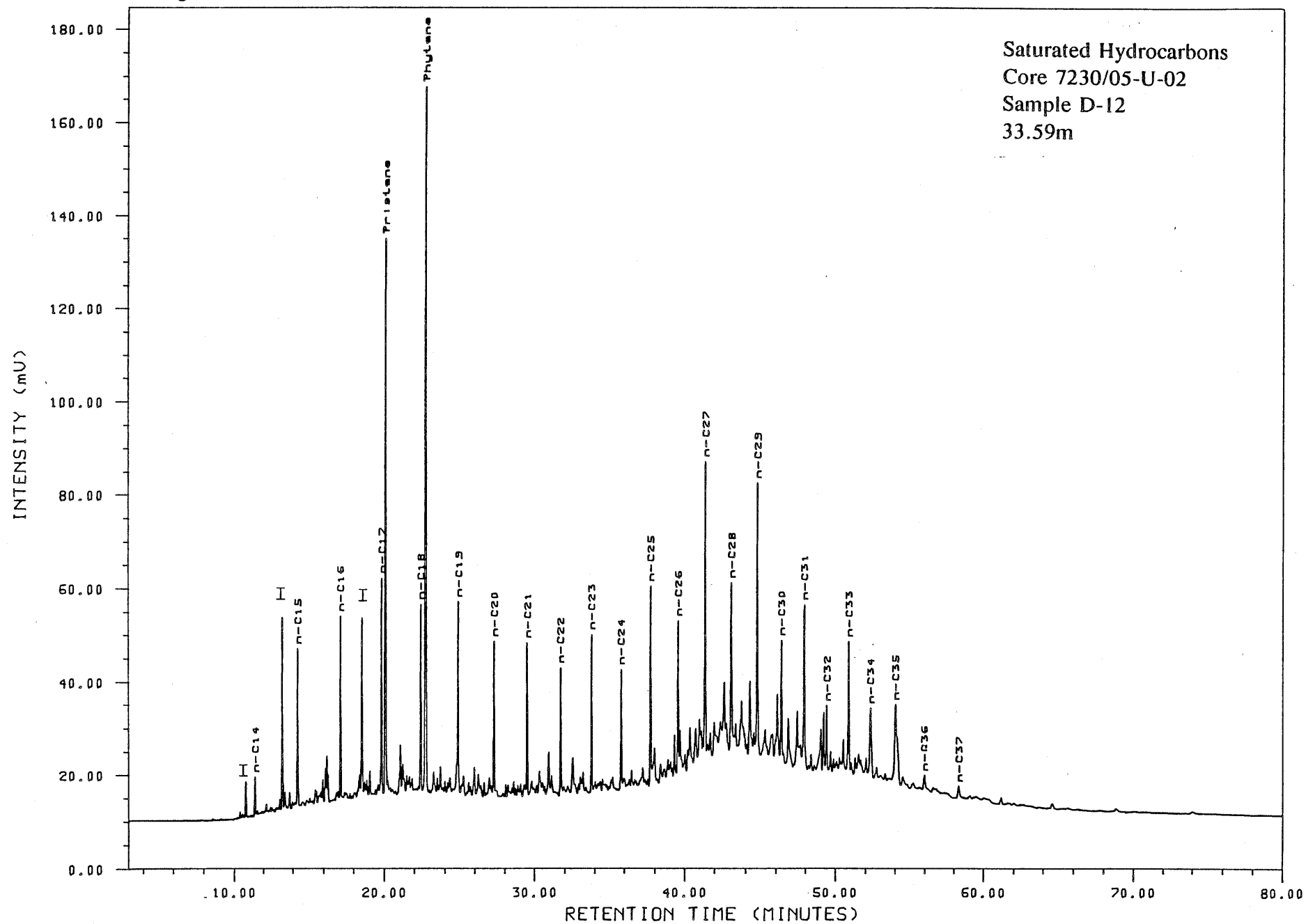


Figure A.I.2:

Saturated hydrocarbon gas chromatogram
of expelled pyrolysate fluid

I = acyclic isoprenoids

Analysis 427D0012S 3,1,1 7230/05-U-02



Analysis 427C7261S

3,1,1

7230/05-U-02,EXP.PYR

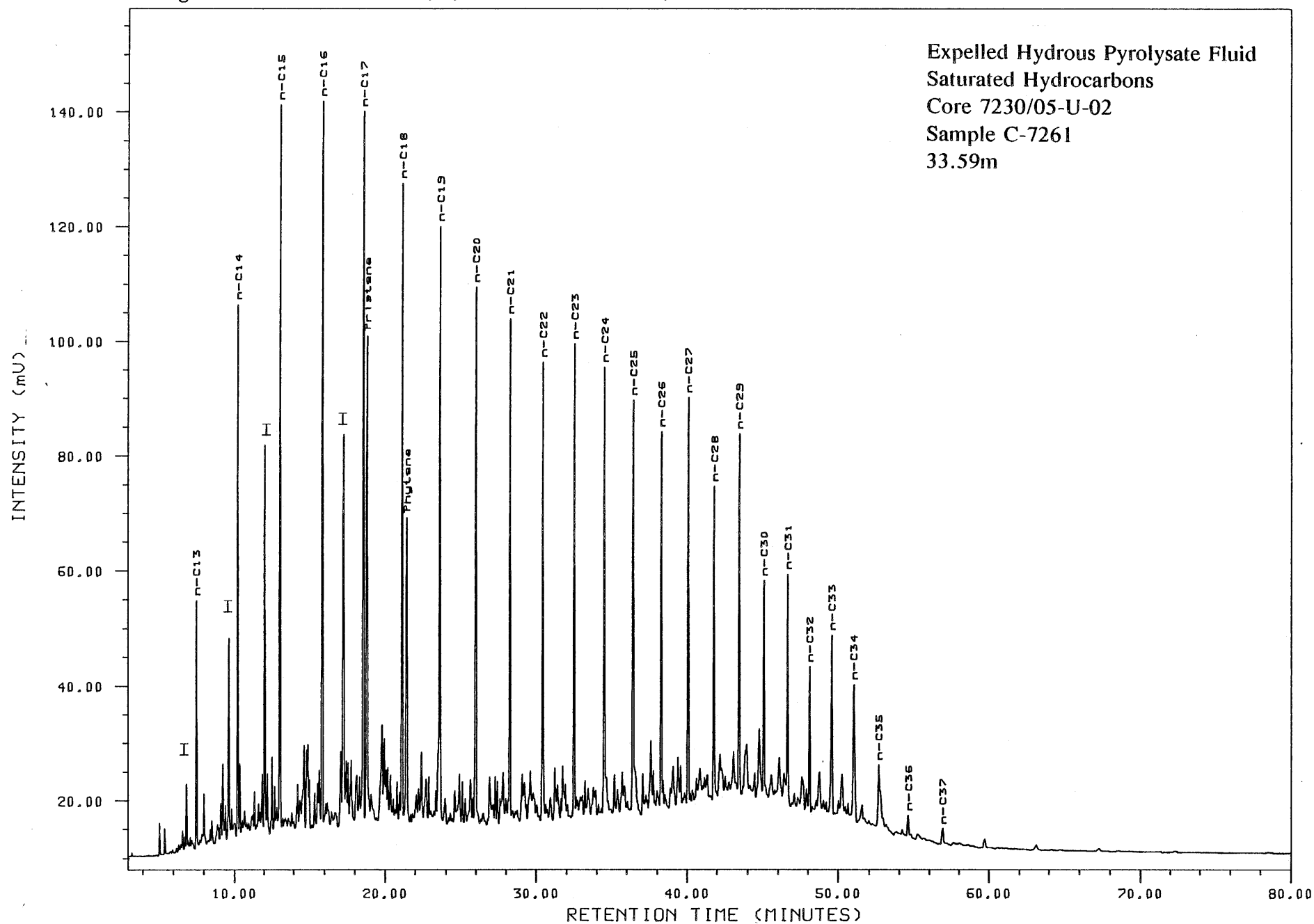


Figure A.I.3:

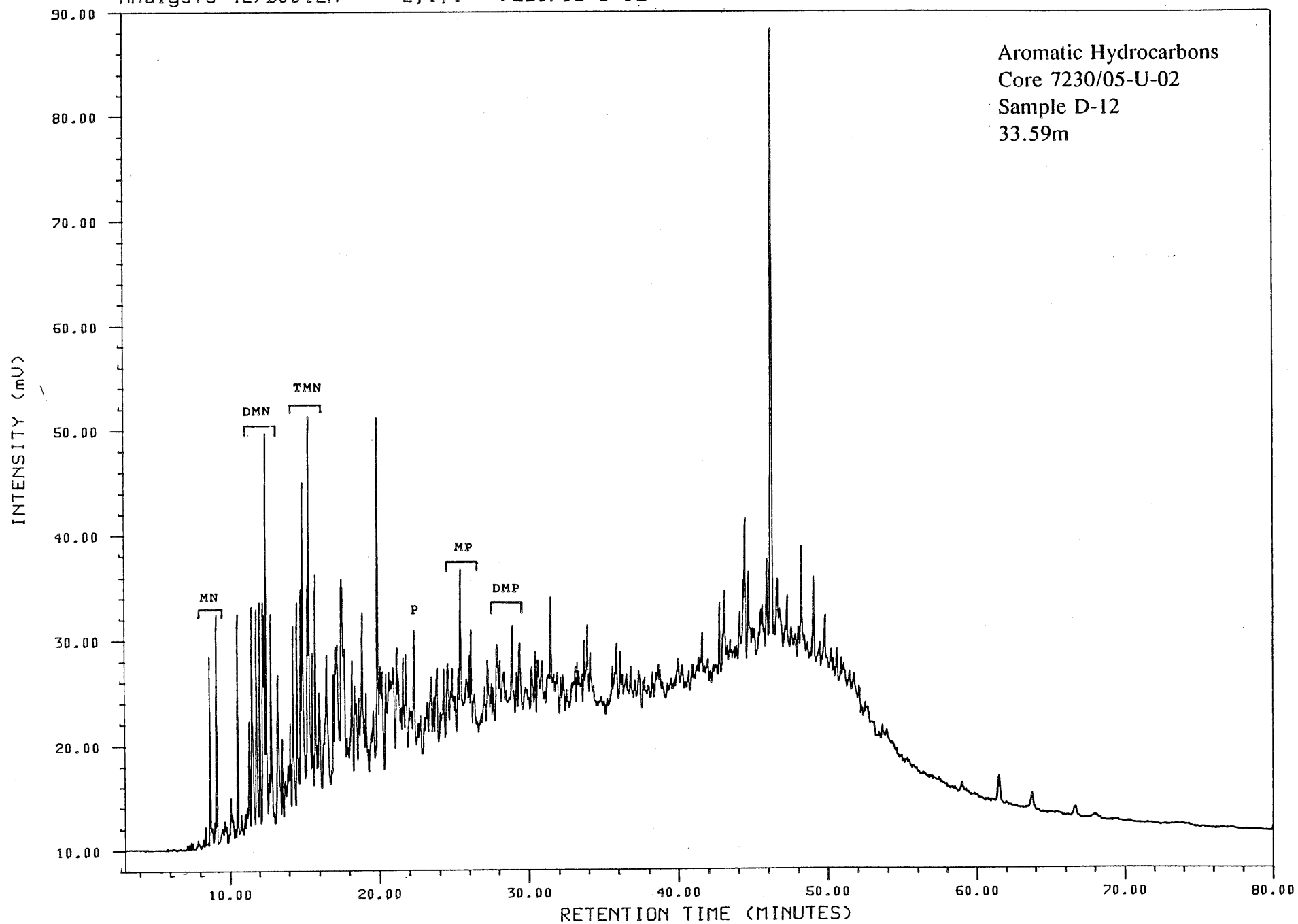
Aromatic hydrocarbon gas chromatogram of expelled pyrolysate fluid

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

Analysis 427D0012A

2,1,1

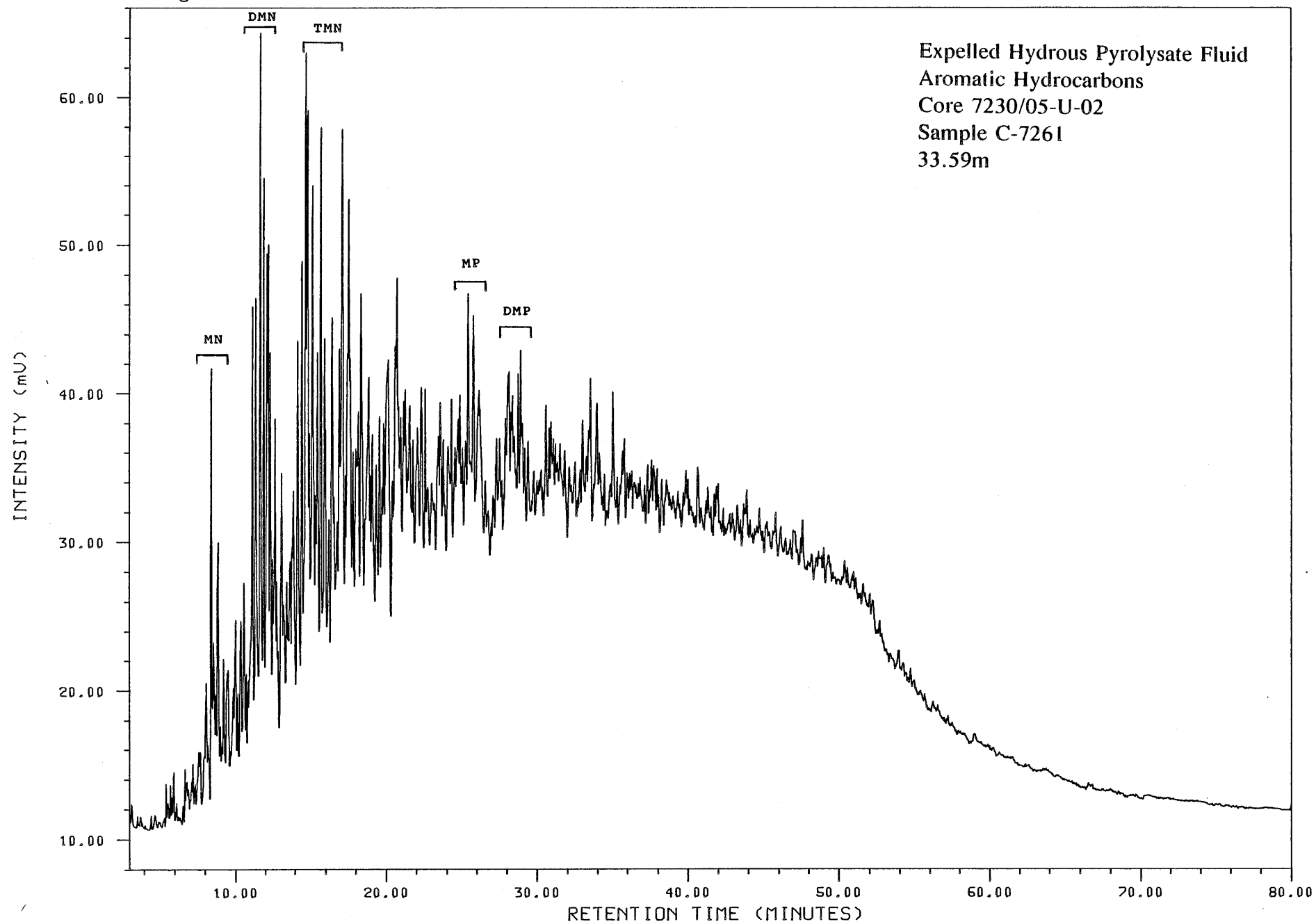
7230/05-U-02



Analysis 427C7261A

2,1,1

7230/05-U-02,EXP.PYR



Variation in distribution of n-alkane peaks before and after hydrous pyrolysis

Samples D-0012 (before) and C-7261 (after)

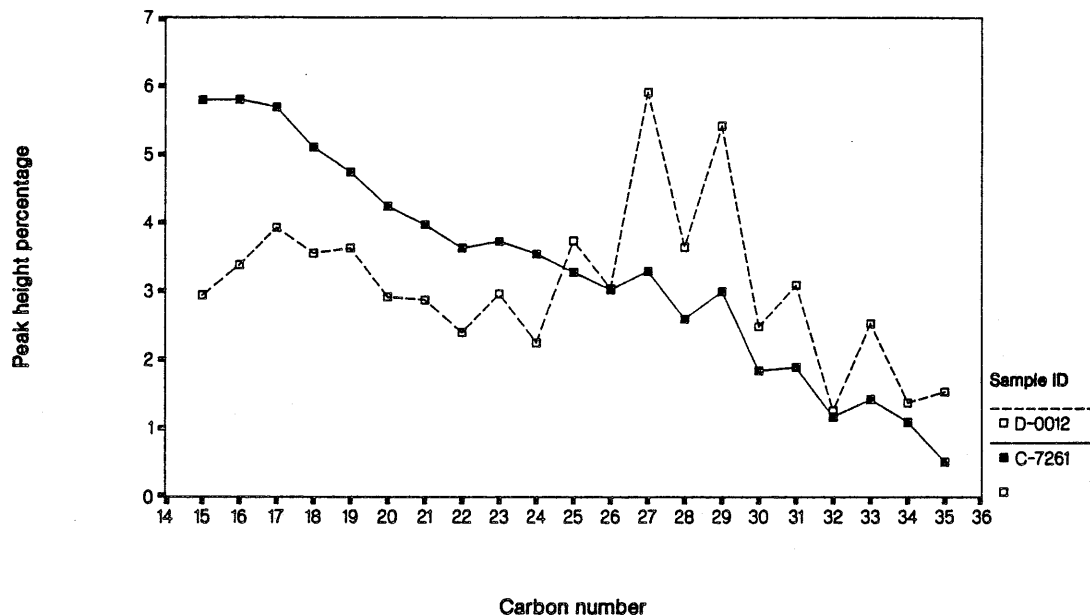


Figure A.I.4:

Variation in distribution of isoprenoid peaks before and after hydrous pyrolysis

Samples D-0012 (before) and C-7261 (after)

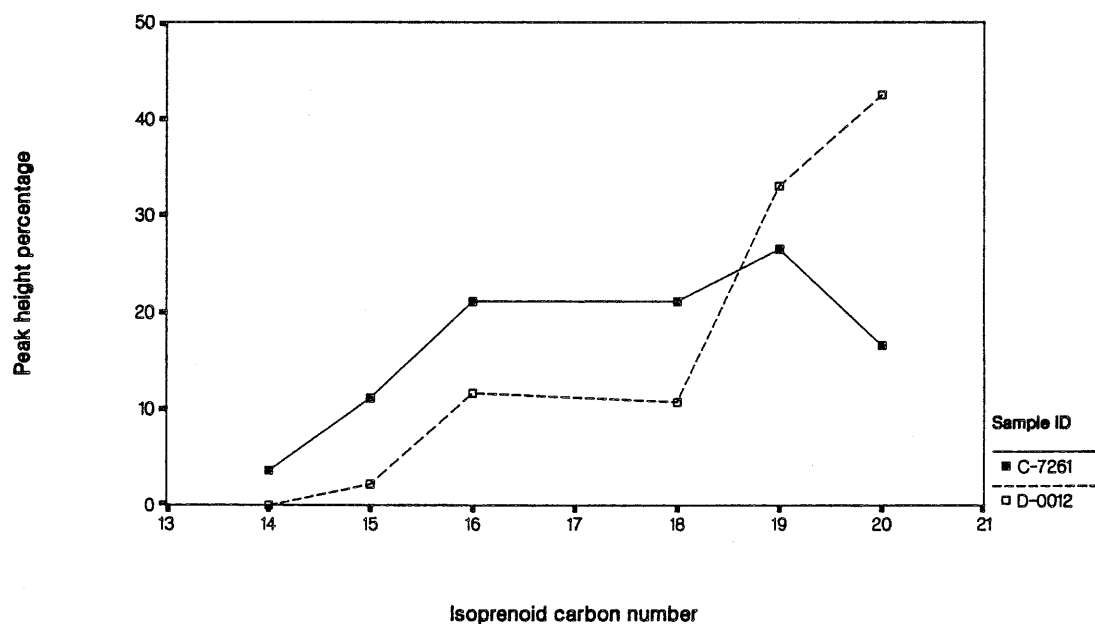
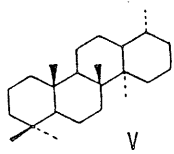
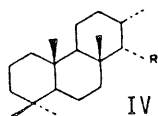
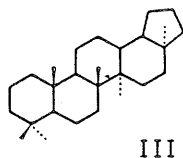
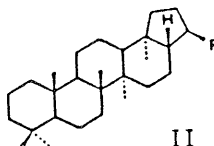
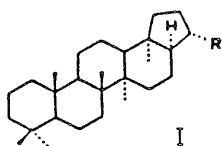


Figure A.I.5:

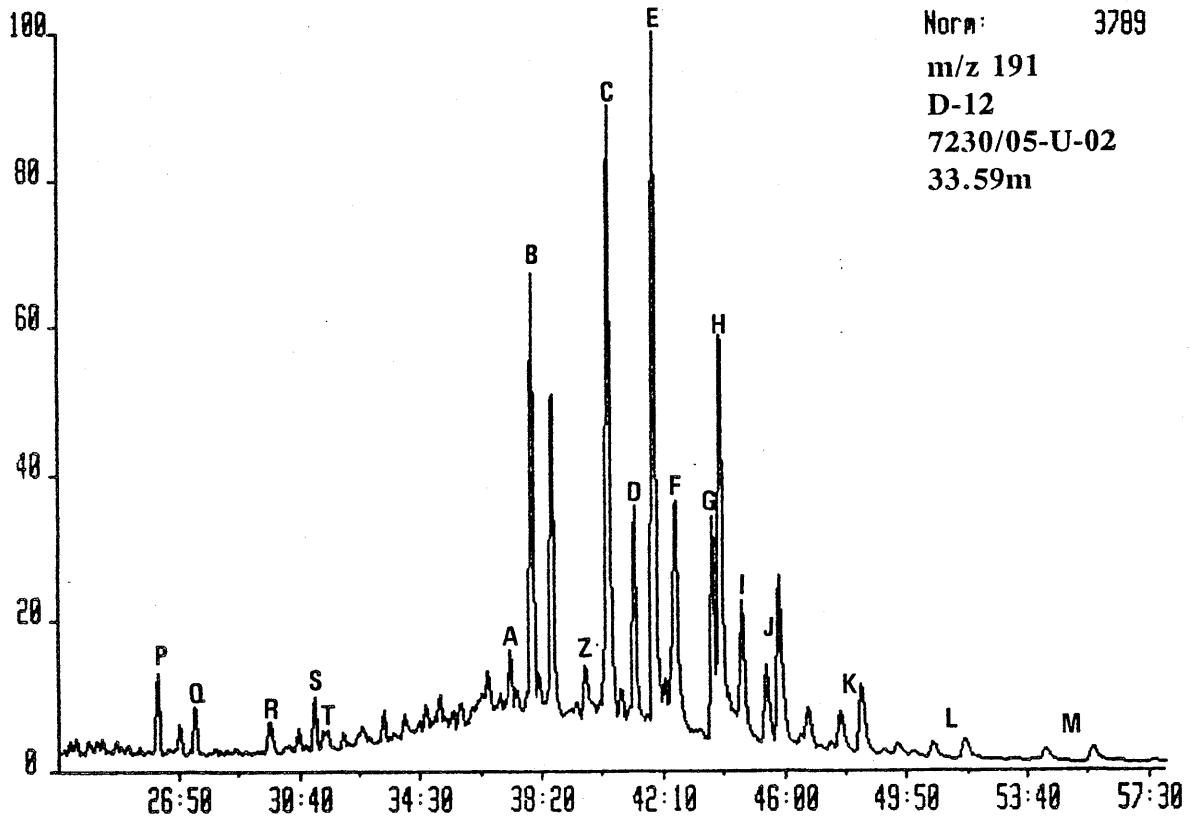
Figure A.I.6:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes)
for rock extract and expelled pyrolysate fluid

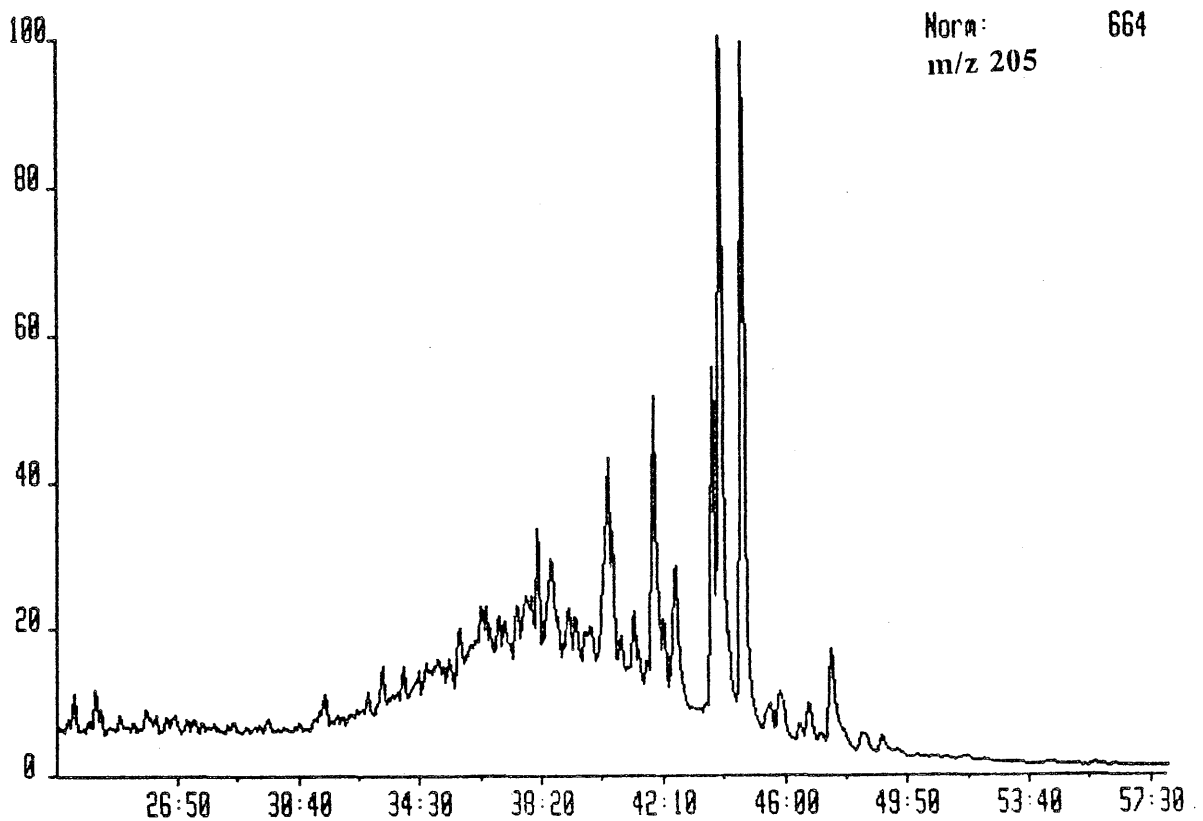
P	tricyclic terpene	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpene	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpene (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpene	$C_{24}H_{42}$	(V)
T	tricyclic terpene (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trishomohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trishomohopane	$C_{27}H_{46}$	(I, R=H)
Z	bishomohopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpene	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpene (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



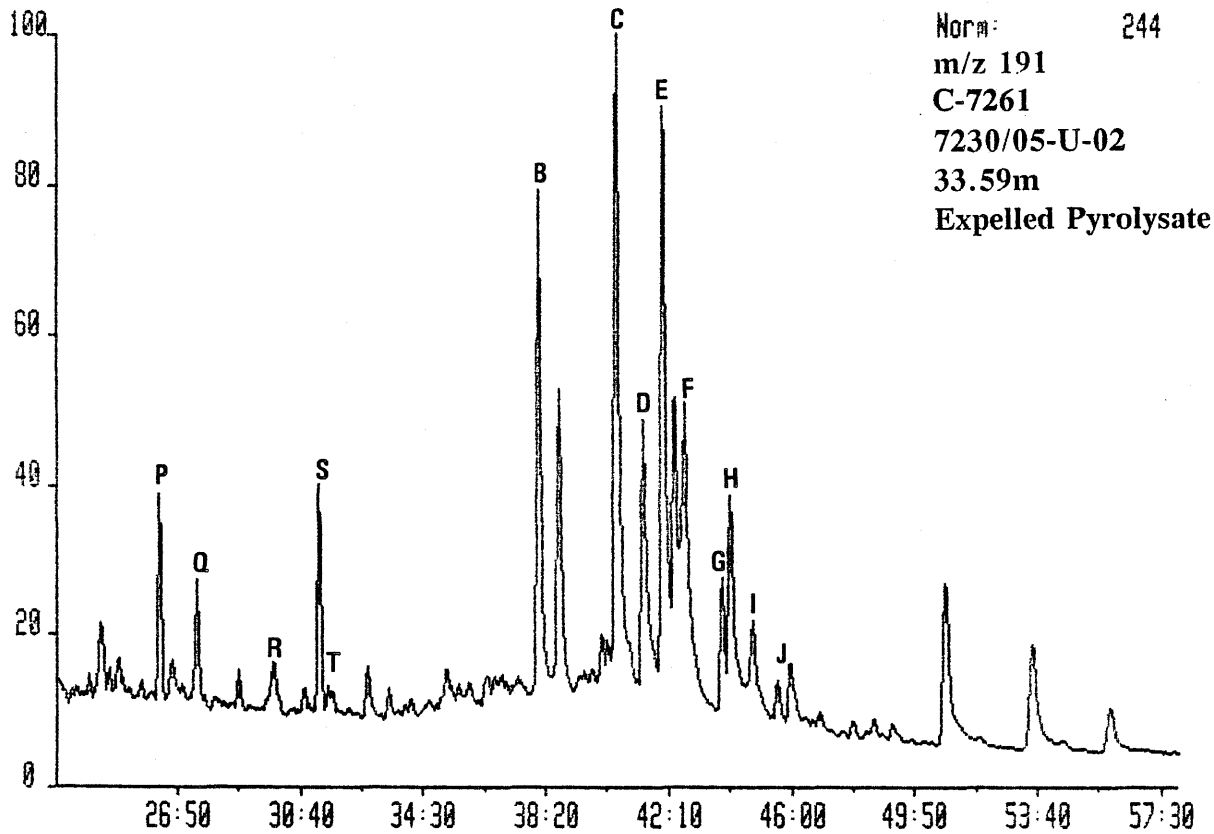
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



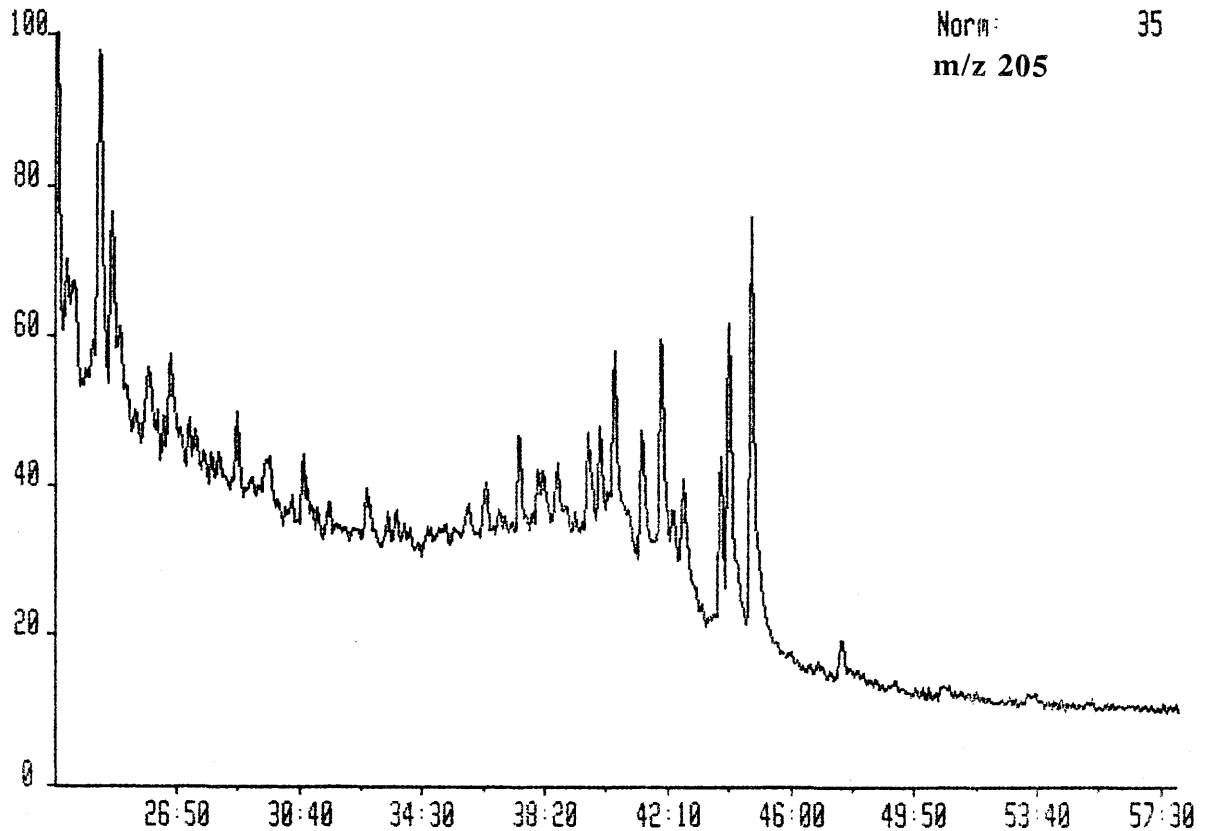
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



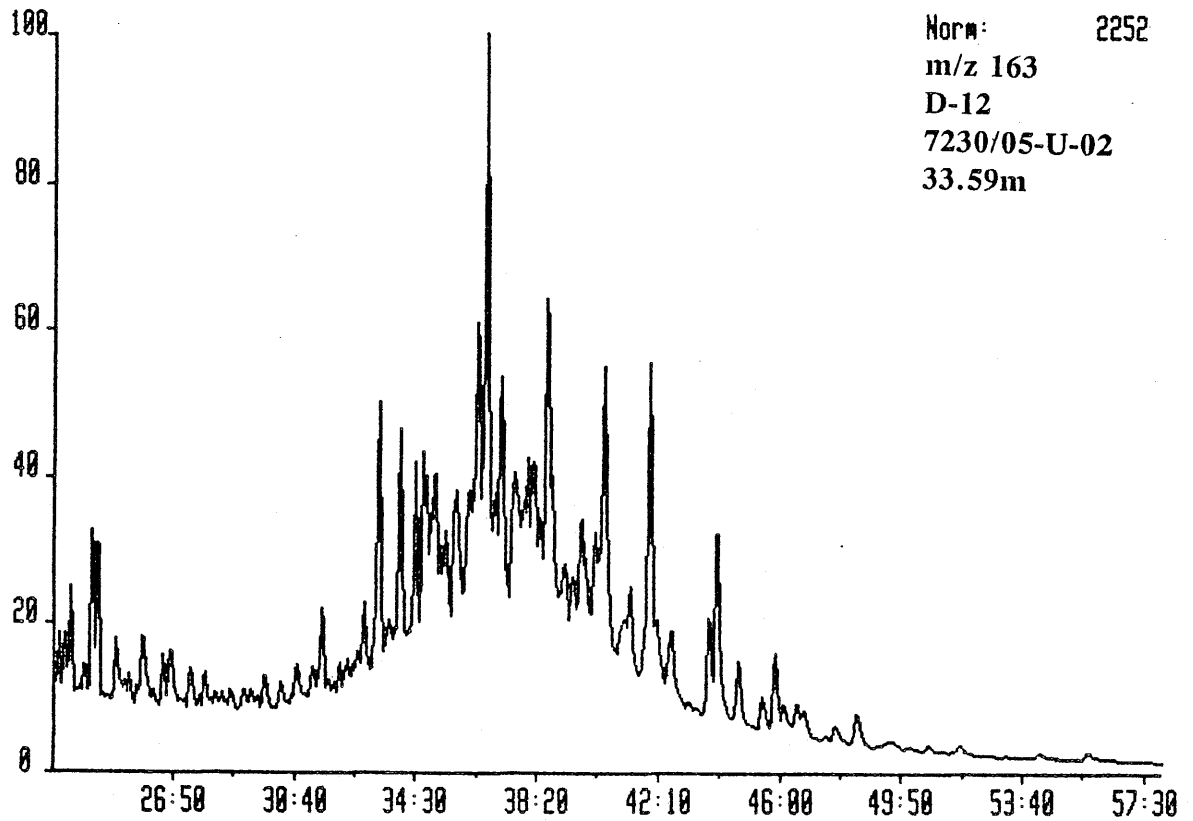
D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



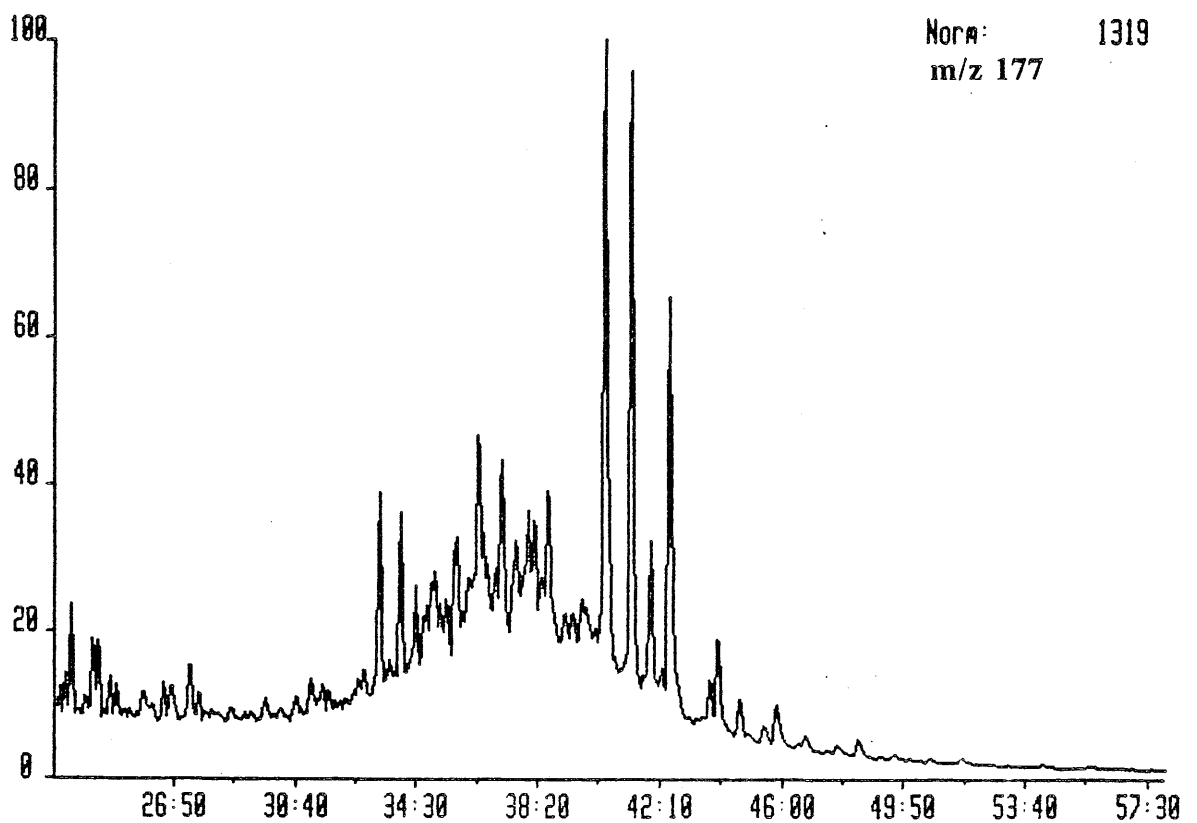
D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



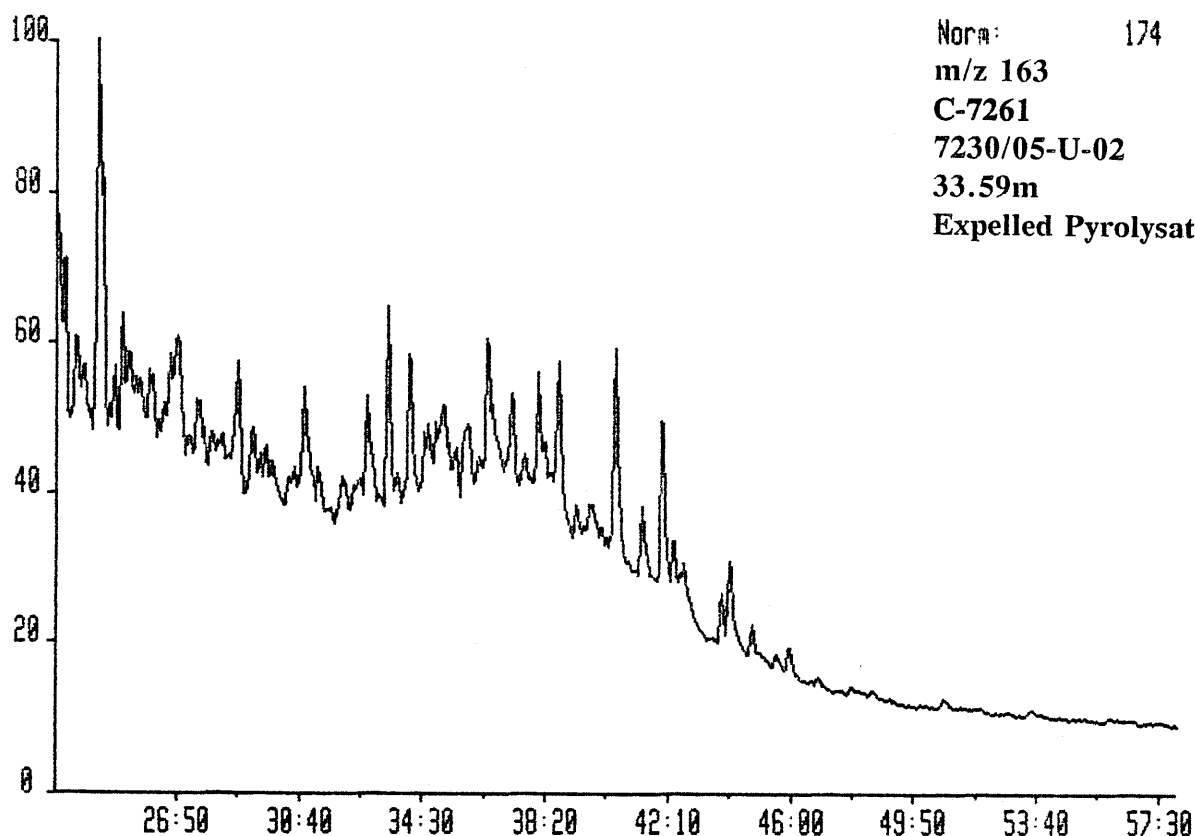
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

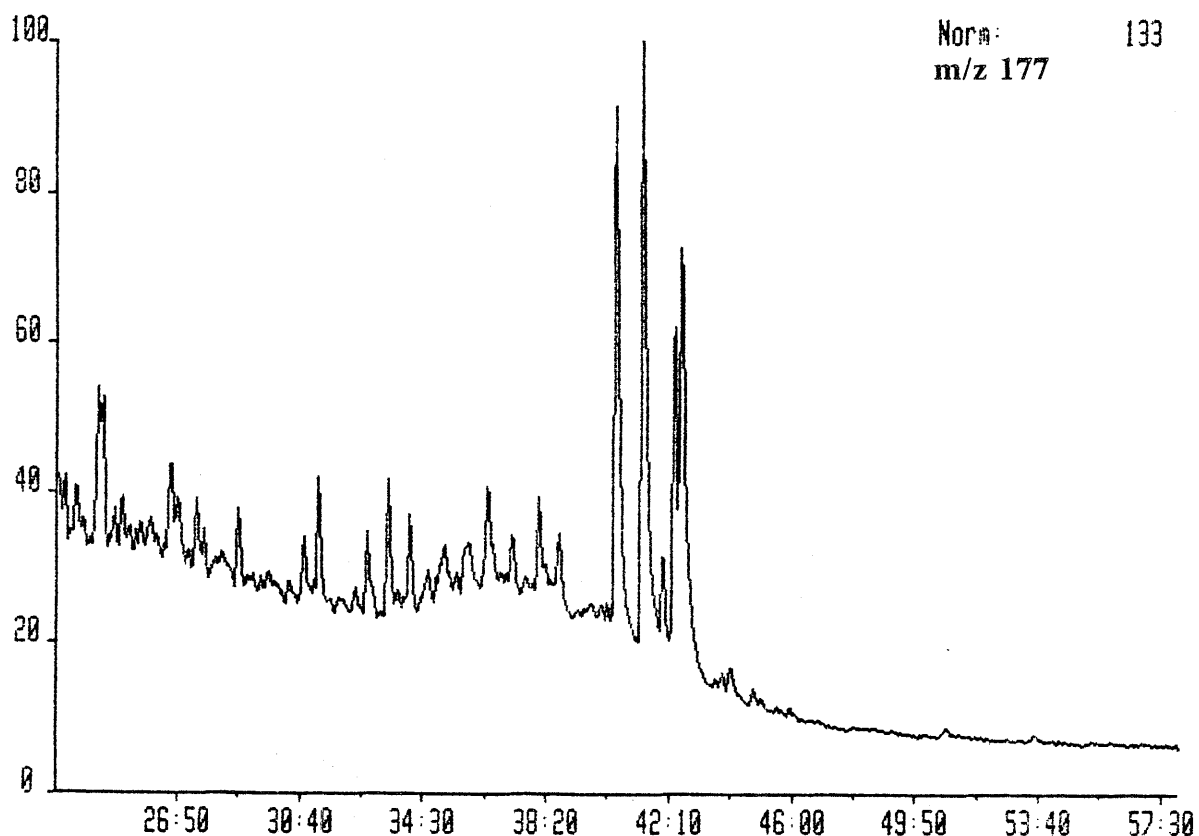
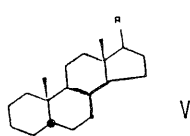
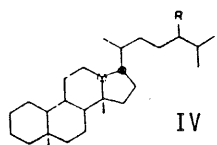
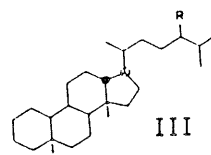
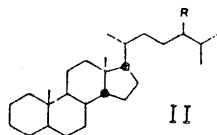
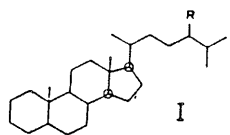


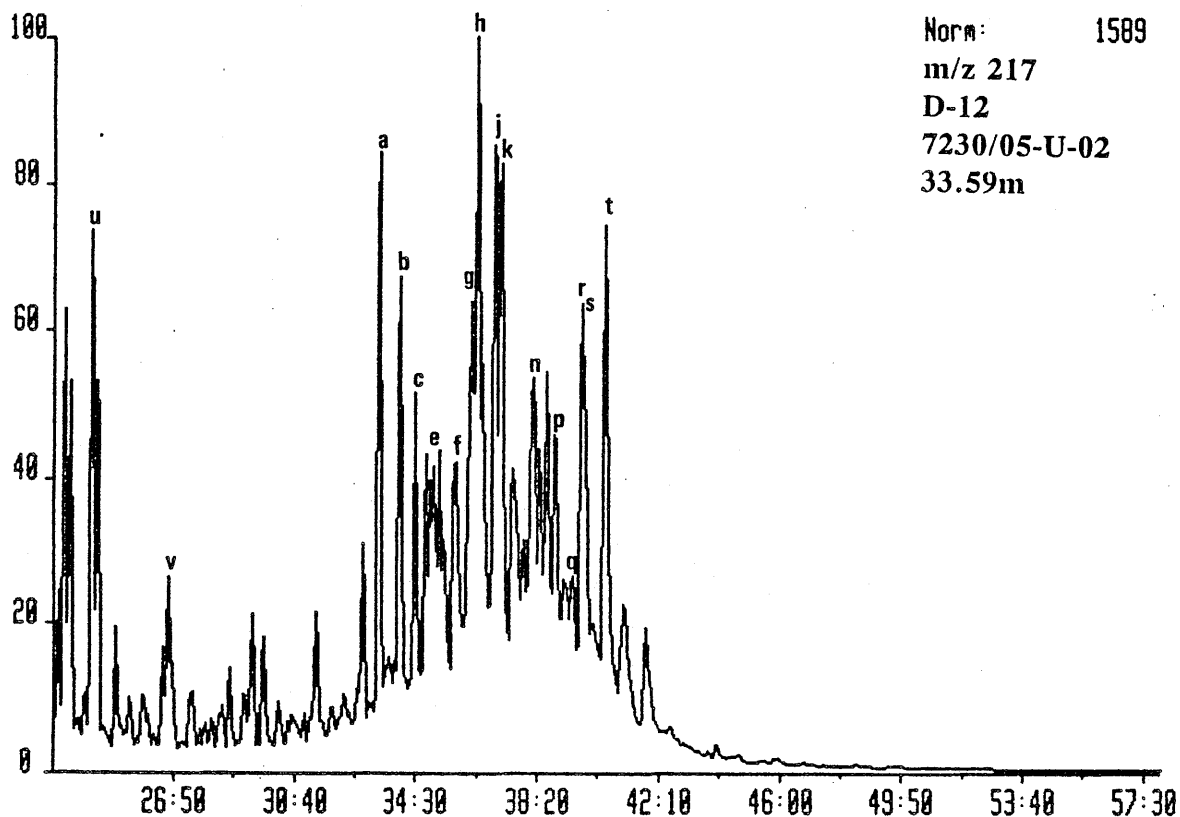
Figure A.I.7:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)
for rock extract and expelled pyrolysate fluid

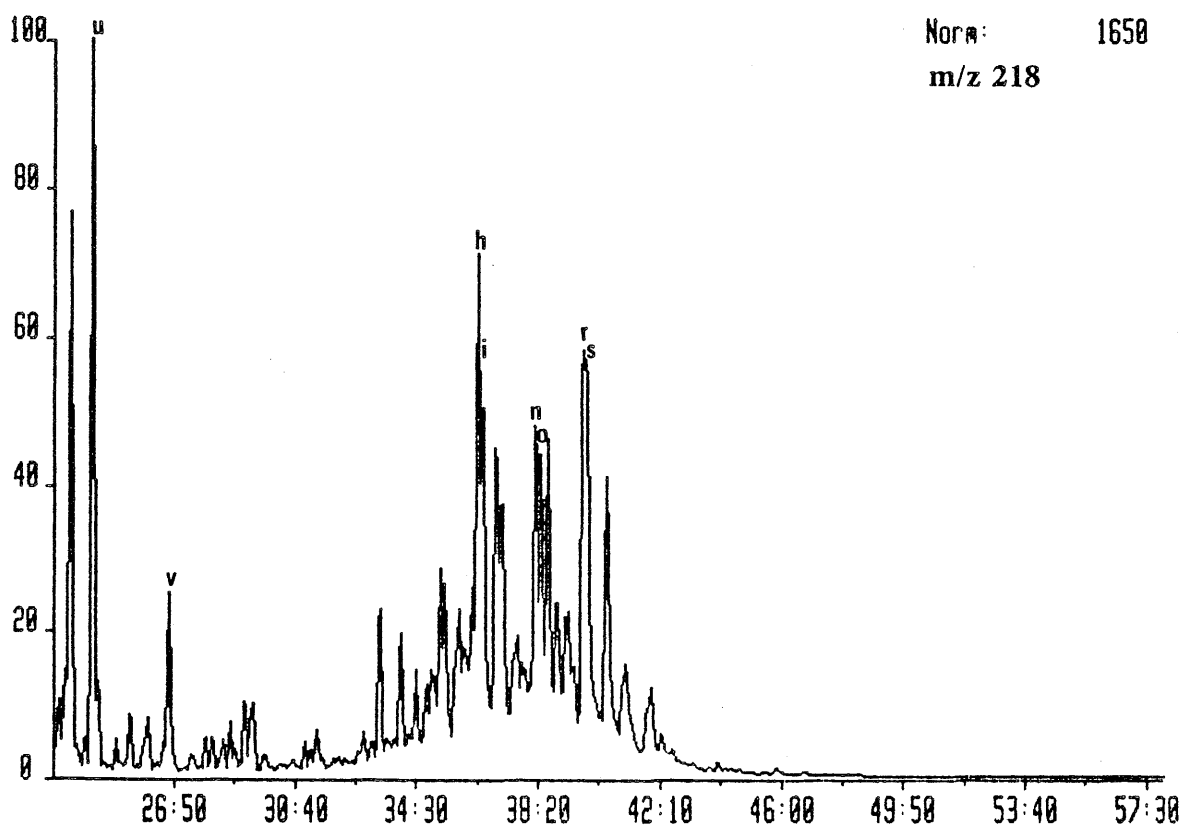
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)



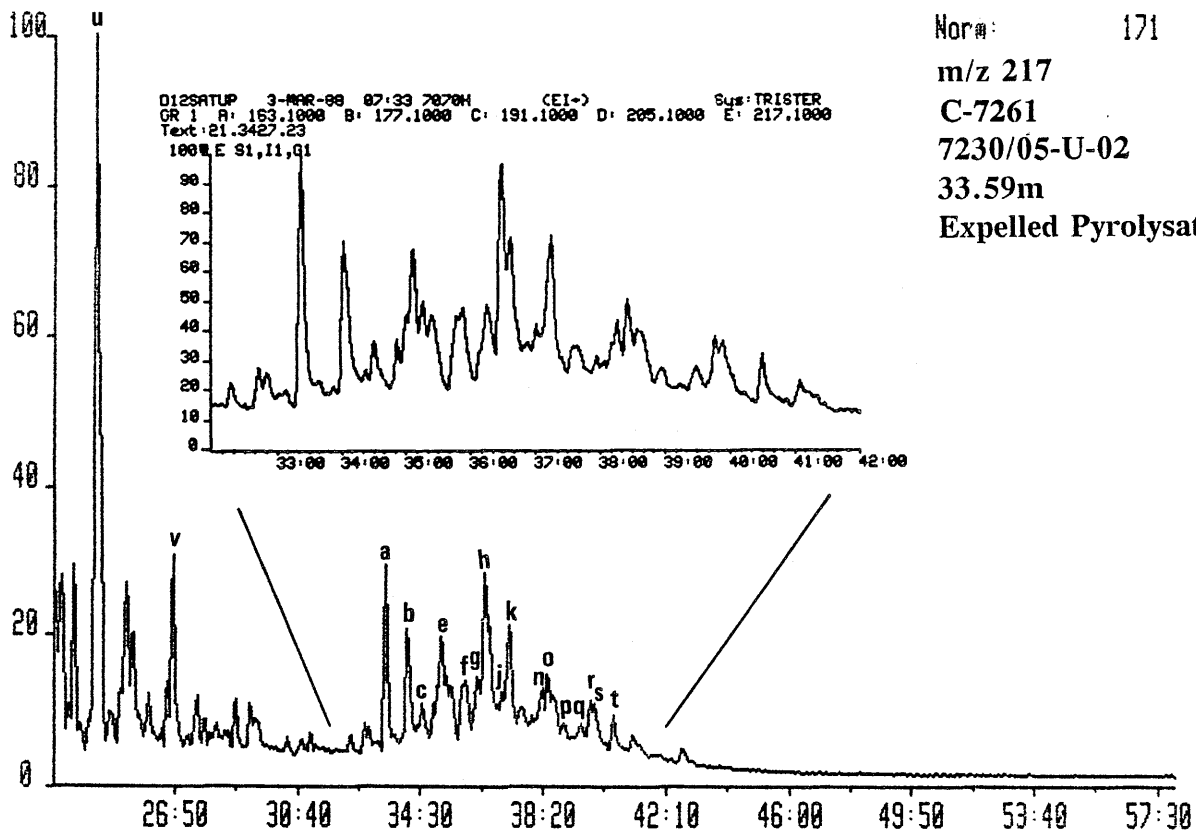
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23

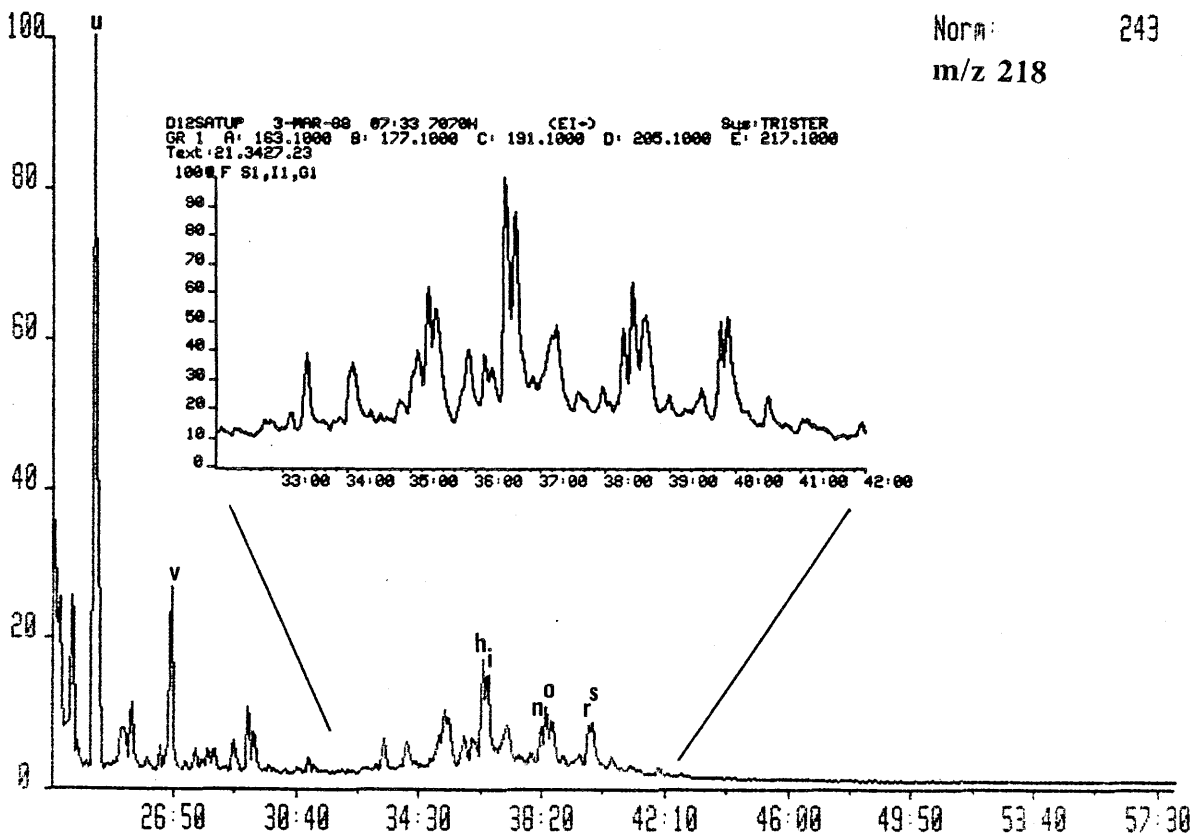


D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



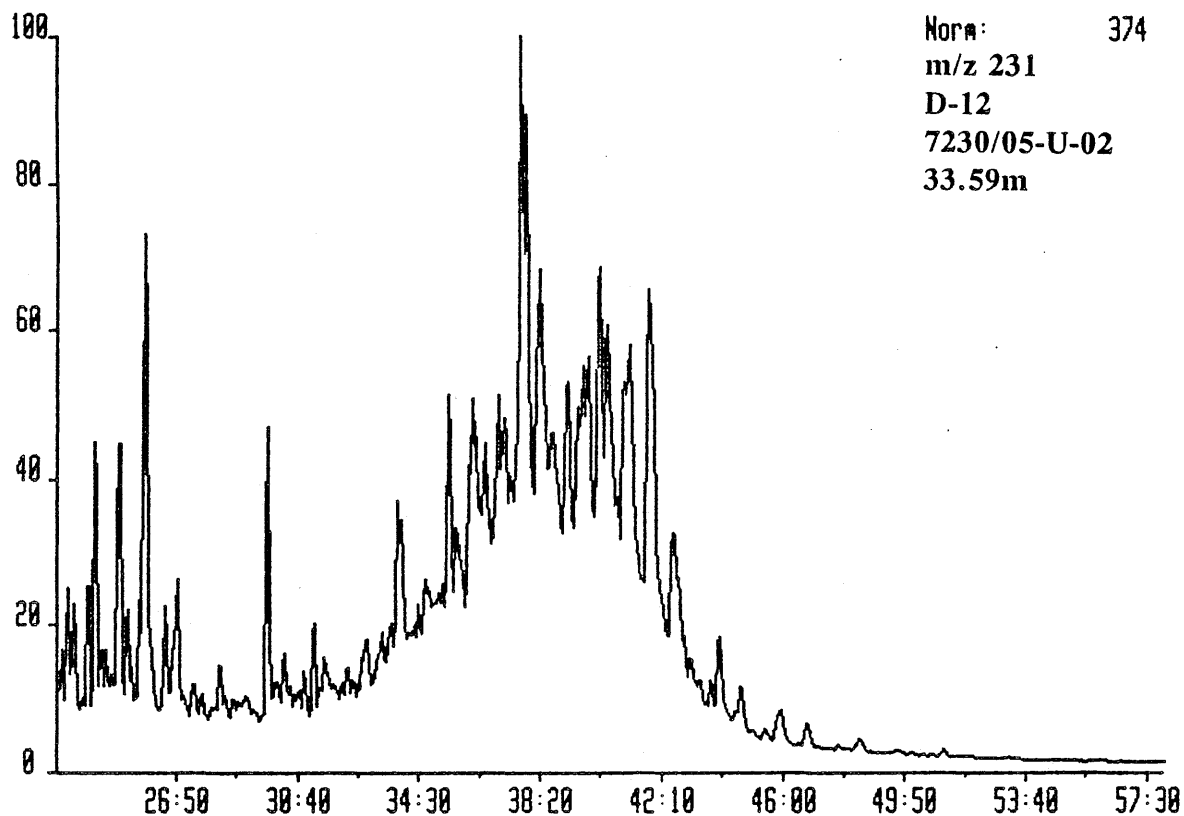
Norm: 171
m/z 217
C-7261
7230/05-U-02
33.59m
Expelled Pyrolysate

D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23

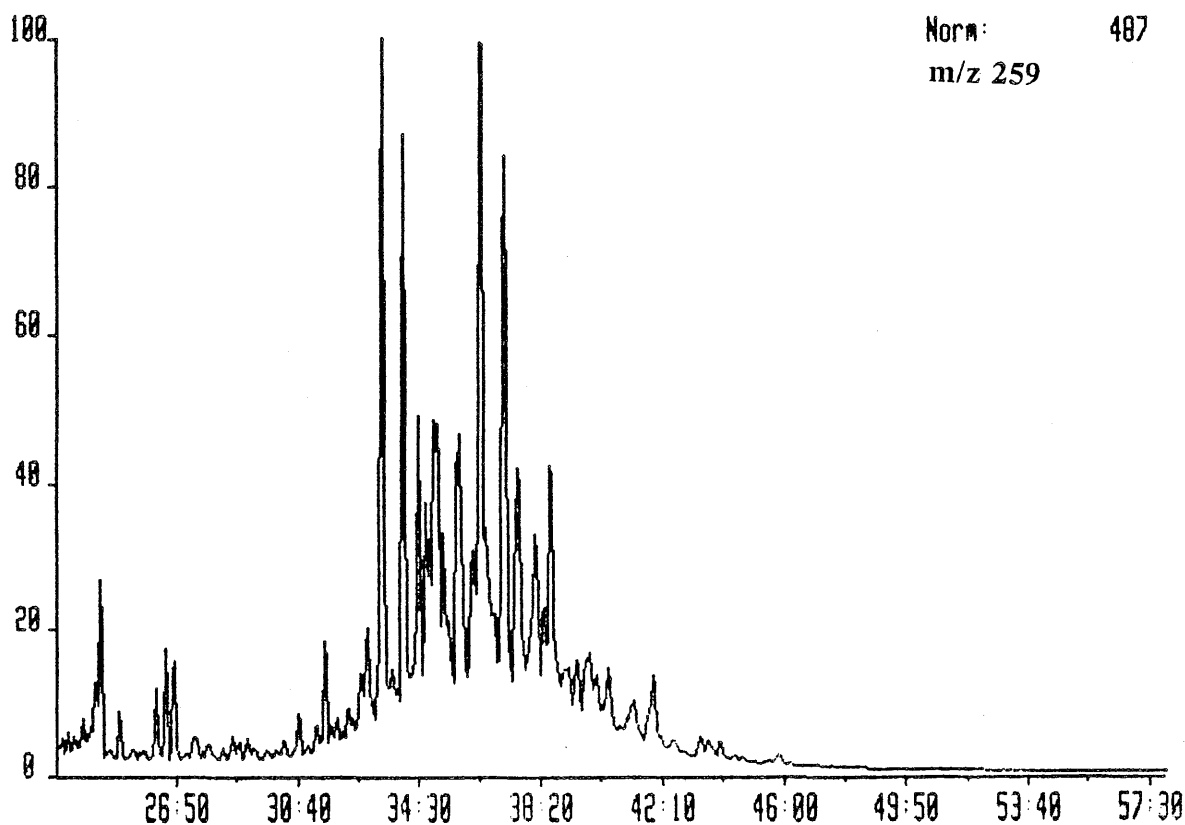


Norm: 243
m/z 218

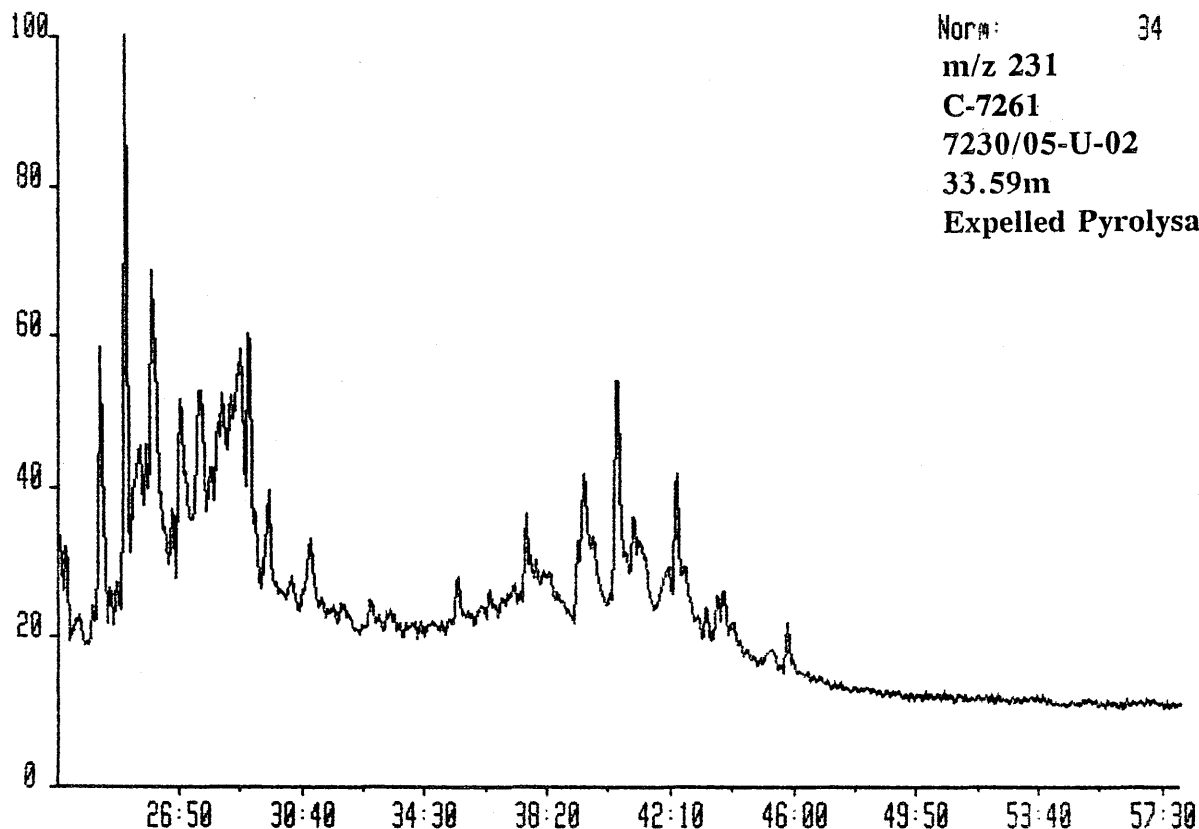
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D12SATUP 3-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

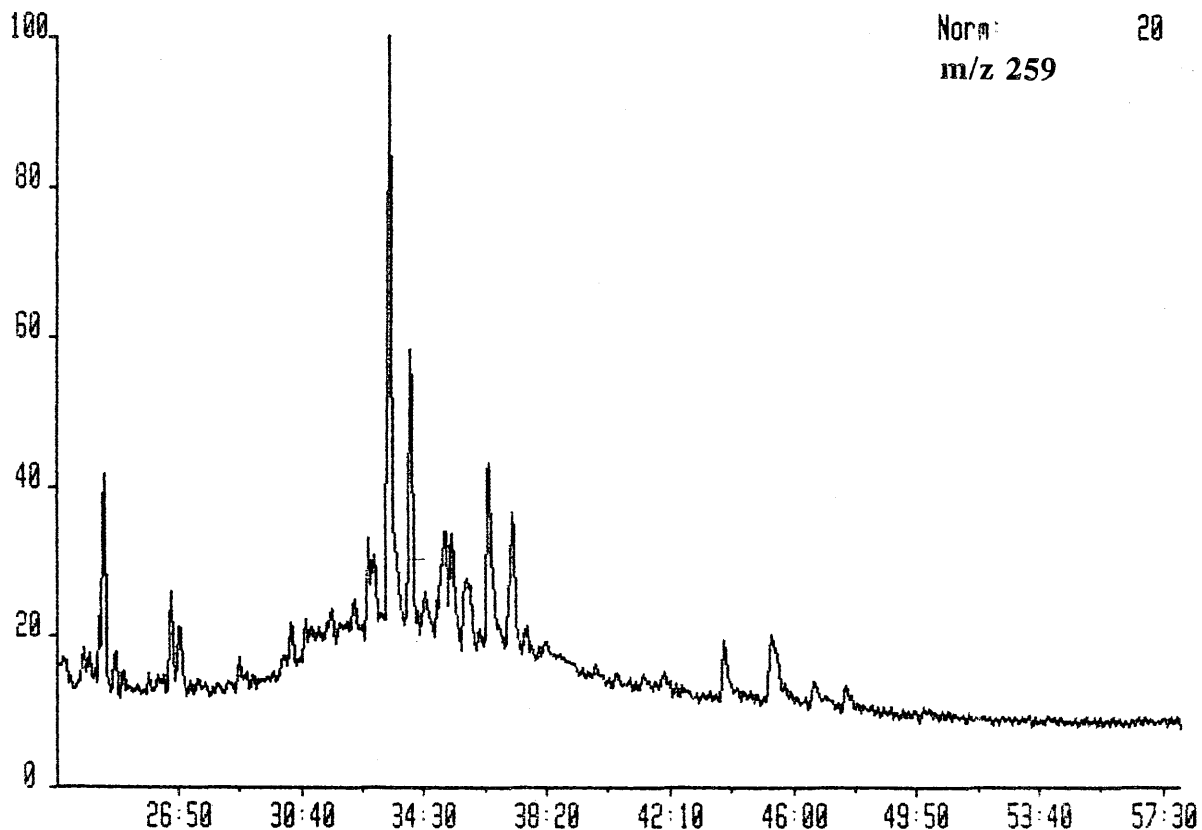


Figure A.I.8:

Mass fragmentograms of m/z 231, 239, 253 (aromatic steranes)
 for expelled pyrolysate fluid

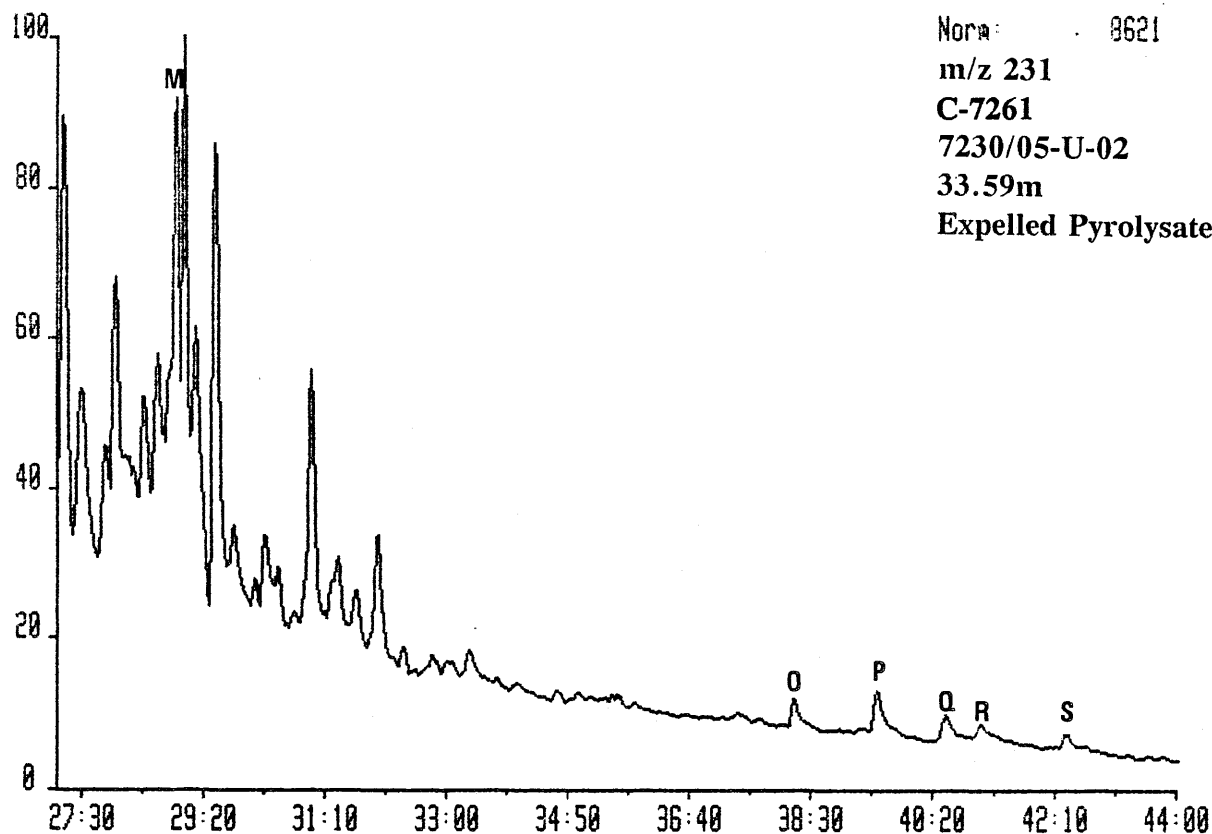
m/z 231

M	C ₂₀ triaromatic sterane
N	C ₂₁ triaromatic sterane
O	C ₂₆ triaromatic sterane
P	C ₂₆ + C ₂₇ triaromatic sterane
Q	C ₂₈ triaromatic sterane
R	C ₂₇ triaromatic sterane
S	C ₂₈ triaromatic sterane

m/z 253

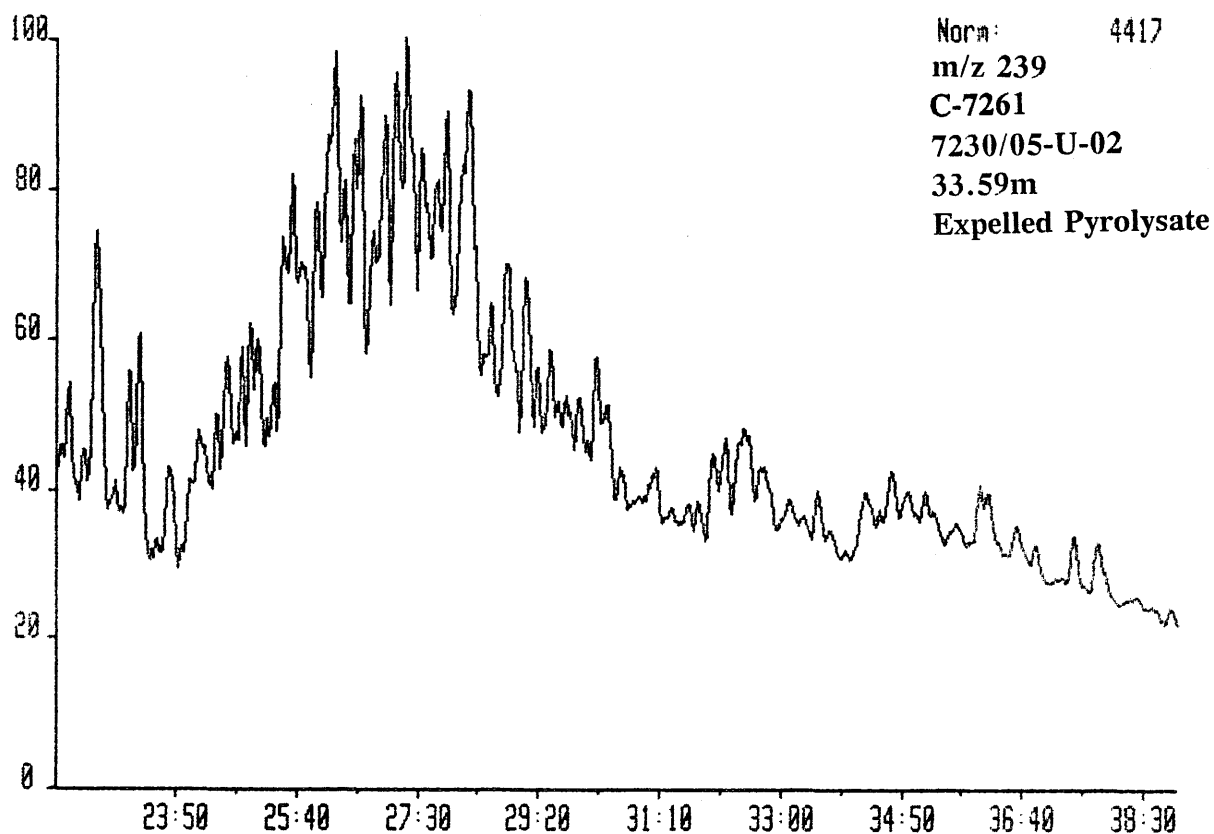
a	C ₂₁ monoaromatic sterane
b	C ₂₂ monoaromatic sterane
c	unidentified
d	C ₂₇ monoaromatic sterane
e	C ₂₇ monoaromatic sterane
f	C ₂₈ monoaromatic sterane
g	C ₂₇ monoaromatic sterane
h	C ₂₈ +C ₂₉ monoaromatic sterane
i	C ₂₉ monoaromatic sterane
j	C ₂₉ monoaromatic sterane
k	unidentified
l	unidentified

D12AR0UP 3-MAR-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:



Norm: 8621
m/z 231
C-7261
7230/05-U-02
33.59m
Expelled Pyrolysate

D12AR0UP 3-MAR-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 239.1000
Text:



D12AR0UP 3-MAR-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 253.1000
Text:

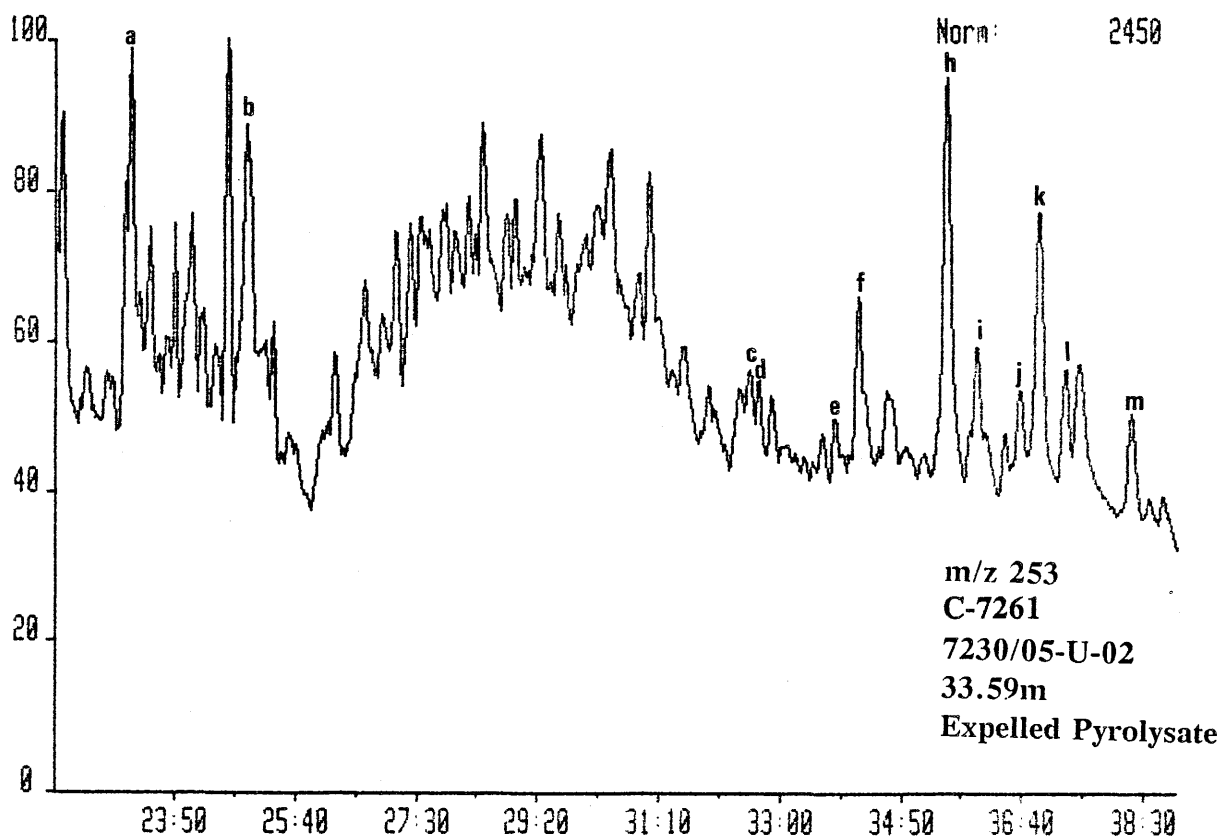


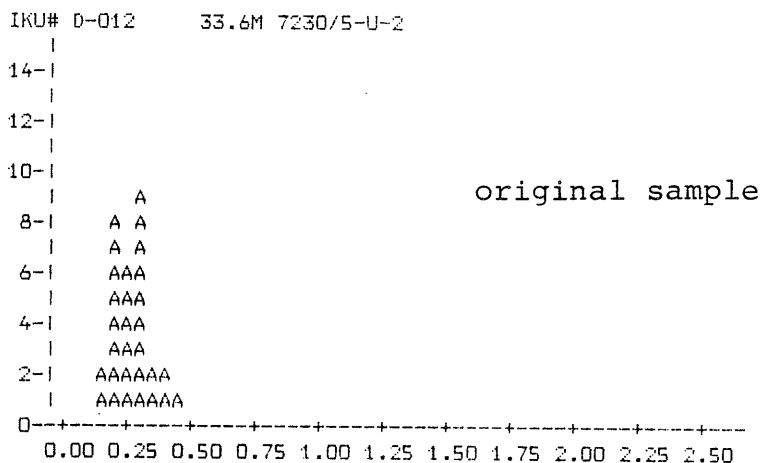
Figure A.I.9: Vitrinite reflectance histograms.

Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the
	main population. Lower case letters
	represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

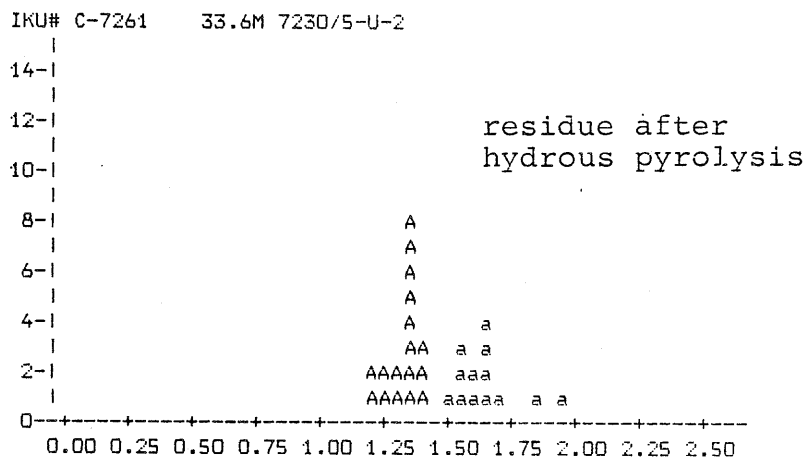
A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X



PP LOW HIGH LIT #VAL MEAN STDV
Y 0.18 0.48 ALL 30 0.28 0.08
OVERALL 30 0.28 0.08

ORDERED VALUES FOLLOW:

0.18A 0.19A 0.20A 0.20A 0.20A 0.21A 0.21A 0.22A 0.22A 0.24A 0.25A
0.25A 0.26A 0.26A 0.27A 0.26A 0.30A 0.30A 0.30A 0.31A 0.31A 0.32A
0.32A 0.33A 0.34A 0.35A 0.35A 0.44A 0.44A 0.47A



PP LOW HIGH LIT #VAL MEAN STDV
Y 1.22 1.42 ALL 17 1.34 0.06
N 1.54 1.72 ALL 11 1.62 0.05
N 1.85 1.96 ALL 2 1.90 0.07
OVERALL 30 1.48 0.18

ORDERED VALUES FOLLOW:

1.22A 1.24A 1.27A 1.27A 1.30A 1.34A 1.35A 1.36A 1.36A 1.36A 1.37A
1.37A 1.39A 1.39A 1.40A 1.40A 1.41A 1.54a 1.55a 1.56a 1.59a 1.60a
1.61a 1.65a 1.65a 1.66a 1.67a 1.71a 1.85a 1.95a

APPENDIX II.1: TABLE OF CONTENTS

Core 7030/03-U-01

TABLES

Table A.II.1.1a:	Concentration of C_1-C_{5+} hydrocarbons in headspace gas.
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Table A.II.1.1c:	Concentration of C_1-C_{5+} hydrocarbons - summation.
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Table A.II.1.3:	Vitrinite reflectance data.
Table A.II.1.4:	Visual kerogen analysis.
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Table A.II.1.6:	Weight of EOM and chromatographic fractions.
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Table A.II.1.11a:	Molecular ratios from sterane and terpane mass fragmentograms. Maturity characteristic ratios.
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FIGURES

Figure A.II.1.1:	Saturated hydrocarbon gas chromatograms.
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Figure A.II.1.4:	Mass fragmentograms of m/z 217, 218, 231, 259 (steranes).
Figure A.II.1.5:	Mass fragmentograms of m/z 231, 239, 253 (aromatic steranes).
Figure A.II.1.6:	Vitrinite reflectance histograms.
Figure A.II.1.7:	Carbon isotope type curves of sediment extracts.

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

[illegible]

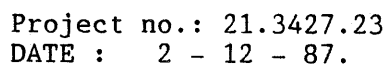


Table A.II.1.1a (continued)

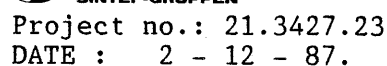
CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

[illegible]

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I									SUM	SUM	WET-	iC4	I	
I		IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I		no.	m									(%)	nC4	I
I														I
I	D	1830	166.48	10	2					12	2	17.02	*****	I
I	D	1845	172.30	15	0					15	0	2.14	*****	I



CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

[illegible]

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

[illegible]

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I									SUM	SUM	WET-	iC4	I	
I		IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	I	
I		no.	m									(%)	I	
I												nC4	I	
I	D	1830	166.48	276	36	20		8	20	340	64	18.75	0.00	I
I	D	1845	172.30	327	27	16		5	36	376	48	12.85	0.00	I
I														I

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

[illegible]

Table A.II.1.1.c (continued)

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS											SUMMATION	
IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4	
no.	m											
D 1693	98.79	198	12	7			20	217	19	8.73	*****	
D 1698	101.77	513	19	2		3		537	24	4.38	0.00	
D 1707	102.63	349	16	4	7		17	377	28	7.33	*****	
D 1720	110.81	152	9	1	4			166	14	8.32	*****	
D 1725	113.97	325	20	15		7		368	43	11.61	0.00	
D 1731	116.63	453	25	19		9	32	506	52	10.36	0.00	
D 1732	118.20	214	13	9	8			244	30	12.25	*****	
D 1736	123.24	208	18	14		6		246	38	15.51	0.00	
D 1744	124.98	235	20	16	7		25	279	44	15.65	*****	
D 1748	128.41	325	25	17	14		22	381	56	14.71	*****	
D 1753	131.35	605	51	11			32	667	62	9.25	*****	
D 1761	133.09	227	19	12		3		261	34	13.05	0.00	
D 1771	137.00	298	28	16	12	8	40	361	64	17.62	1.58	
D 1777	140.83	332	31	8	11	7	25	389	57	14.57	1.62	
D 1780	143.81	178	15	10		4	17	206	28	13.72	0.00	
D 1783	147.26	274	19	4		1	28	298	24	8.09	0.00	
D 1788	148.97	236	33	22		7	55	298	62	20.83	0.00	
D 1790	150.84	233	18	1		1		253	20	7.88	0.00	
D 1793	154.26	274	18	1	7		34	300	26	8.60	*****	
D 1802	157.24	171	31	10			28	212	41	19.40	*****	
D 1810	158.48	288	29	12	4	12	51	346	57	16.61	0.29	
D 1820	160.34	192	25	15		2	36	234	42	17.77	0.00	
D 1826	162.64	298	24	13		5	33	341	43	12.56	0.00	

CORE 7030/03-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I									SUM	SUM	WET-	iC4	I	
I		IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I		no.	m									(%)	nC4	I
I														I
I	D	1830	166.48	286	38	20		8	20	352	66	18.69	0.00	I
I	D	1845	172.30	342	28	16		5	36	391	49	12.44	0.00	I
I														I

Table A.II.1.2

Core 7030/03-U-01

DATA FROM ROCK EVAL PYROLYSIS

IKU No.	DEPTH m	S1 (mg/g ROCK)	S2 (mg/g ROCK)	S3 (mg/g ROCK)	TOC (%)	HYDR. INDEX (mg/g TOC)	OXYGEN INDEX (mg/g TOC)	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1+S2	TEMP. MAX (C)
I D 1552	26.81	0.07	0.00	0.64	0.19	0	337	0.07	1.00	***
I D 1557	29.67	****	****	****	0.17	*****	****	*****	*****	***
I D 1562	30.91	****	****	****	0.11	*****	****	*****	*****	***
I D 1564	32.67	****	****	****	0.14	*****	****	*****	*****	***
I D 1567	33.60	****	****	****	0.14	*****	****	*****	*****	***
I D 1574	37.72	****	****	****	0.14	*****	****	*****	*****	***
I D 1583	39.10	0.07	0.00	0.79	0.26	0	304	0.07	1.00	***
I D 1588	42.09	****	****	****	0.22	*****	****	*****	*****	***
I D 1593	43.81	0.05	0.02	0.57	0.26	8	219	0.07	0.71	406
I D 1599	46.08	****	****	****	0.17	*****	****	*****	*****	***
I D 1605	48.72	****	****	****	0.16	*****	****	*****	*****	***
I D 1609	50.31	0.08	0.00	0.28	0.20	0	140	0.08	1.00	***
I D 1613	52.06	****	****	****	0.14	*****	****	*****	*****	***
I D 1617	53.70	0.06	0.00	0.31	0.23	0	135	0.06	1.00	***
I D 1622	55.24	****	****	****	0.19	*****	****	*****	*****	***
I D 1620	56.10	****	****	****	0.15	*****	****	*****	*****	***
I D 1634	59.25	****	****	****	0.13	*****	****	*****	*****	***
I D 1636	61.29	0.06	0.00	0.67	0.31	0	216	0.06	1.00	***
I D 1640	64.16	0.10	0.00	0.61	0.26	0	235	0.10	1.00	***
I D 1637	66.14	****	****	****	0.16	*****	****	*****	*****	***
I D 1646	66.43	****	****	****	0.16	*****	****	*****	*****	***
I D 1647	69.52	0.05	0.01	0.66	0.28	4	236	0.06	0.83	298

Bracketed Tmax values are artifacts (low S2).

DATE : 28 - 1 - 88.

Table A.II.1.2 (continued)

Core 7030/03-U-01

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	I
I		m	:	(mg/g ROCK)			(%)	(mg/g TOC)		S1+S2	S1+S2	(C)
I			:									I
I	D 1657	74.42	:	****	****	****	0.25	*****	****	*****	*****	***
I	D 1659	77.14	:	0.07	0.01	0.67	0.27	4	248	0.08	0.88	(277)
I	D 1663	79.05	:	****	****	****	0.26	*****	****	*****	*****	***
I	D 1666	81.14	:	0.09	0.15	1.06	0.45	33	236	0.24	0.38	413
I	D 1667	81.82	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 1668	84.11	:	****	****	****	0.20	*****	****	*****	*****	***
I	D 1673	86	:	0.16	0.04	0.31	0.36	11	86	0.20	0.80	(307)
I	D 1671	86.47	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 1675	88.13	:	0.07	0.00	0.82	0.25	0	328	0.07	1.00	***
I	D 1676	90.25	:	0.08	0.01	0.69	0.29	3	238	0.09	0.89	(244)
I	D 1682	92.06	:	0.15	0.02	0.81	0.40	5	203	0.17	0.88	(277)
I	D 1691	93.95	:	0.12	0.25	0.84	0.78	32	108	0.37	0.32	408
I	D 1688	95.06	:	0.07	0.07	0.60	0.45	16	133	0.14	0.50	(364)
I	D 1697	96.63	:	0.09	0.04	0.55	0.48	8	115	0.13	0.69	(323)
I	D 1693	98.79	:	****	****	****	0.15	*****	****	*****	*****	***
I	D 1985	100.95	:	0.09	0.00	0.10	0.16	0	63	0.09	1.00	***
I	D 1701	100.97	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 1698	101.77	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 1707	102.63	:	****	****	****	0.13	*****	****	*****	*****	***
I	D 1709	104.23	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 1722	108.31	:	0.09	0.00	0.63	0.21	0	300	0.09	1.00	***
I	D 1720	110.81	:	****	****	****	0.13	*****	****	*****	*****	***

Bracketed Tmax values are artifacts (low S2).

DATE : 28 - 1 - 88.

Table A.II.1.2 (continued)

Core 7030/03-U-01

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)
I	I	I	I	I	I	I	I	I	I	I	I	I
I	D 1725	113.97	:	0.09	0.00	0.49	0.14	0	350	0.09	1.00	***
I	D 1731	116.63	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 1732	118.20	:	****	****	****	0.14	*****	****	*****	*****	***
I	D 1736	123.24	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 1746	123.99	:	0.08	0.00	1.04	0.27	0	385	0.08	1.00	***
I	D 1744	124.98	:	****	****	****	0.20	*****	****	*****	*****	***
I	D 4035	126	:	0.06	0.00	0.00	0.27	0	0	0.06	1.00	***
I	D 4036	126.12	:	0.19	0.16	0.32	1.05	15	30	0.35	0.54	409
I	D 1748	128.41	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 1752	128.86	:	****	****	****	0.28	*****	****	*****	*****	***
I	D 1758	130.20	:	0.07	0.00	0.17	0.36	0	47	0.07	1.00	***
I	D 1753	131.35	:	0.16	0.92	0.91	0.86	107	106	1.08	0.15	429
I	D 4037	131.60	:	0.05	0.05	0.37	0.25	20	148	0.10	0.50	(373)
I	D 1761	133.09	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 1774	136.29	:	0.08	0.00	0.31	0.18	0	172	0.08	1.00	***
I	D 1771	137	:	****	****	****	0.17	*****	****	*****	*****	***
I	D 1777	140.83	:	0.06	0.00	0.32	0.33	0	97	0.06	1.00	***
I	D 1781	143.11	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 1780	143.81	:	****	****	****	0.13	*****	****	*****	*****	***
I	D 1784	145.48	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 4038	146.12	:	0.08	0.00	0.00	0.10	0	0	0.08	1.00	***
I	D 1783	147.26	:	****	****	****	0.16	*****	****	*****	*****	***

Bracketed Tmax values are artifacts (low S2).

DATE : 28 - 1 - 88.

Table A.II.1.2 (continued)

Core 7030/03-U-01

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)	I
I	D		:										I
I	1788	148.97	:	0.11	0.01	0.09	0.82	1	11	0.12	0.92	(304)	I
I	4039	149.85	:	0.72	0.61	0.14	1.47	41	10	1.33	0.54	413	I
I	1984	150.34	:	0.43	0.09	0.28	0.22	41	127	0.52	0.83	(310)	I
I	1790	150.84	:	****	****	****	0.17	*****	****	*****	*****	***	I
I	1794	153.98	:	****	****	****	0.17	*****	****	*****	*****	***	I
I	1793	154.26	:	****	****	****	0.15	*****	****	*****	*****	***	I
I	1809	155.71	:	0.07	0.00	0.92	0.21	0	438	0.07	1.00	***	I
I	1802	157.24	:	0.10	0.00	0.33	0.29	0	114	0.10	1.00	***	I
I	1810	158.48	:	0.12	0.00	0.42	0.31	0	135	0.12	1.00	***	I
I	1820	160.34	:	0.21	0.00	0.37	0.50	0	74	0.21	1.00	***	I
I	1826	162.64	:	****	****	****	0.15	*****	****	*****	*****	***	I
I	1830	166.48	:	0.11	0.05	0.20	0.52	10	38	0.16	0.69	(334)	I
I	1845	172.30	:	****	****	****	0.19	*****	****	*****	*****	***	I

Bracketed Tmax values are artifacts (low S2).

DATE : 28 - 1 - 88.

Table A.II.1.3

Core number: 7030/03-U-01
 Reference number: 21.3427.23
 (1/1)

VITRINITE REFLECTANCE DATA

I IKU NO	I LOCATION	I DEPTH	I VITRINITE	I REL	I STANDARD	I FLUORE-	I
I	I	I (M)	I REFLECTANCE	I RAT	I DEVIATION	I SCENCE	I
I D-1992	I -----	I 130.50	I 0.56 (7)	I P	I 0.10	I 3-4	I
I	I	I	I 0.87 (2)	I R	I 0.00	I	I
I D-1993	I -----	I 130.57	I 0.45 (4)	I P	I 0.04	I 3-4	I
I	I	I	I 0.68 (2)	I R	I 0.04	I	I
I D-1994	I -----	I 159.99	I 0.81 (9)	I R	I 0.15	I 3-4?	I
I	I	I	I	I	I	I	I

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
 S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.1.4
Well no.: 7030/03-U-01

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 1560	30.08	Am: 5-10% Lm: <5% W: <5% C: 85-90%	F-M	No palynomorphs observed	N.D.P.	Organic residue dominated by black, opaque coaly fragments
D 1585	39.78	Am: >90% Lm: <5% W: <5% C: <5%	F-M-L	No palynomorphs observed	N.D.P.	Organic residue totally dominated by amorphous matter, i.e. large bundles of granular degraded material specked with abundant pyrite.
D 1614	51.46	Am: 45-50% Lm: <5% W: <5% C: 45-50%	F-M-L	No palynomorphs observed	N.D.P.	Organic residue consists of amorphous, granular degraded matter together with black opaque, angular coaly fragments.
D 1638	64.05	Am: 85-90% Lm: <5% W: <5% C: 5-10%	F-M	No palynomorphs observed	N.D.P.	Organic residue totally dominated by finely dispersed amorphous matter.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.1.4
Well no.: 7030/03-U-01

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 1661	77.89	Am: 35-40% Lm: <5% W: 5% C: 55-60%	F-M-L	No palynomorphs observed	N.D.P.	Organic residue consists mainly of degraded granular amorphous matter and black, inert coaly fragments.
D 1674	86.00	Am: 45-50% Lm: <5% W: <5% C: 45-50%	F-M-L	No palynormorphs observed	N.D.P.	Comparable with sample D 1661 (77.89 m) above.
D 1685	92.40	Am: 15-20% Lm: <5% W: <5% C: 80%	F-M-L	No palynomorphs recorded	N.D.P.	Organic esidue is dominated by black, inert angular coaly fragments, but contains also a significant proportion of amorphous matter.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.1.4
Well no.: 7030/03-U-01

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 1690	94.62	Am: >90% Lm: <5% W: <5% C: <5%	F-M	No palynomorphs observed	N.D.P.	Organic residue totally dominated by finely dispersed amorphous matter.
D 1745	126.06	Am: <5% Lm: <5% W: 5-10% C: >90%	F-M-L	Fair	3.5-4.0	Organic residue dominated by opaque, angular coaly fragments.
D 1757	130.54	Am: <5% Lm: <5% W: 10% C: 80-90%	F-M-L	No palynomorphs observed	N.D.P.	Comparable with sample D 1745 (126.06 m) above.
D 1789	149.01	Am: 5-10% Lm: <5% W: 5% C: 85-90%	F-M	No palynomorphs observed	N.D.P.	Organic residue totally dominated by black (opaque) angular coaly fragments.
D 1825	160.01	Am: 5% Lm: <5% W: 5% C: 85-90%	F-M	No palynomorphs observed	N.D.P.	Comparable with sample D 1789 (149.01 m) above.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.1.4
Well no.: 7030/03-U-01

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 1832	166.03	Am: <5% Lm: <5% W: <5% C: >90%	F-M	No palynomorphs observed	N.D.P.	Comparable with samples D 1789 (149.01 m) and D 1825 (160.01 m) above.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.1.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7030/03-U-01

I	I	I	I	I	I	I
I	IKU-No.	DEPTH	:	Asphaltenes	:	Polars
I		(m)	:	(mg)	:	(mg)
I	=====					
I	D 1691	93.95	:	6.0	:	1.4
I	D 4036	126.12	:	5.0	:	0.6
I	D 1753	131.35	:	14.3	:	1.6
I	D 4037	131.60	:	5.3	:	1.2
I	D 1788	148.97	:	4.6	:	0.4
I	D 4039	149.85	:	4.0	:	3.2
I	D 1984	150.34	:	10.9	:	14.4
I	D 1820	160.34	:	7.4	:	1.7
I	D 1830	166.48	:	7.6	:	1.6
I			:		:	
I	=====					

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DATE : 3 - 3 - 88.

Table A.II.1.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	: Rock : Extr. : (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
D 1691	93.95	: 6.6	4.1	0.1	0.1	0.2	3.9	0.78
D 4036	126.12	: 7.7	5.3	0.1	0.5	0.6	4.7	0.80
D 1753	131.35	: 12.0	15.7	0.2	0.8	1.0	14.7	0.86
D 4037	131.60	: 15.1	9.3	0.5	0.5	1.0	8.3	0.24
D 1788	148.97	: 11.6	5.9	0.7	0.5	1.2	4.7	0.82
D 4039	149.85	: 15.1	3.2	0.1	0.6	0.7	2.5	0.28
D 1984	150.34	: 66.5	84.2	20.9	31.0	51.9	32.3	0.22
D 1820	160.34	: 15.9	5.3	0.2	0.5	0.7	4.6	0.50
D 1830	166.48	: 11.2	5.8	0.1	0.1	0.2	5.6	0.52

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 DATE : 3 - 3 - 88.

Table A.II.1.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC
I		(m)	:					
I	I	I	I	I	I	I	I	I
I	D 1691	93.95	:	626	15	15	31	595
I	D 4036	126.12	:	685	13	65	78	607
I	D 1753	131.35	:	1309	17	67	83	1226
I	D 4037	131.60	:	617	33	33	66	551
I	D 1788	148.97	:	509	60	43	104	406
I	D 4039	149.85	:	211	7	40	46	165
I	D 1984	150.34	:	1266	313	467	780	485
I	D 1820	160.34	:	333	13	31	44	289
I	D 1830	166.48	:	519	9	9	18	501
I			:					

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Table A.II.1.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 1691	93.95	80.3	2.0	2.0	3.9	76.3
D 4036	126.12	85.6	1.6	8.1	9.7	75.9
D 1753	131.35	152.3	1.9	7.8	9.7	142.6
D 4037	131.60	257.1	13.8	13.8	27.6	229.5
D 1788	148.97	62.1	7.4	5.3	12.6	49.5
D 4039	149.85	75.5	2.4	14.2	16.5	59.0
D 1984	150.34	575.3	142.5	212.1	354.6	220.7
D 1820	160.34	66.6	2.5	6.3	8.8	57.8
D 1830	166.48	99.8	1.7	1.7	3.4	96.3

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Table A.II.1.9

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 1691	93.95	:	2.4	2.4	4.9	100.0	95.1	5.1	I
I	D 4036	126.12	:	1.9	9.4	11.3	20.0	88.7	12.8	I
I	D 1753	131.35	:	1.3	5.1	6.4	25.0	93.6	6.8	I
I	D 4037	131.60	:	5.4	5.4	10.8	100.0	89.2	12.0	I
I	D 1788	148.97	:	11.9	8.5	20.3	140.0	79.7	25.5	I
I	D 4039	149.85	:	3.1	18.8	21.9	16.7	78.1	28.0	I
I	D 1984	150.34	:	24.8	36.9	61.6	67.1	38.4	160.7	I
I	D 1820	160.34	:	3.8	9.4	13.2	40.0	86.8	15.2	I
I	D 1830	166.48	:	1.7	1.7	3.4	100.0	96.6	3.6	I
I			:							I

Table A.II.1.10

Core 7030/03-U-01

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I	IKU No.	:	-----	A = -----	B = -----	-----	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I		:								I
I	D 1691	93.95	1.1	0.4	0.5	0.9	0.3	1.1	1.1	I
I		:								I
I	D 4036	126.12	0.7	0.2	0.3	0.8	0.3	1.1	1.0	I
I		:								I
I	D 1753	131.35	1.4	0.6	0.5	1.2	0.6	1.1	1.0	I
I		:								I
I	D 4037	131.60	1.6	0.4	0.2	1.5	0.4	1.1	1.0	I
I		:								I
I	D 1788	148.97	1.3	0.4	0.3	1.4	0.2	1.1	1.1	I
I		:								I
I	D 4039	149.85	0.8	0.7	0.5	1.3	0.2	1.2	1.1	I
I		:								I
I	D 1820	160.34	1.3	0.5	0.3	1.4	0.2	1.1	1.1	I
I		:								I
I	D 1830	166.48	1.0	0.7	0.6	1.2	0.1	1.0	1.0	I
I		:								I

DATE : 3 - 3 - 88.

Table A.II.1.11a:

Molecular ratios from sterane and terpane mass chromatograms.
Maturity ratios.

Core 7030/03-U-01

IKU no.	Depth (m)	$\alpha\beta/\alpha\beta+\beta\alpha^{1)}$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-1691	93.95	0.90	50.5	54.1	18.5
D-1753	131.35	0.86	42.0	68.5	11.3
D-4037	131.60	0.85	41.3	69.6	9.5
D-1788	148.97	0.87	53.1	48.9	13.0
D-1984	150.34	n.d.p.	n.d.p.	77.4	57.1
D-1820	160.34	0.86	46.8	64.3	11.8

¹⁾ E/(E+F) in m/z 191.

²⁾ Average % distribution between first and second eluting isomers of extended hopanes.

³⁾ $2(r+s)/(q+t+2(r+s))$ in m/z 217.

⁴⁾ $q/(q+t)$ in m/z 217.

Table A.II.1.11b:

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7030/03-U-01

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-1691	93.95	0.03	4.86			0.29
D-1753	131.35	0.10	4.54			0.54
D-4037	131.60	0.03	3.44			0.32
D-1788	148.97	0.19	2.16			0.23
D-1984	150.34	13.5	n.d.p.			0.95
D-1820	160.34	0.16	2.00			0.18

1) Relative abundance of tricyclic terpanes (Q/E in m/z 191).

2) B/A in m/z 191.

3) Relative abundance of unknown (X/E in m/z 191).

4) Relative abundance of bisnorhopane (Z/E in m/z 191).

5) Relative abundance of C₂₇ rearranged steranes (a/(a+j) in m/z 217).

Table A.II.1.12:

Molecular ratios from aromatic sterane mass chromatograms.

Core 7030/03-U-01

IKU no.	Depth (m)	$\%C_{20}$ ¹⁾	$\%C_{20}$ ²⁾	$\%C_{21}$ ³⁾	$\%C_{27tri}$ ⁴⁾	$\%C_{28tri}$ ⁵⁾
		$\frac{C_{20}+C_{27}}{C_{20}+C_{27}}$	$\frac{C_{20}+C_{28}}{C_{20}+C_{28}}$	$\frac{C_{21}+C_{28}}{C_{21}+C_{28}}$	$\frac{C_{27tri}+C_{28mono}}{C_{27tri}+C_{28mono}}$	$\frac{C_{28tri}+C_{29mono}}{C_{28tri}+C_{29mono}}$
D 1984	150.34	-	-	60.8	-	-

- 1) M/(M+P) in m/z 231 (triaromatic side chain cracking)
- 2) M/(M+S) in m/z 231 (triaromatic side chain cracking)
- 3) a/(a+h) in m/z 253 (monoaromatic side chain cracking)
- 4) P/(P+h) in m/z 231 and m/z 253
- 5) S/[S+m+k*S/(S+R)] in m/z 231 and m/z 253

Table A.II.1.13: Carbon isotope ratios for extract fractions.

Core 7030/03-U-01

IKU no.	Depth (m)	SAT	d13C (0/00 PDB)			EOM
			ARO	Polars	Asph.	
D4037	131.60	-31.58	-28.90	-30.34	-30.19	n.d.
D1788	148.97	-30.84	-26.38	-28.13	-29.36	n.d.
D1984	150.34	-25.75	-26.87	-27.21	-26.84	-26.85

Figure A.II.1.1:

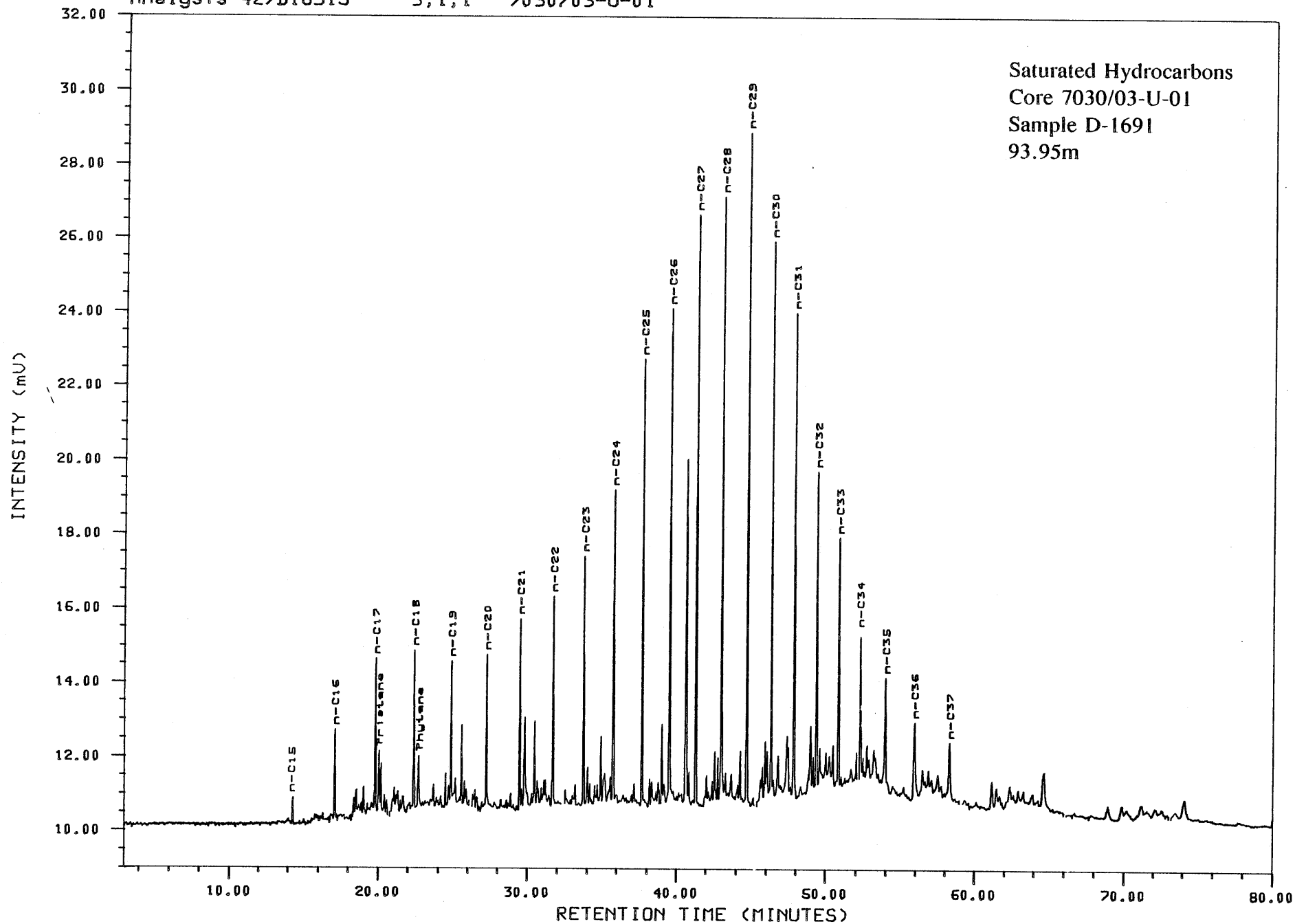
Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D1691S

3,1,1

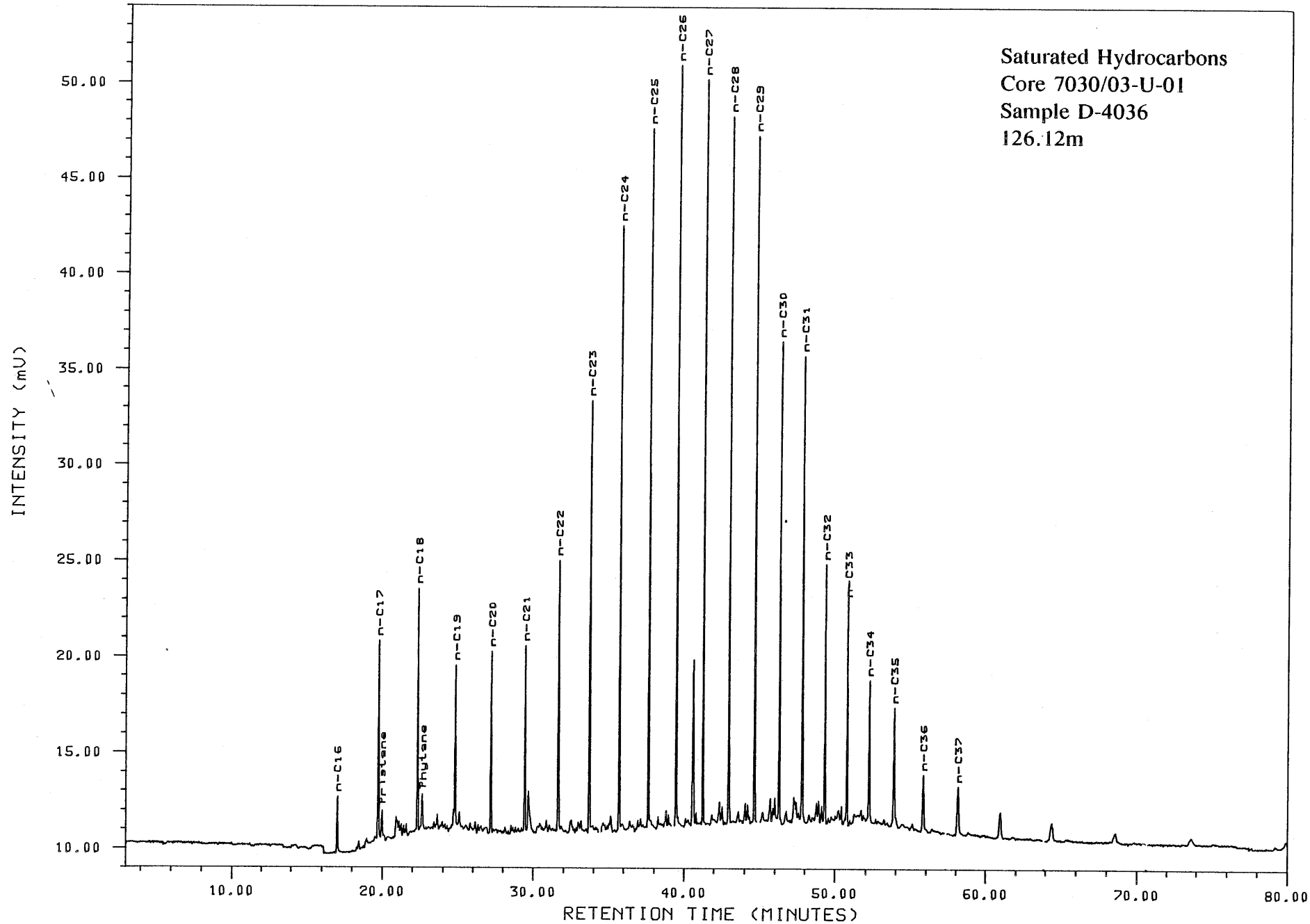
7030/03-U-01



Analysis 427D4036S

3,1,1

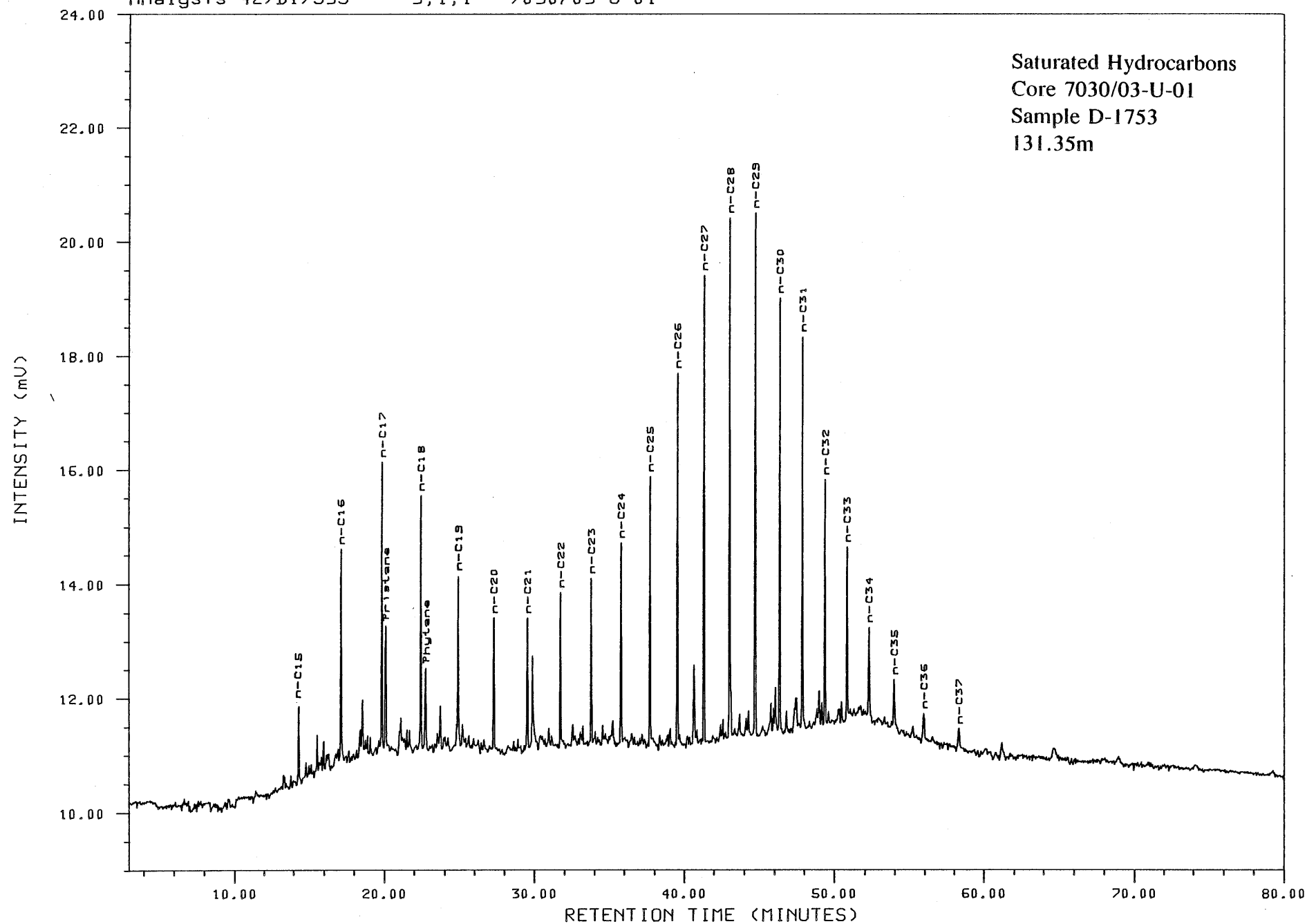
7030/03-U-01



Analysis 427D1753S

3,1,1

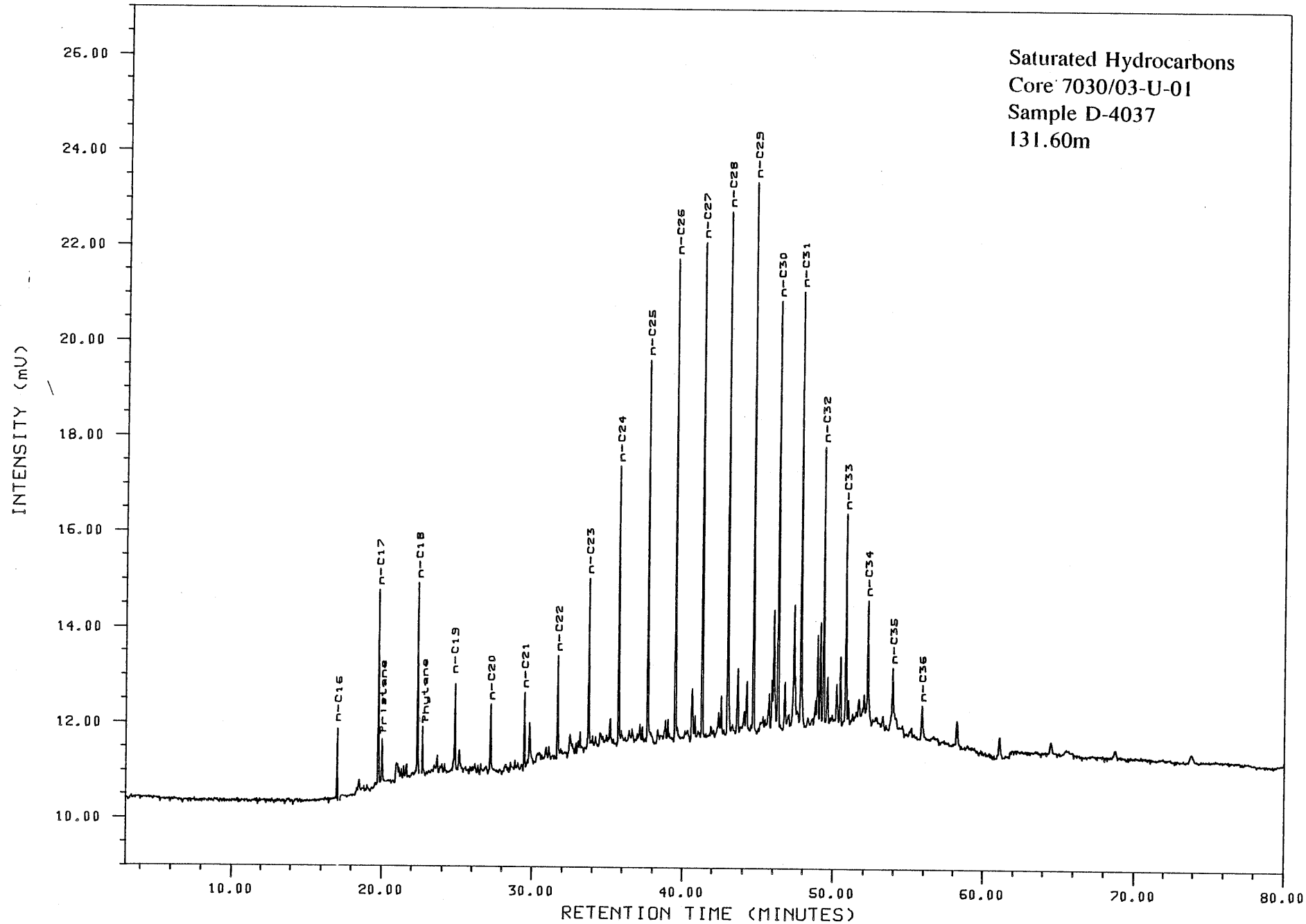
7030/03-U-01



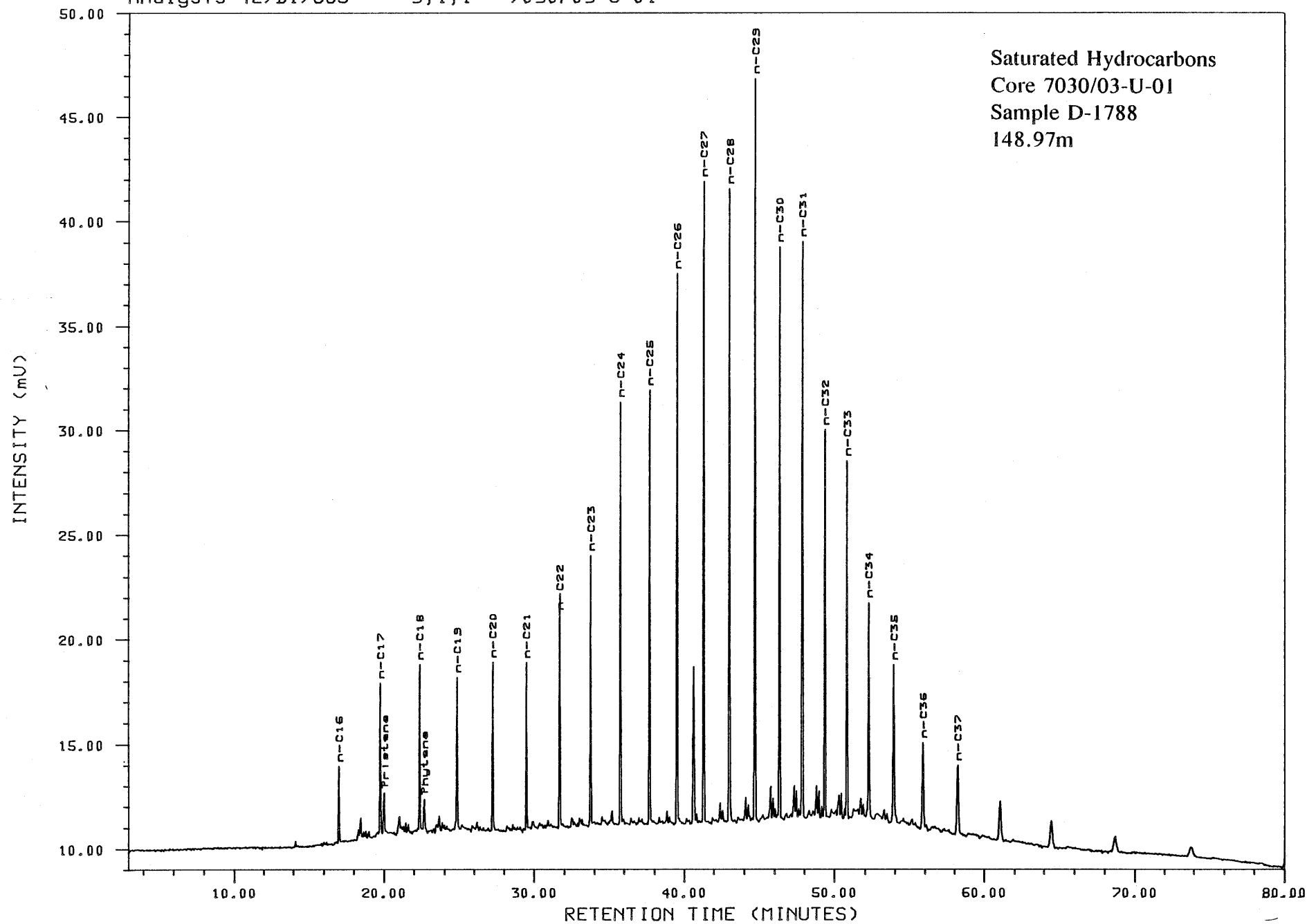
Analysis 427D4037S

3,1,1

7030/03-U-01



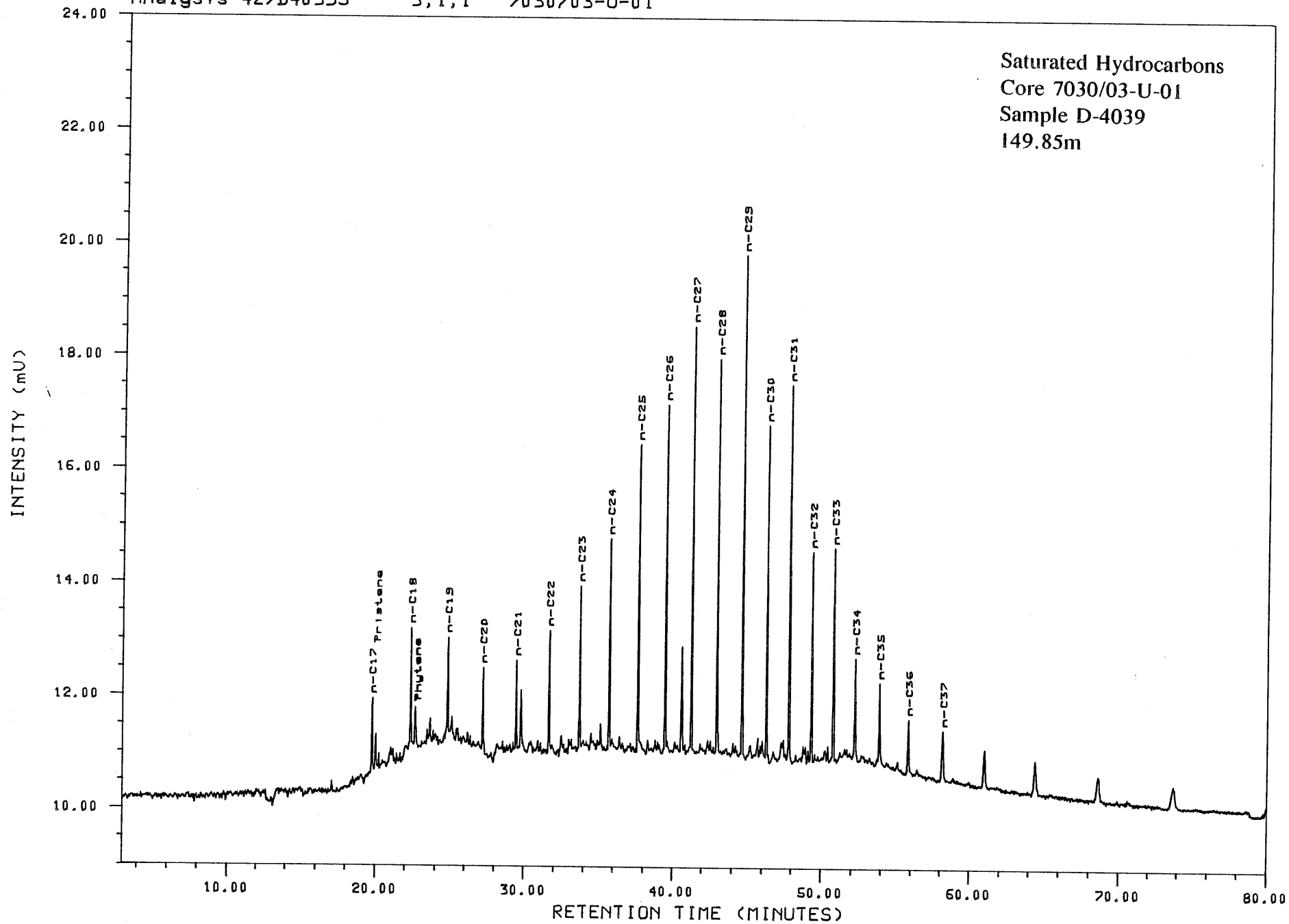
Analysis 427D1788S 3,1,1 7030/03-U-01



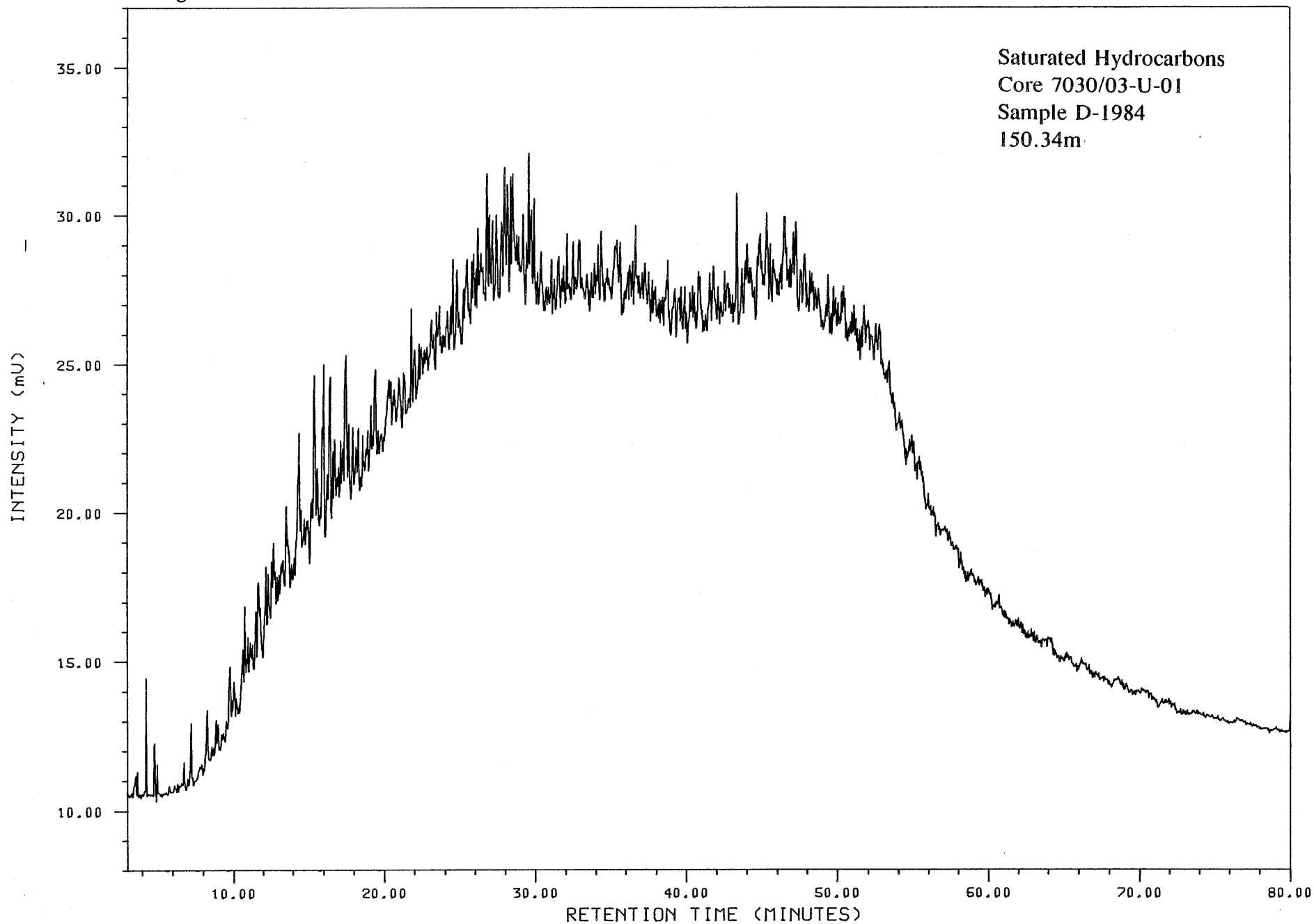
Analysis 427D4039S

3,1,1

7030/03-U-01



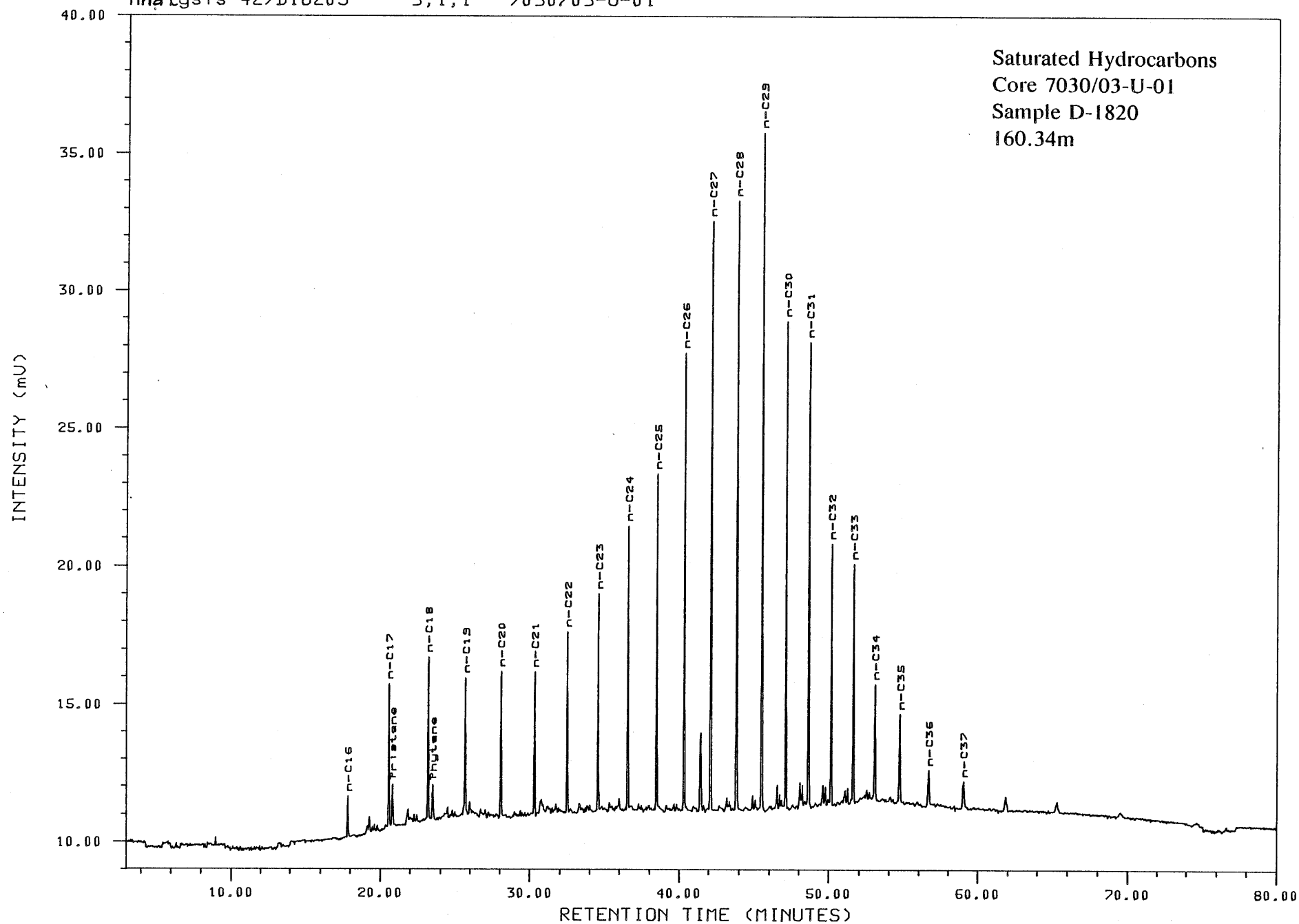
Analysis 427D1984S 2,1,1 D1984,21.3427,SAT



Analysis 427D1820S

3,1,1

7030/03-U-01



Analysis 427D1830

3,1,1

7030/03-U-01

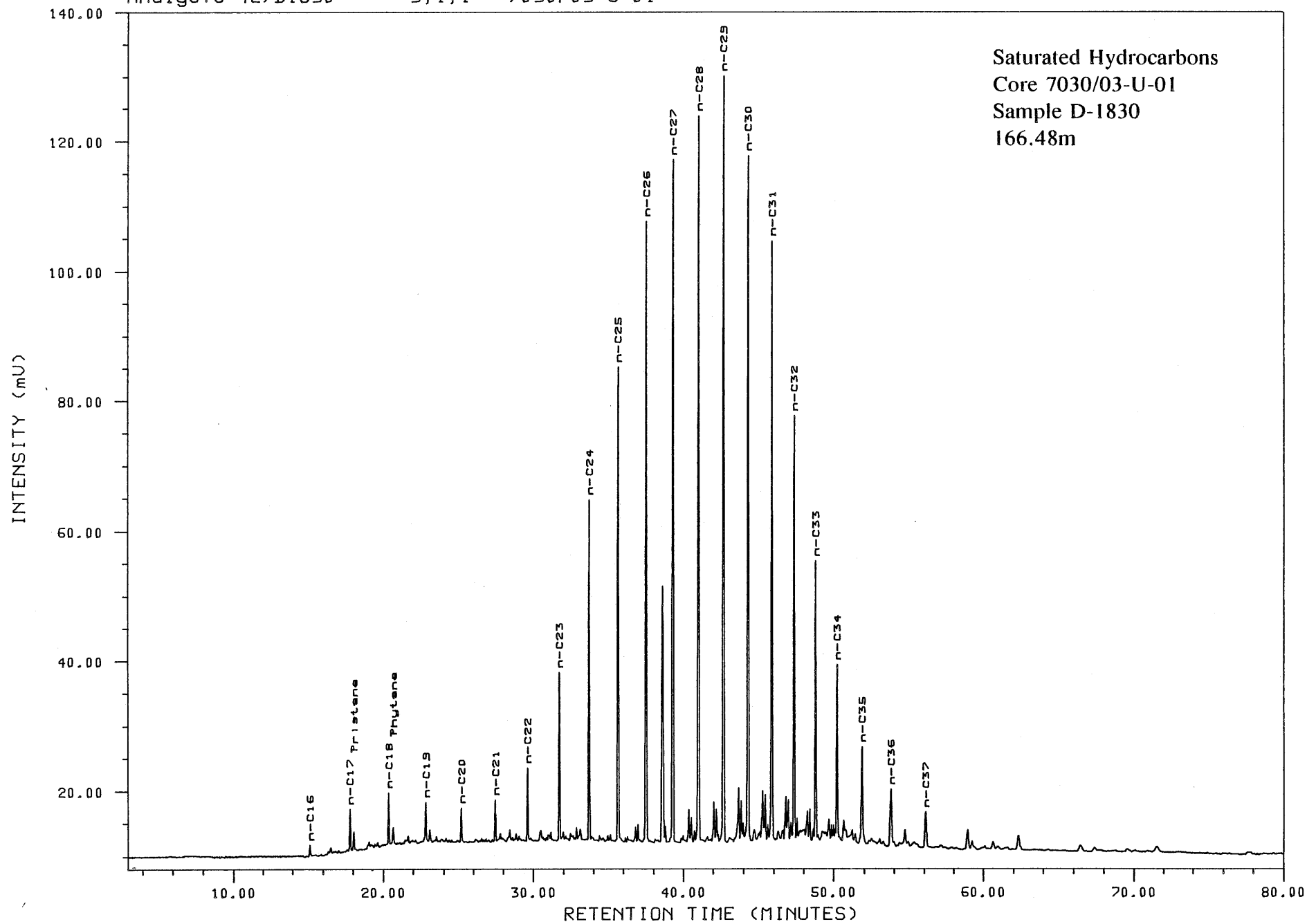
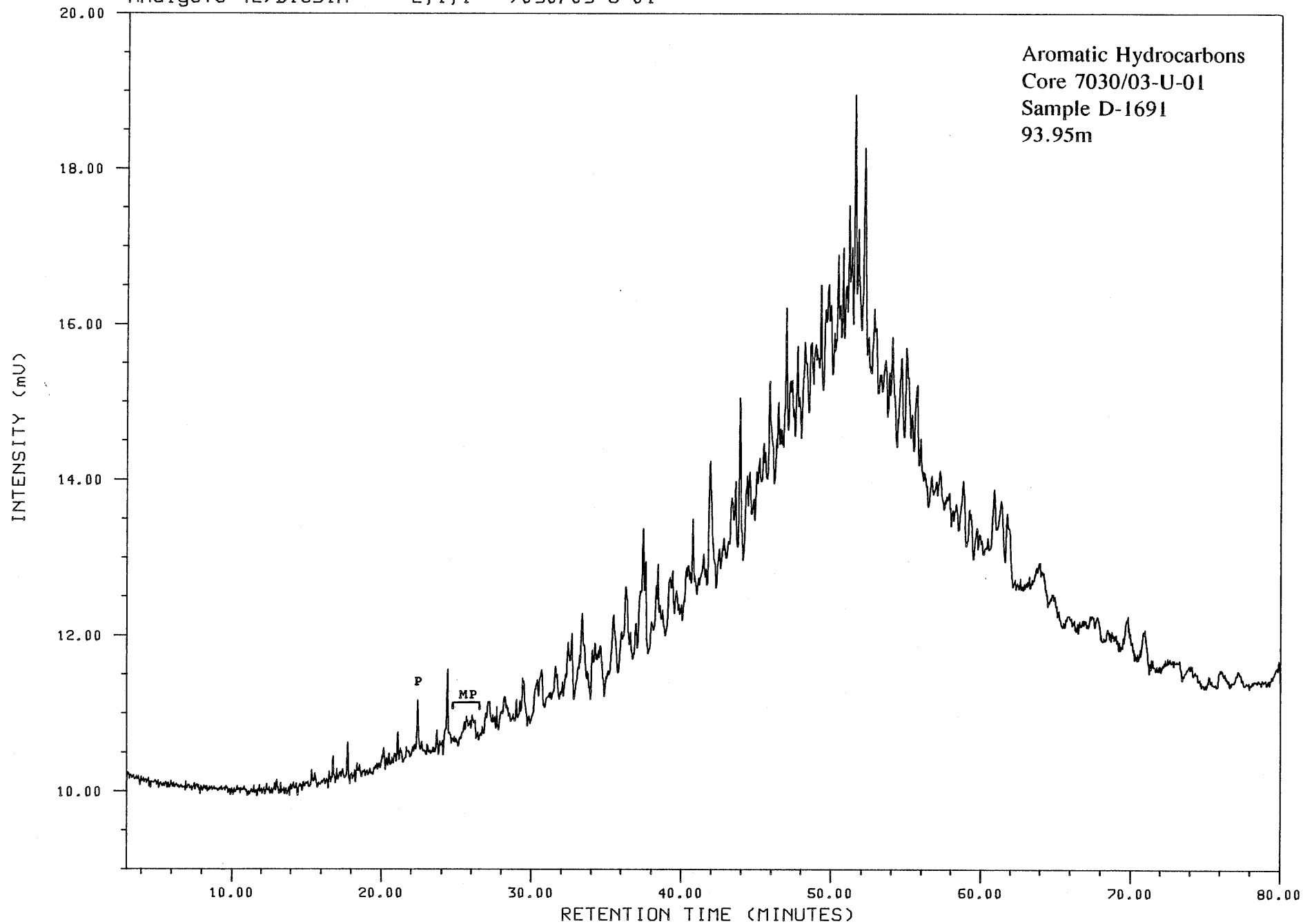


Figure A.II.1.2:

Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

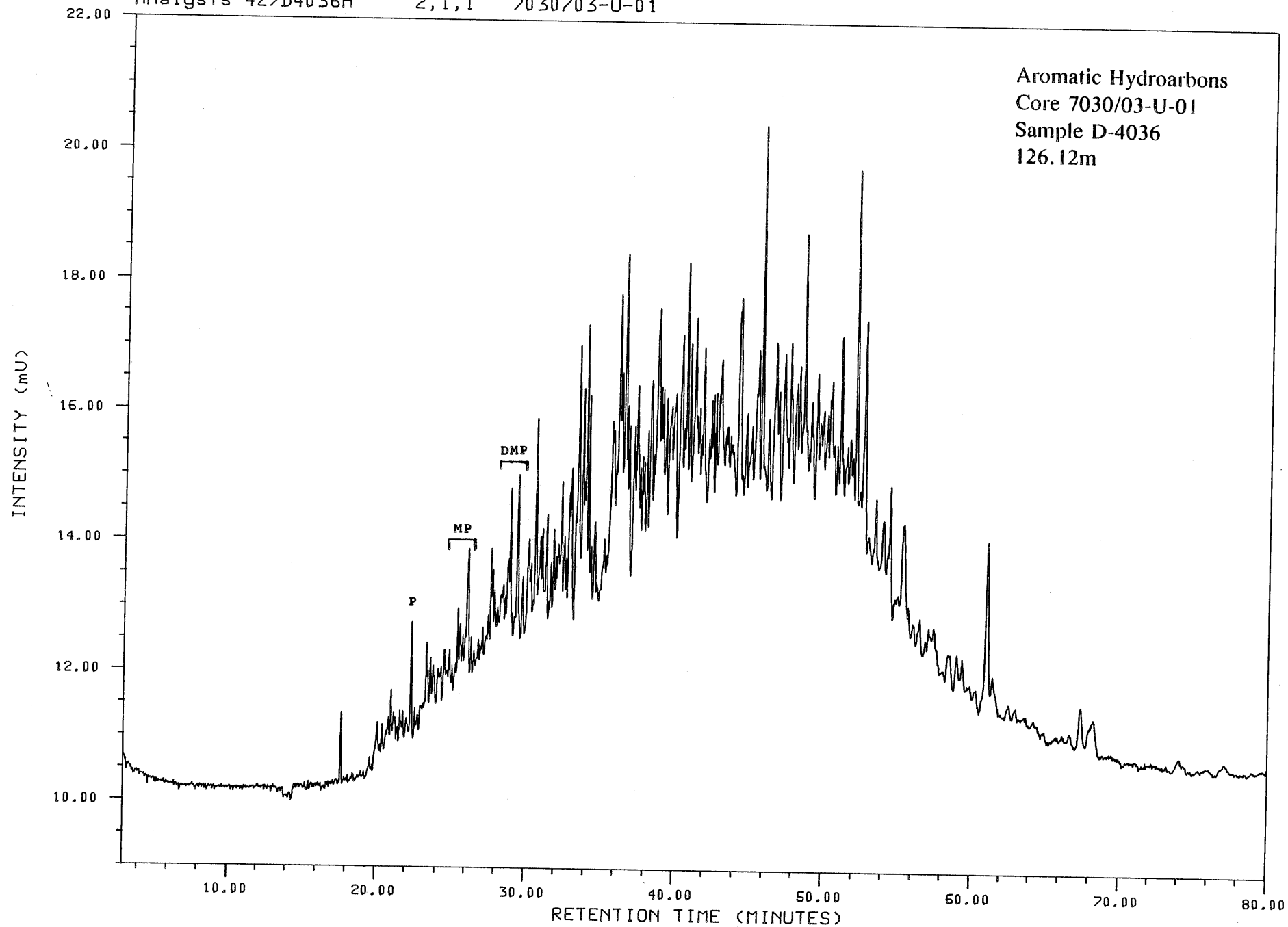
Analysis 427D1691A 2,1,1 7030/03-U-01



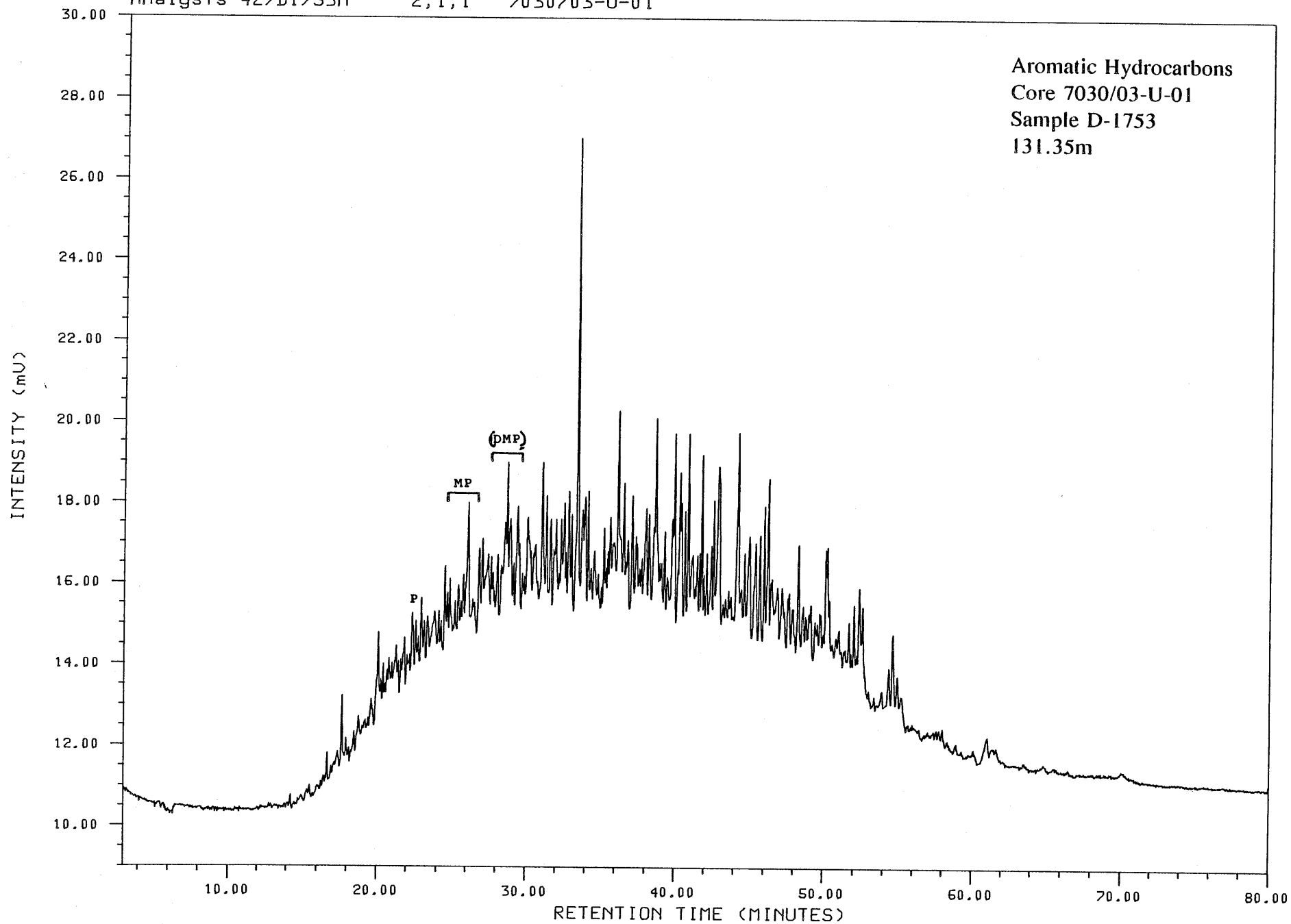
Analysis 427D4036A

2,1,1

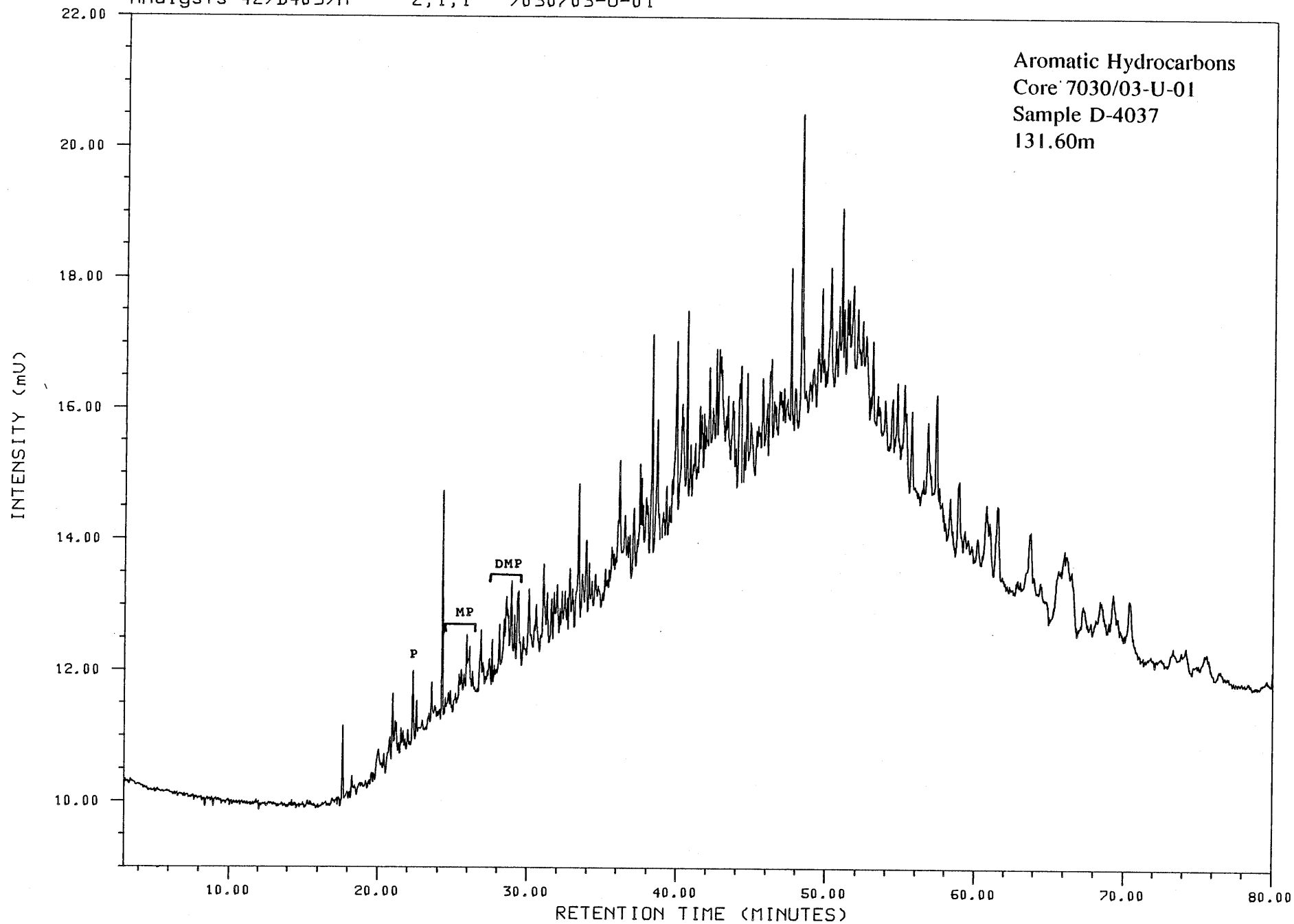
7030/03-U-01



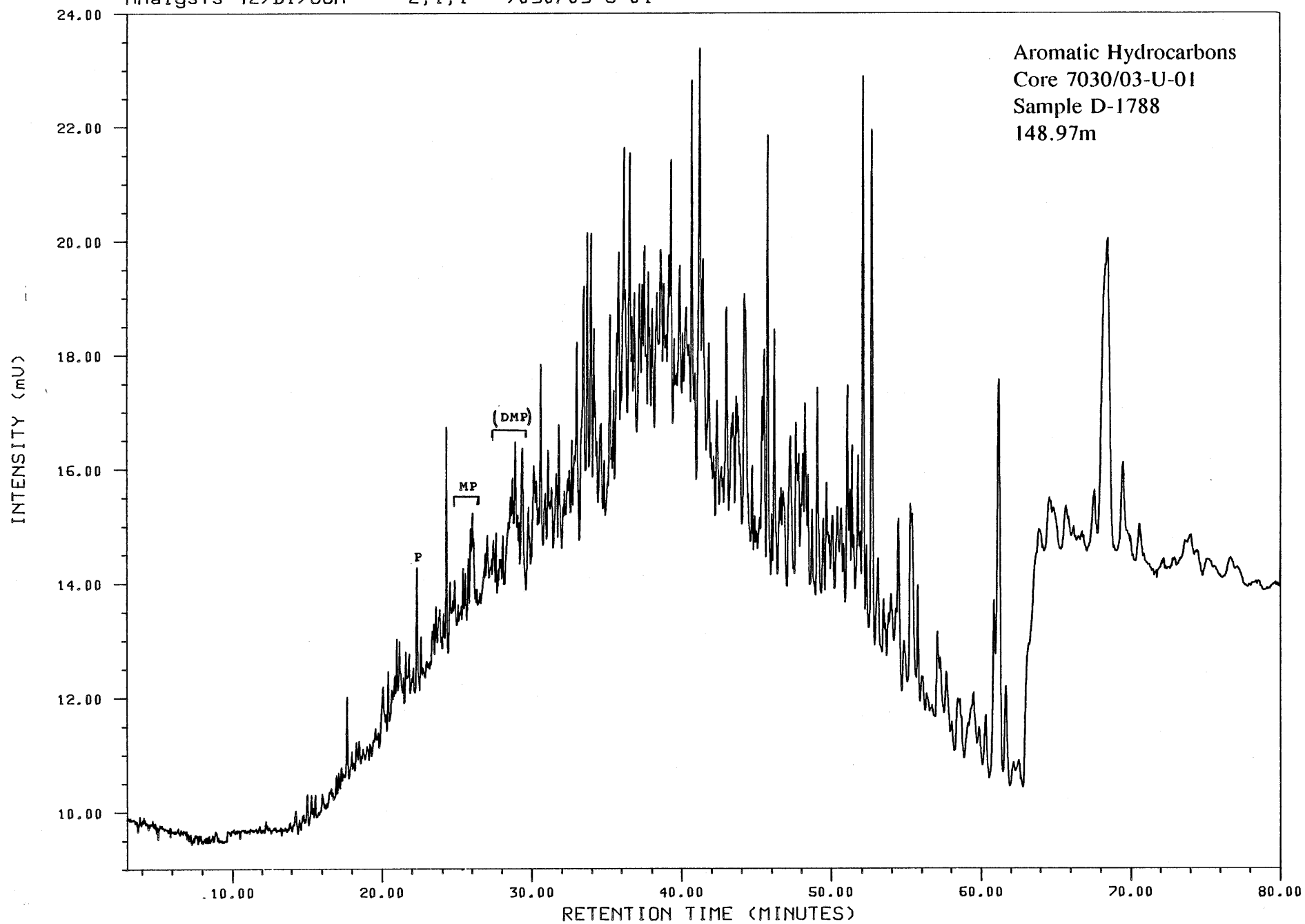
Analysis 427D1753A 2,1,1 7030/03-U-01



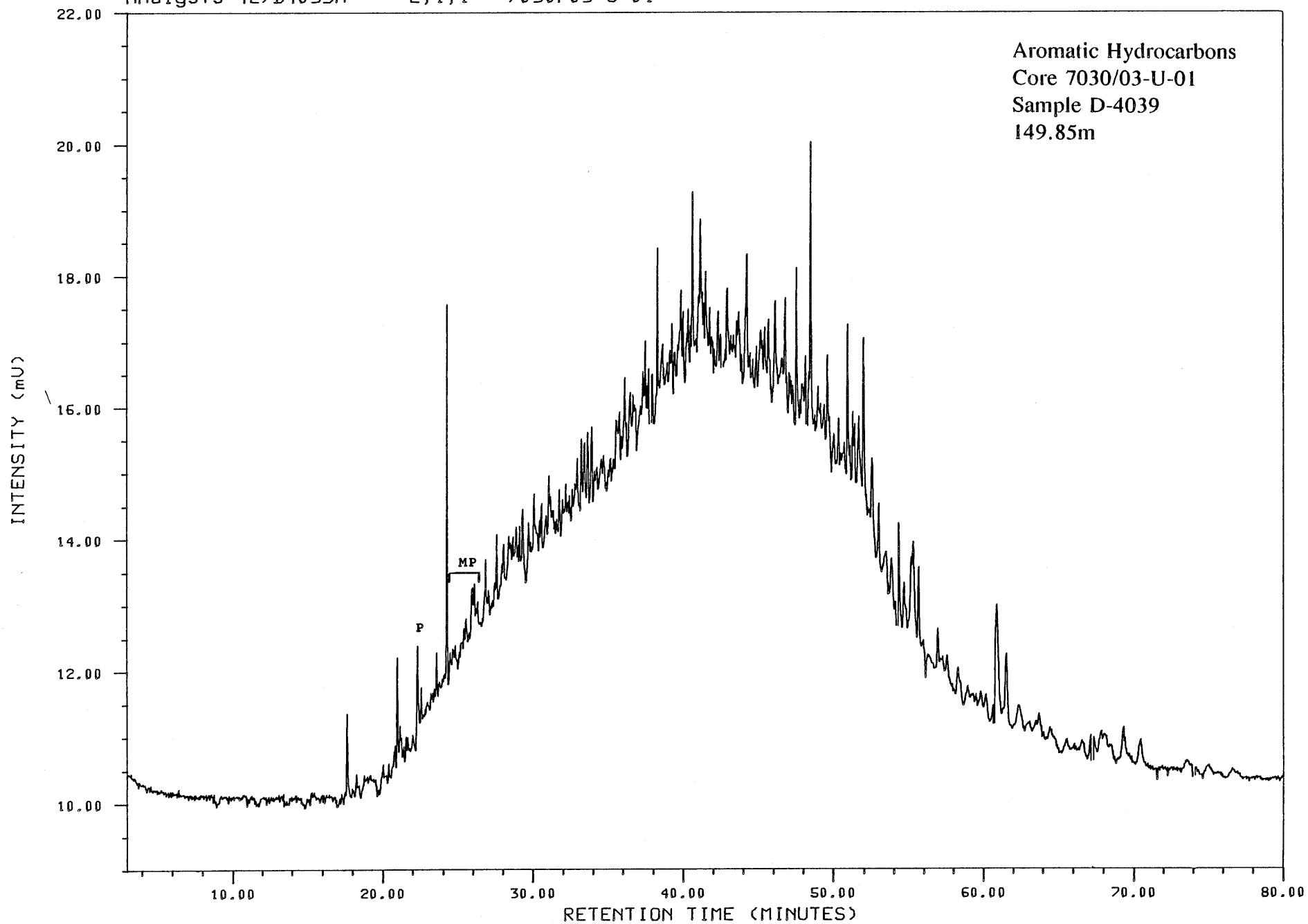
Analysis 427D4037A 2,1,1 7030/03-U-01



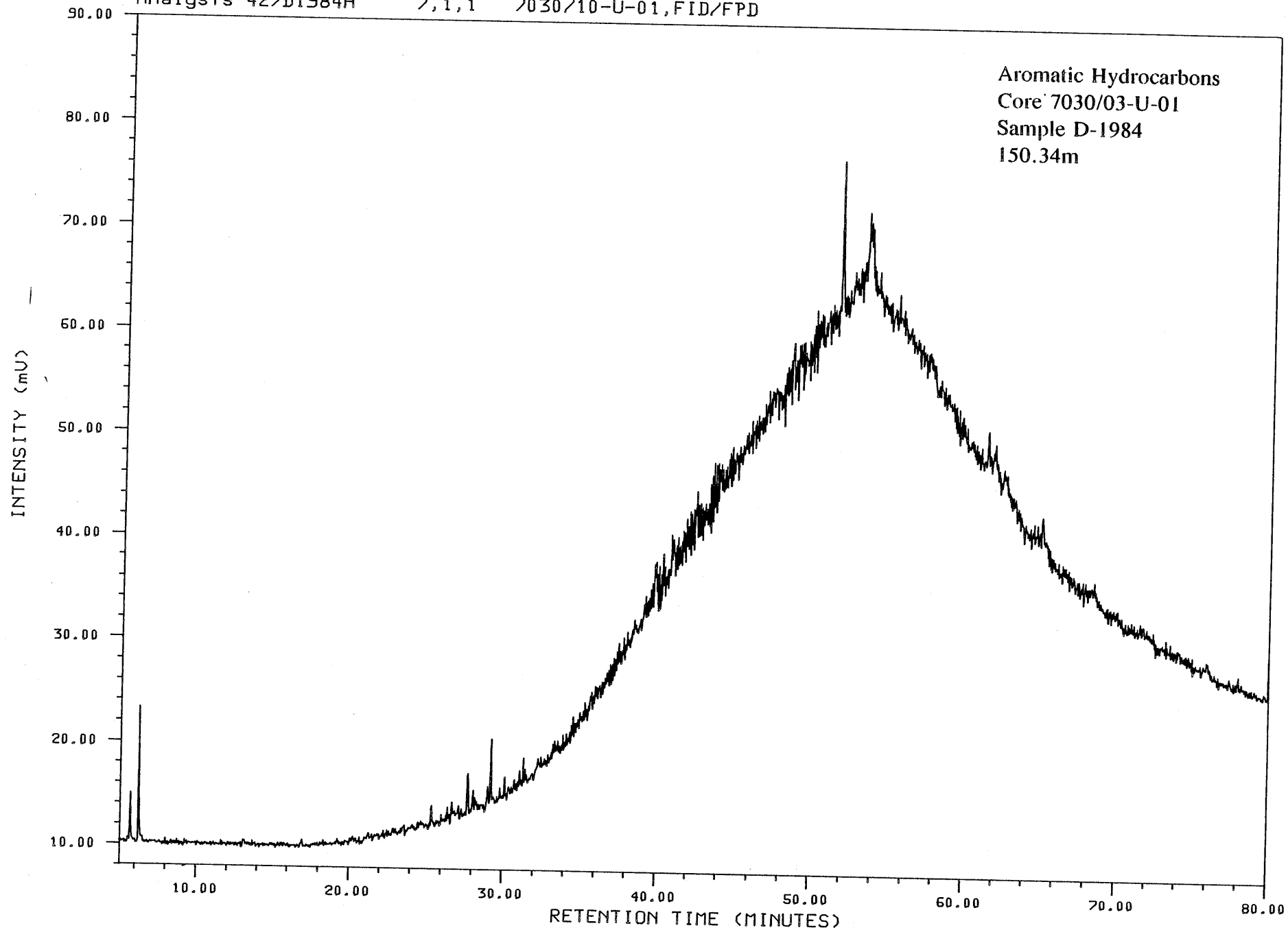
Analysis 427D1788A 2,1,1 7030/03-U-01



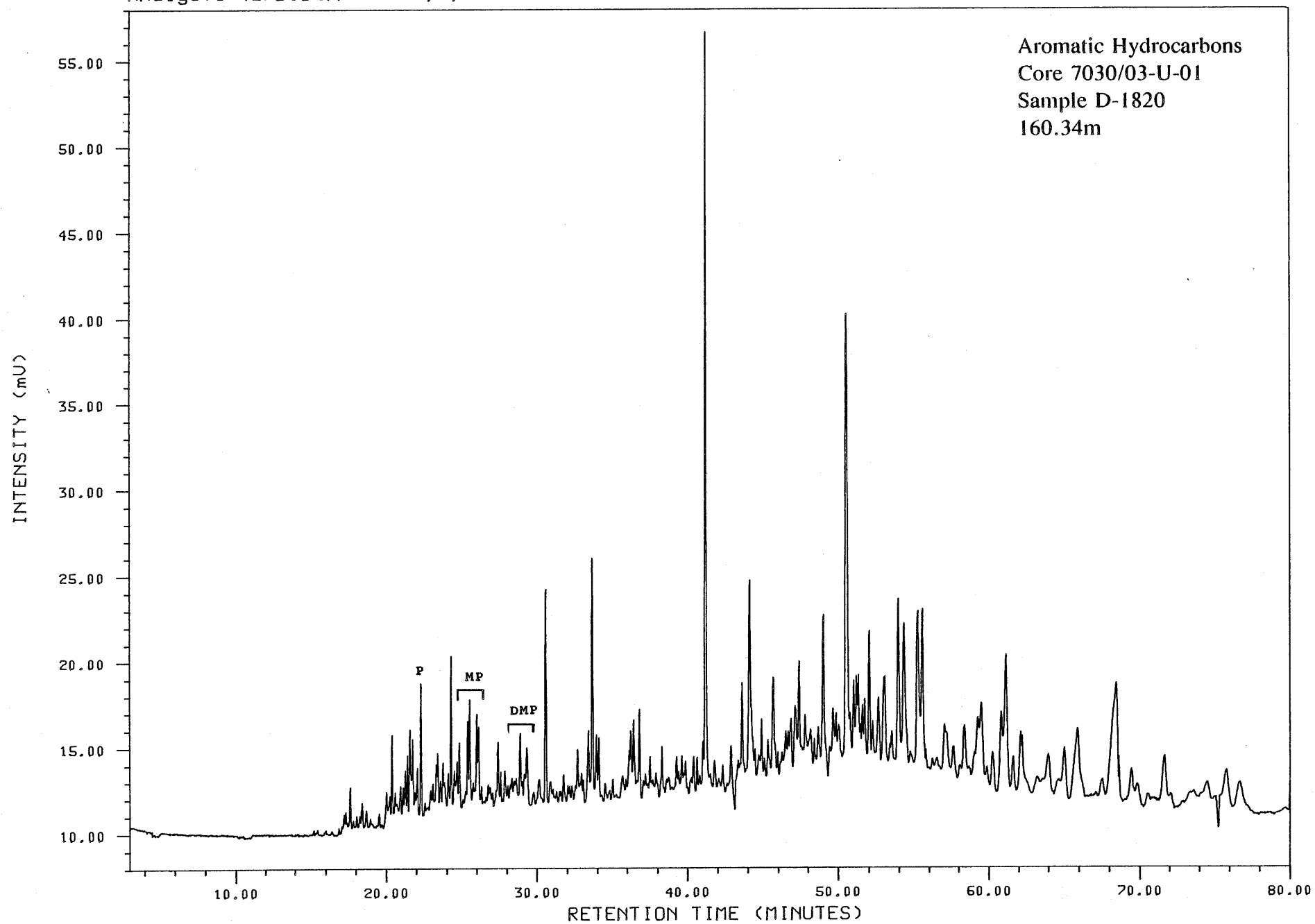
Analysis 427D4039A 2,1,1 7030/03-U-01



Analysis 427D1984R 7,1,1 7030/10-U-01,FID/FPD



Analysis 427D1820A 2,1,1 7030/03-U-01



Analysis 427D1830A

2,1,1

7030/03-U-01

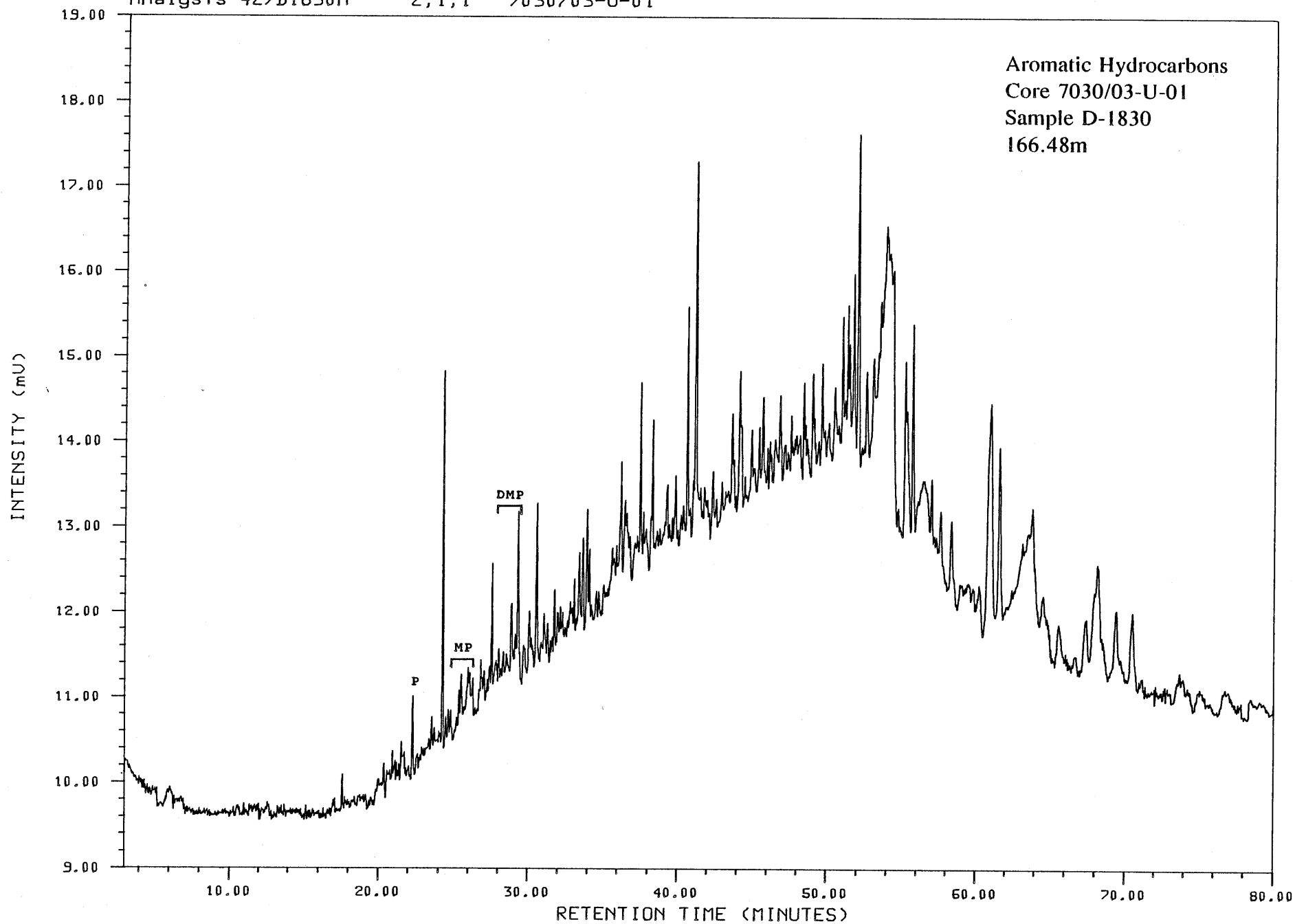
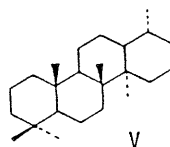
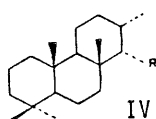
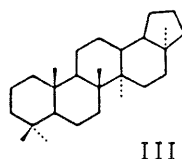
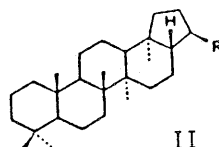
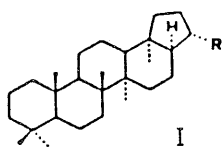


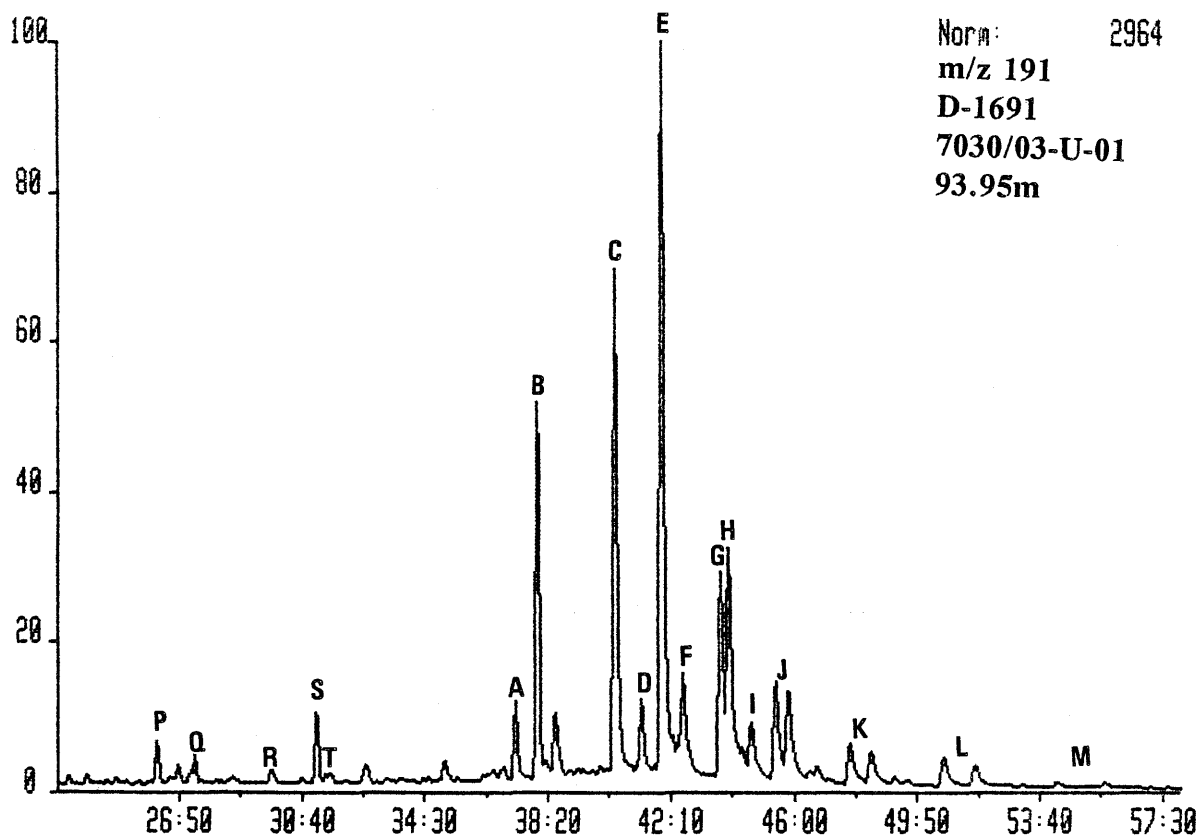
Figure A.II.1.3:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

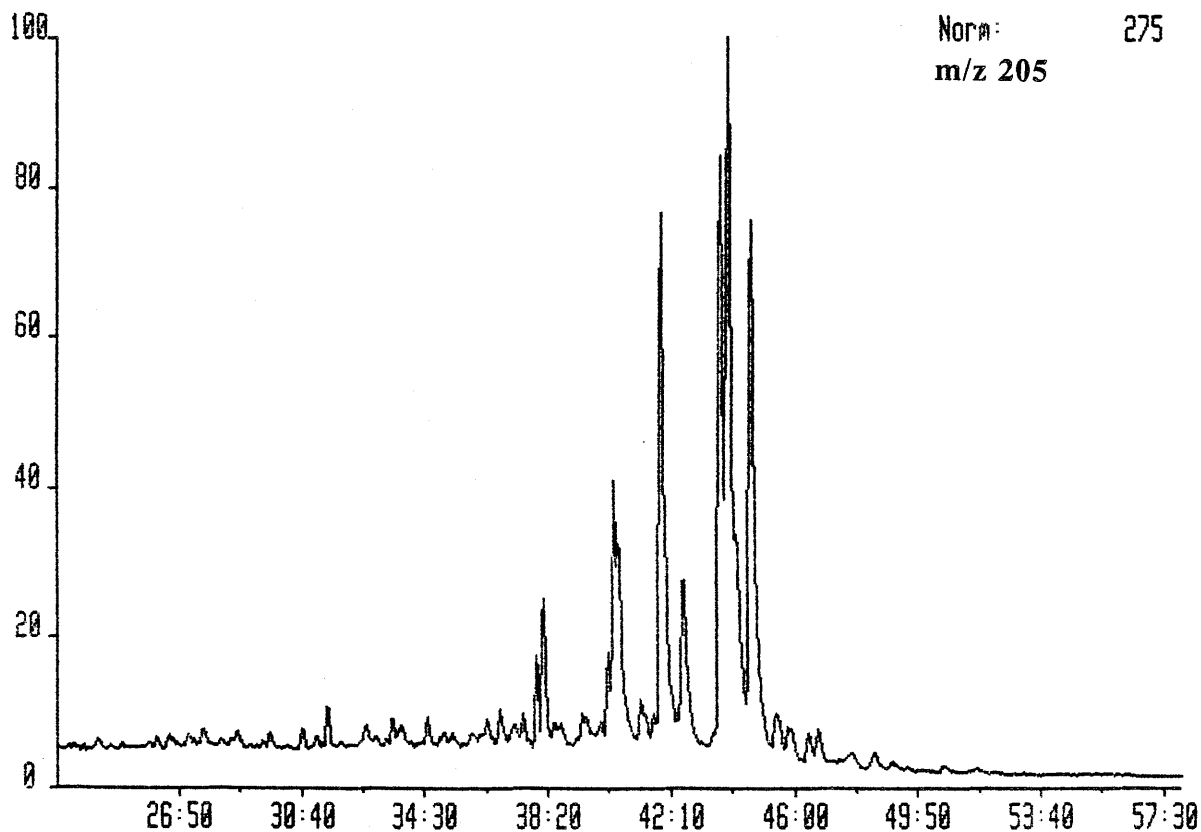
P	tricyclic terpene	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpene	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpene (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpene	$C_{24}H_{42}$	(V)
T	tricyclic terpene (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trisnorneohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trishomohopane	$C_{27}H_{46}$	(I, R=H)
Z	bishomohopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpene	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpene (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



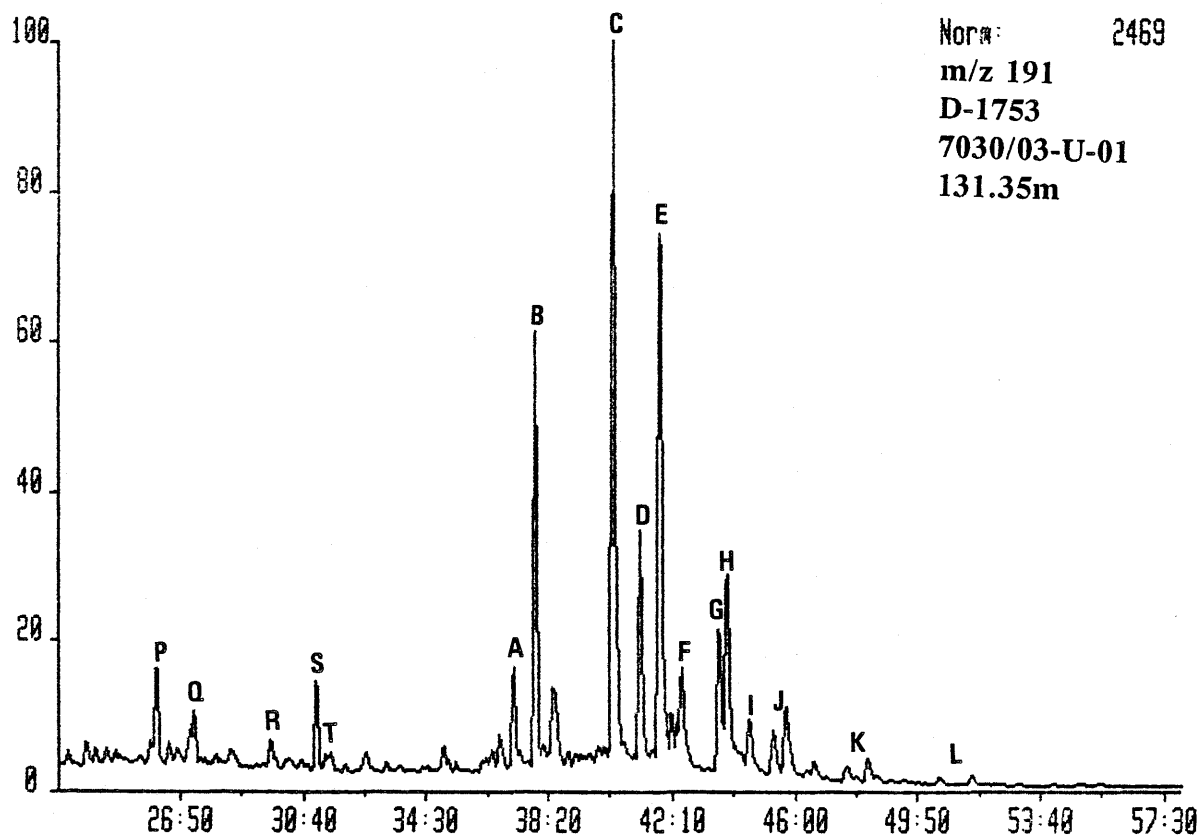
D1691SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



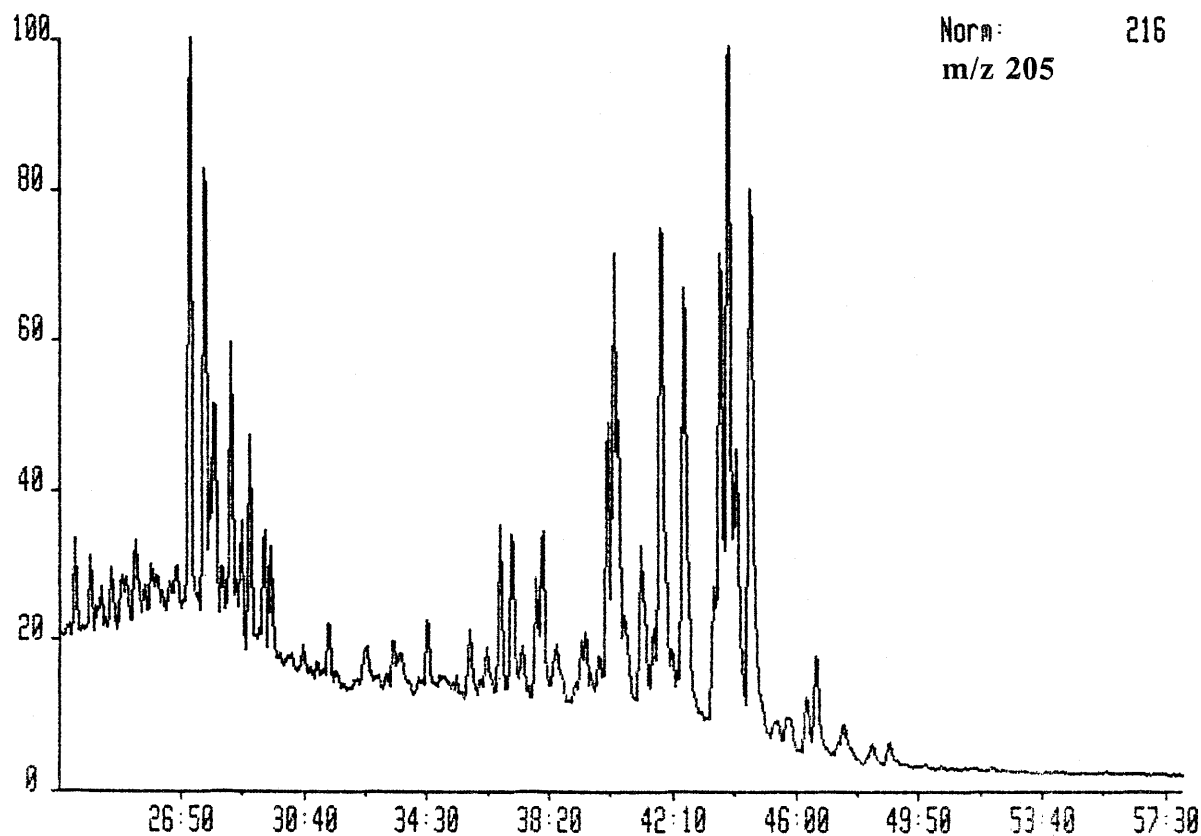
D1691SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



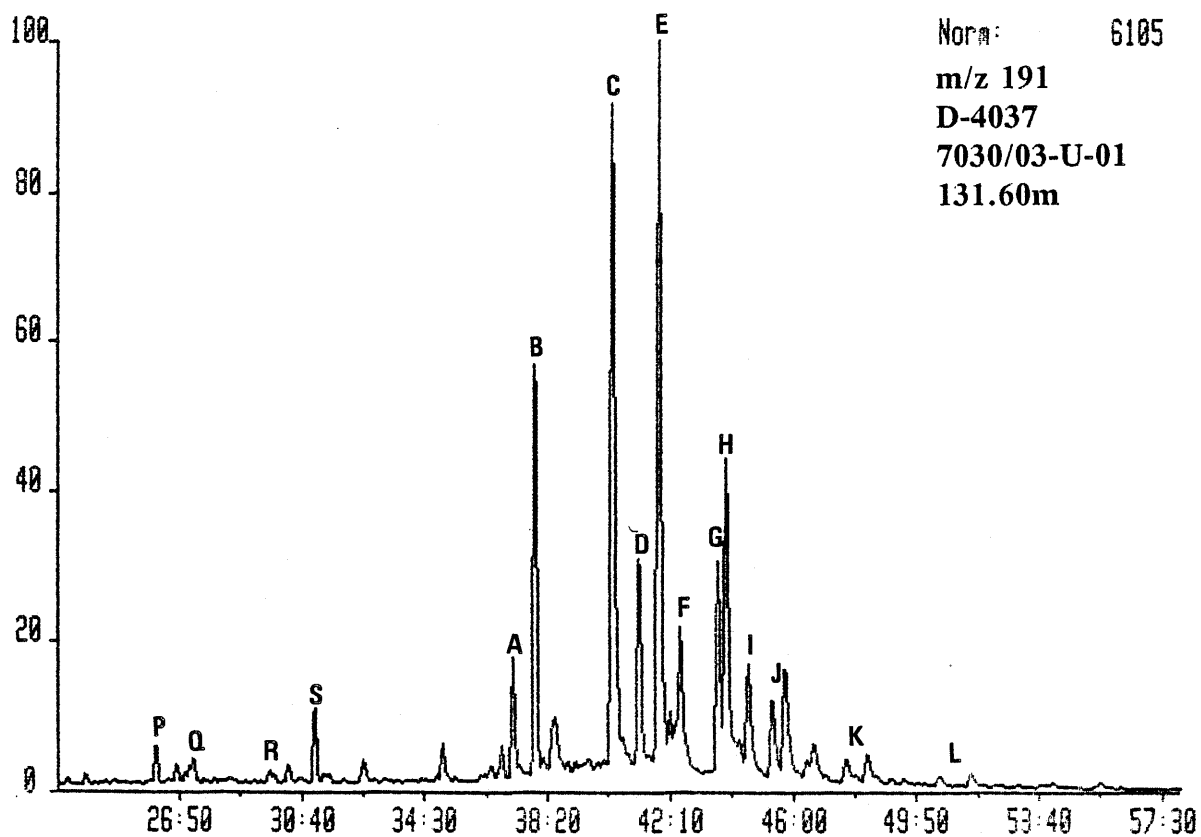
D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



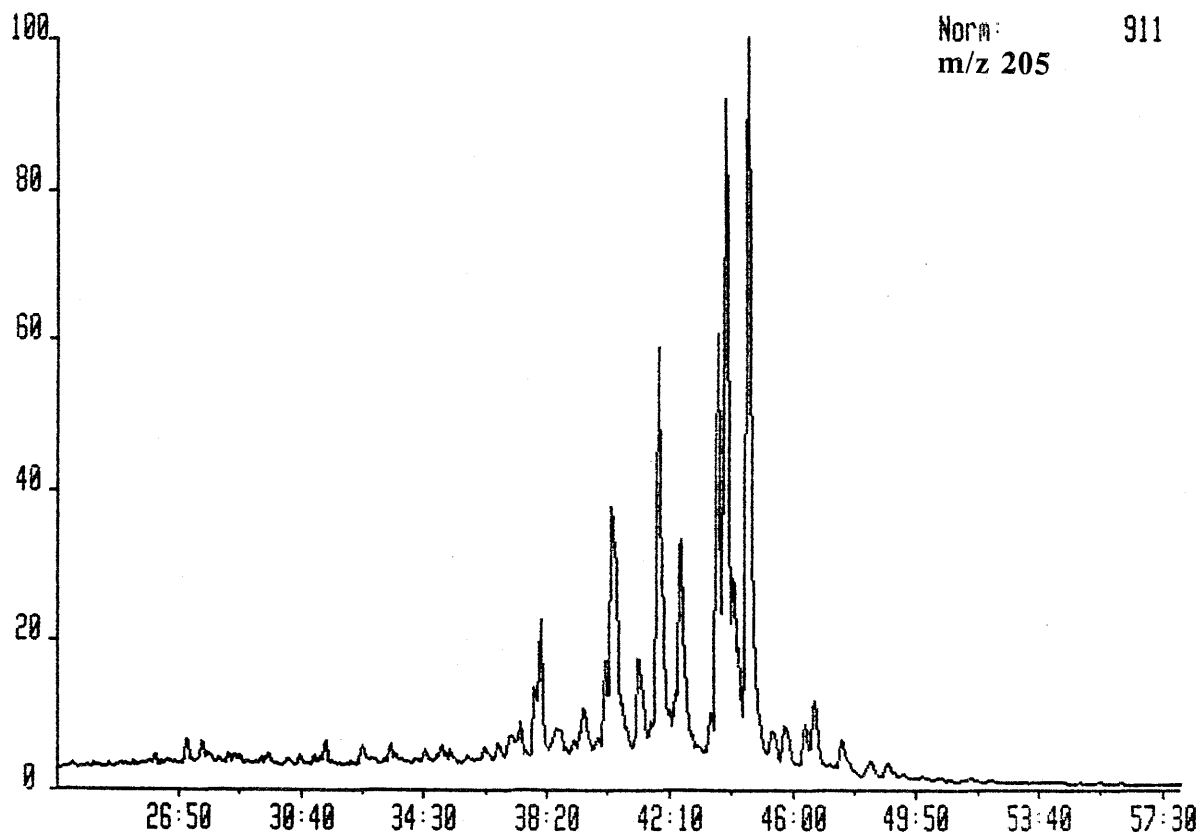
D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



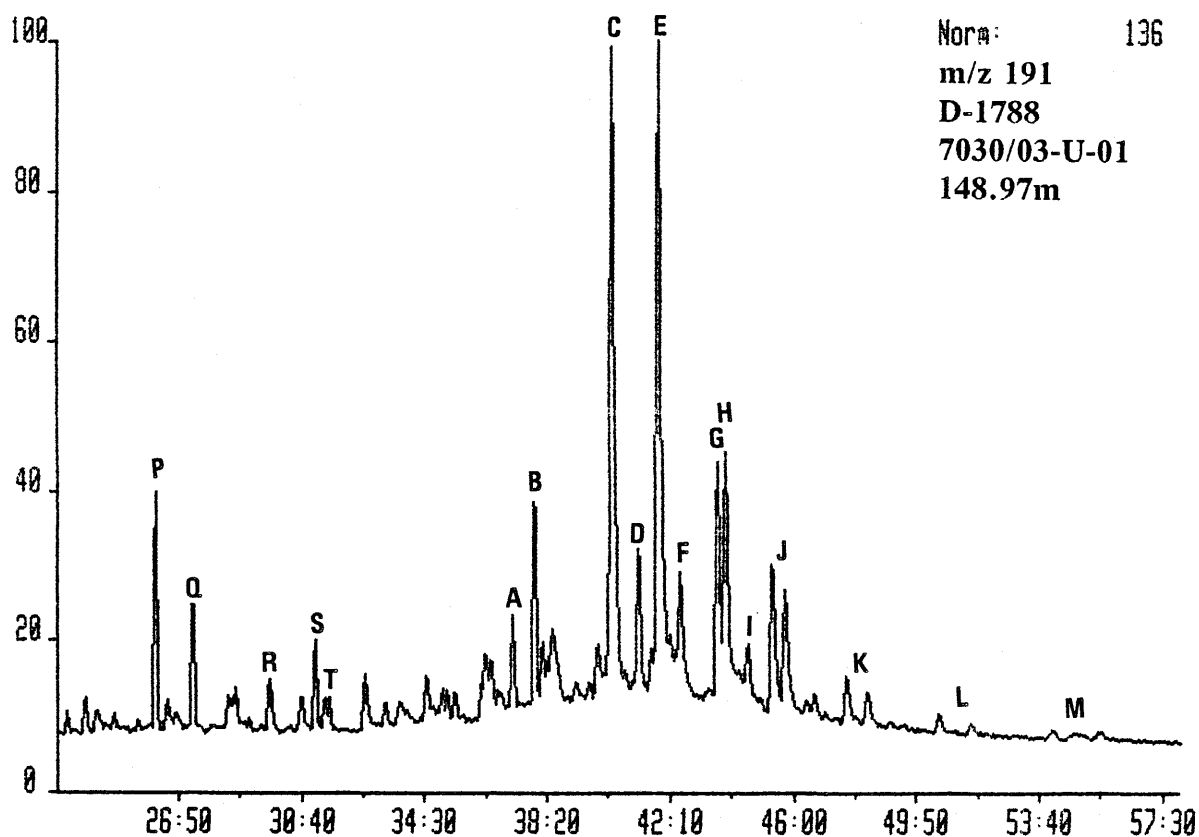
D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23

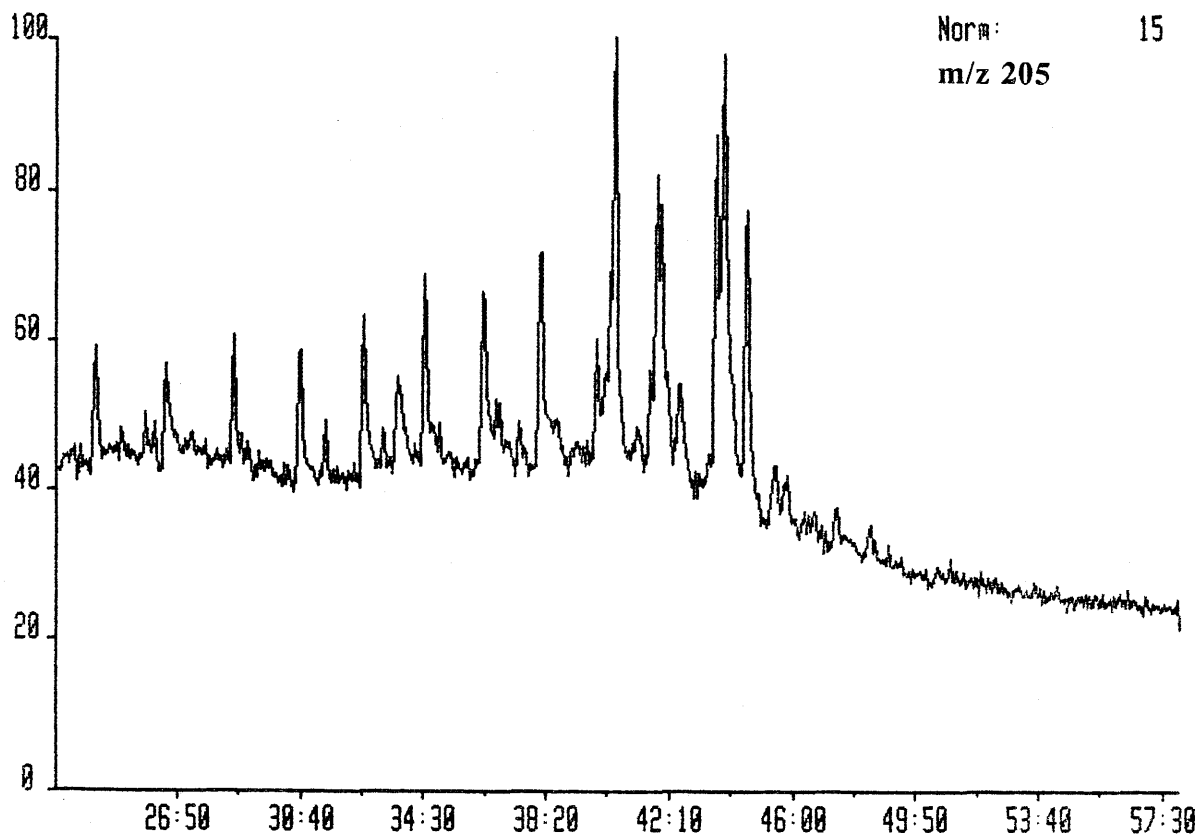


D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



Norm: 136
m/z 191
D-1788
7030/03-U-01
148.97m

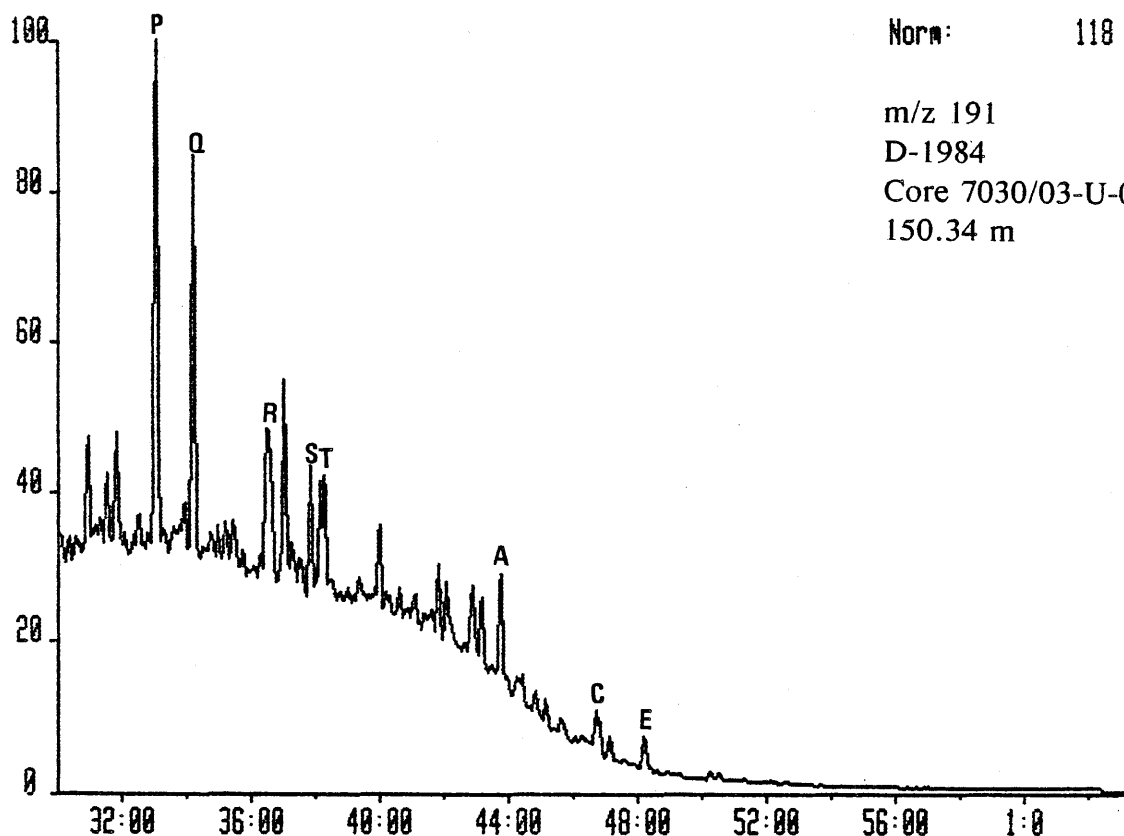
D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



Norm: 15
m/z 205

D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:

System:QUADSAT

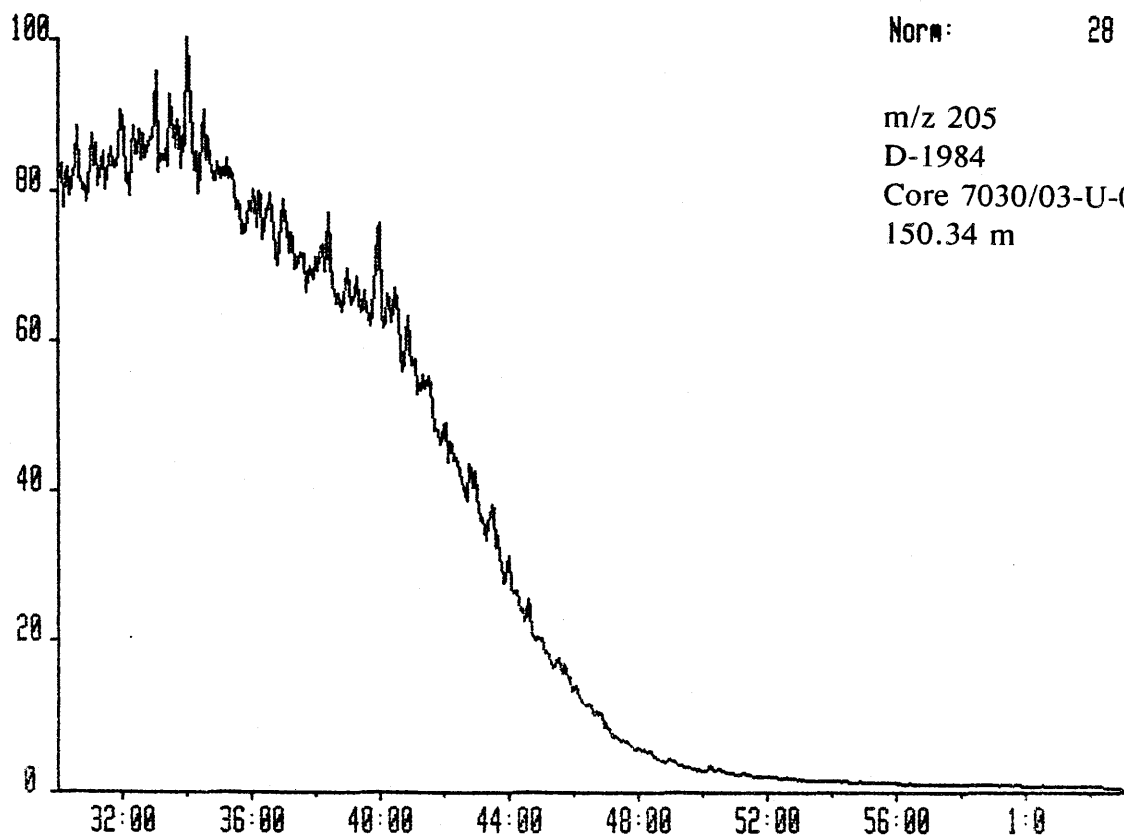


Norm: 118

m/z 191
D-1984
Core 7030/03-U-01
150.34 m

D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:

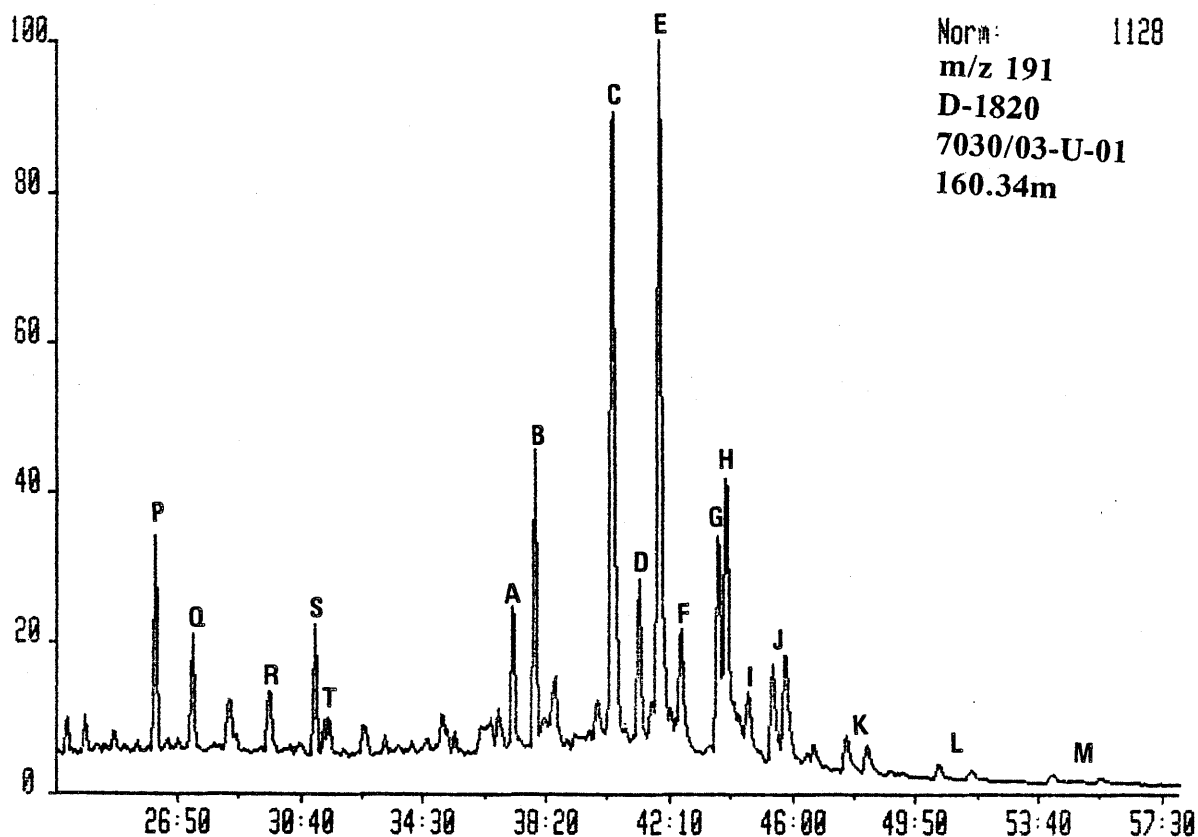
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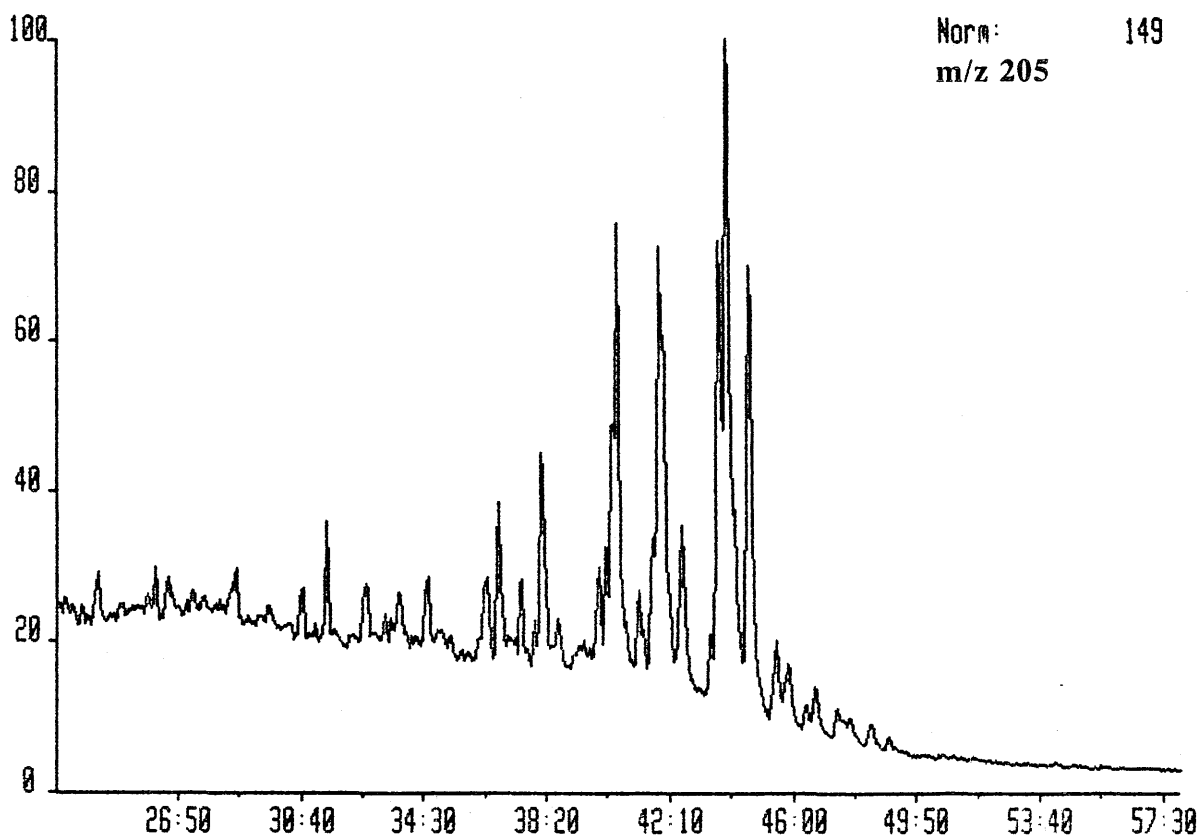
Norm: 28

m/z 205
D-1984
Core 7030/03-U-01
150.34 m

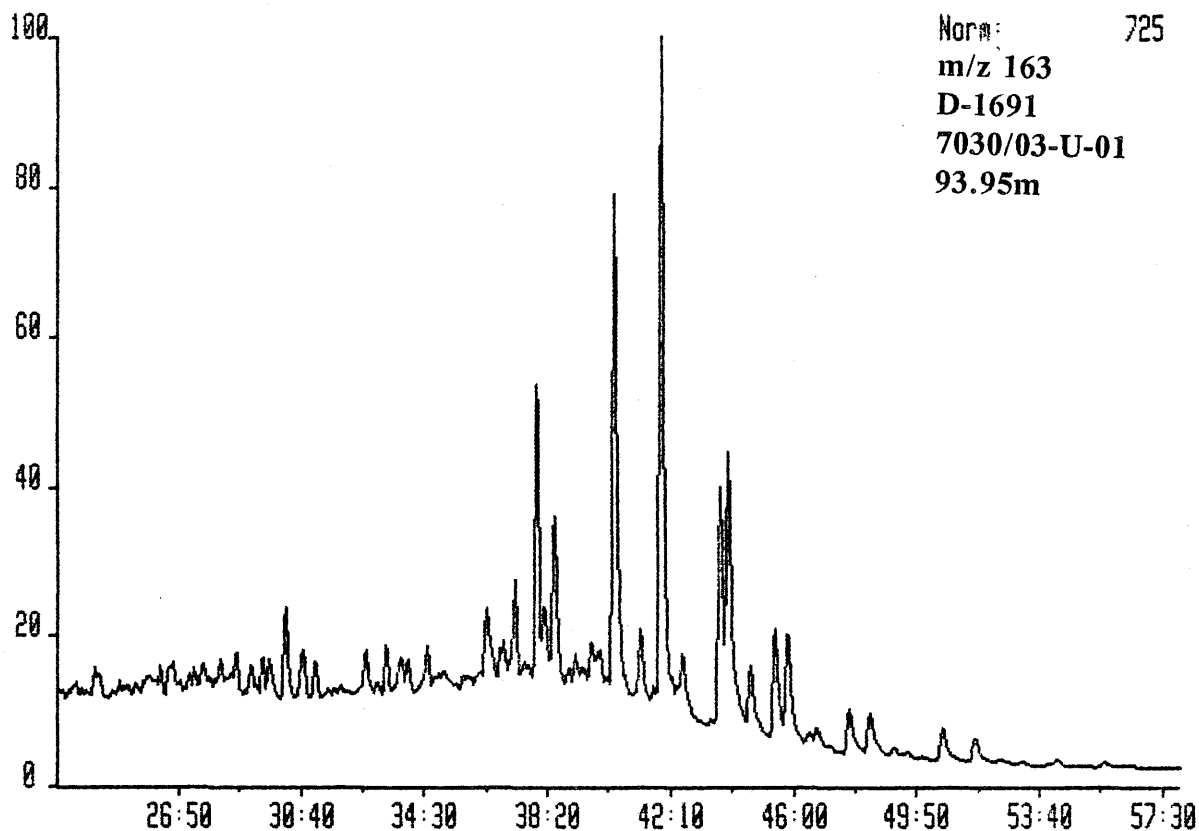
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Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



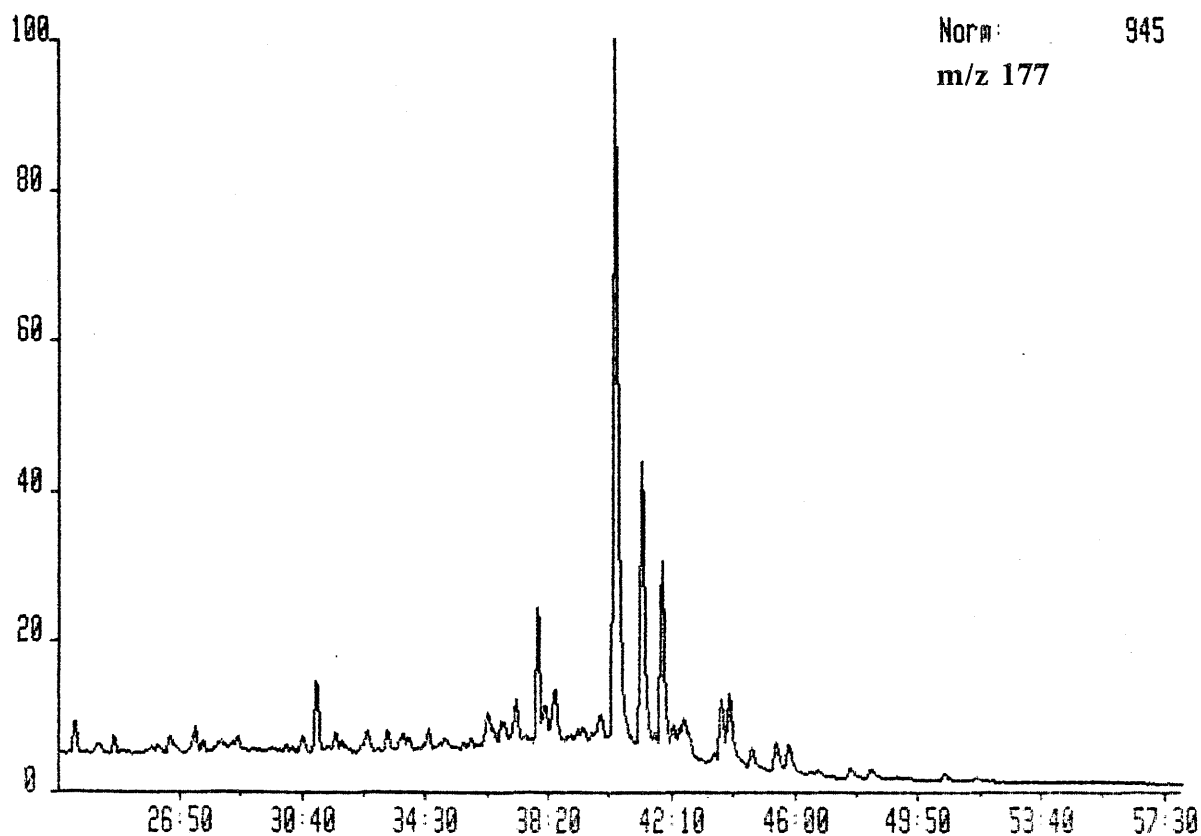
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Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



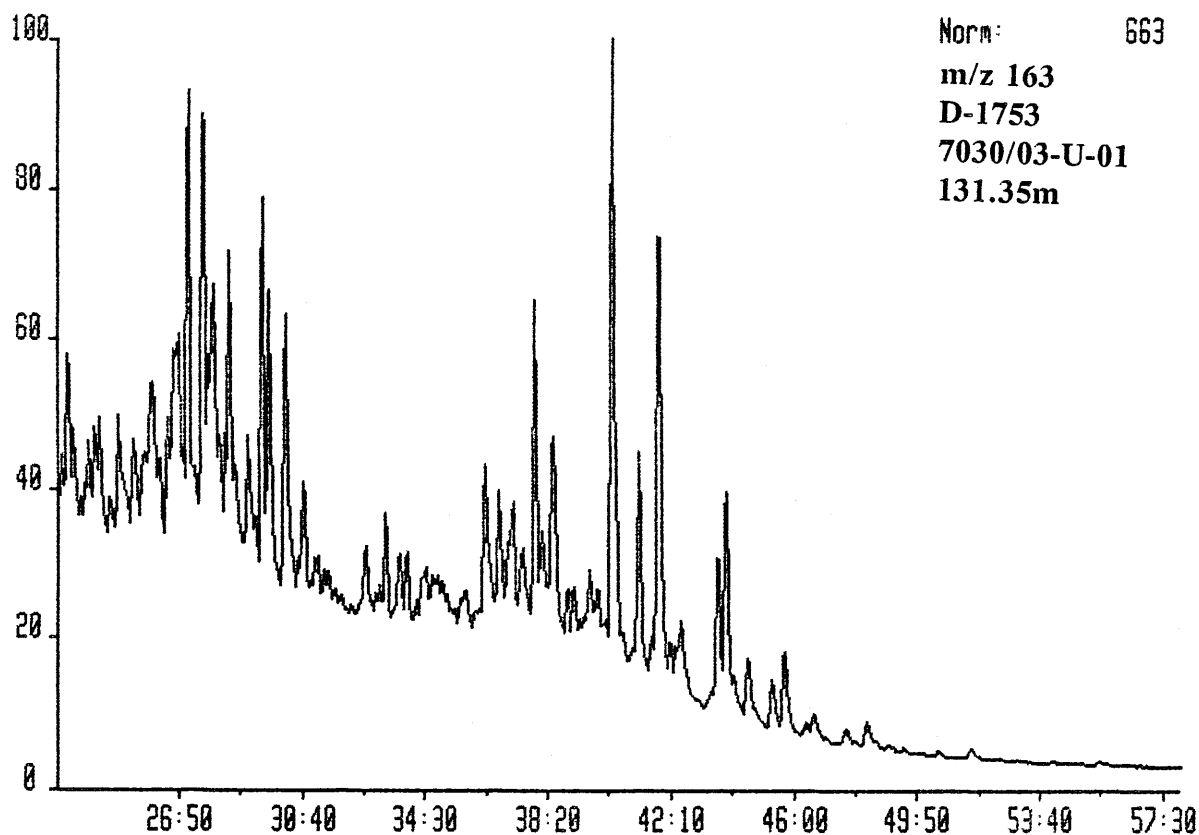
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Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



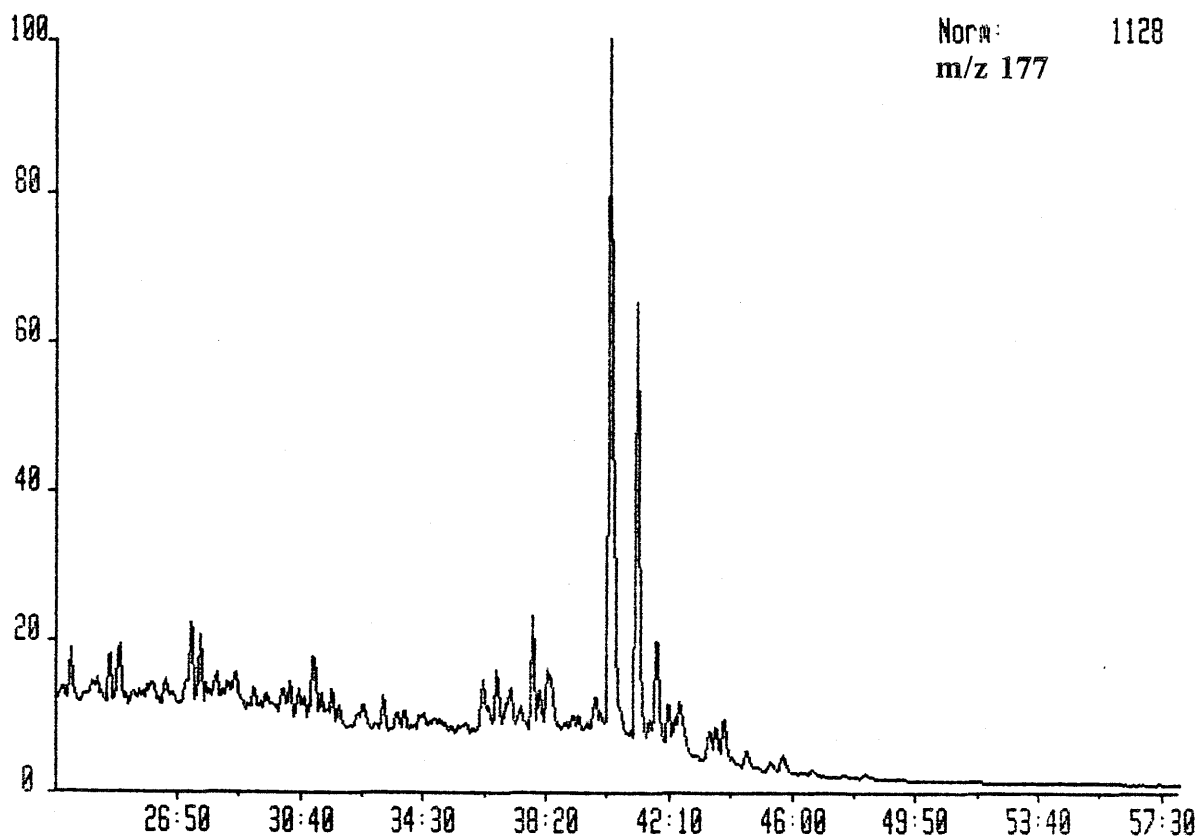
D1691SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



01753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



01753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

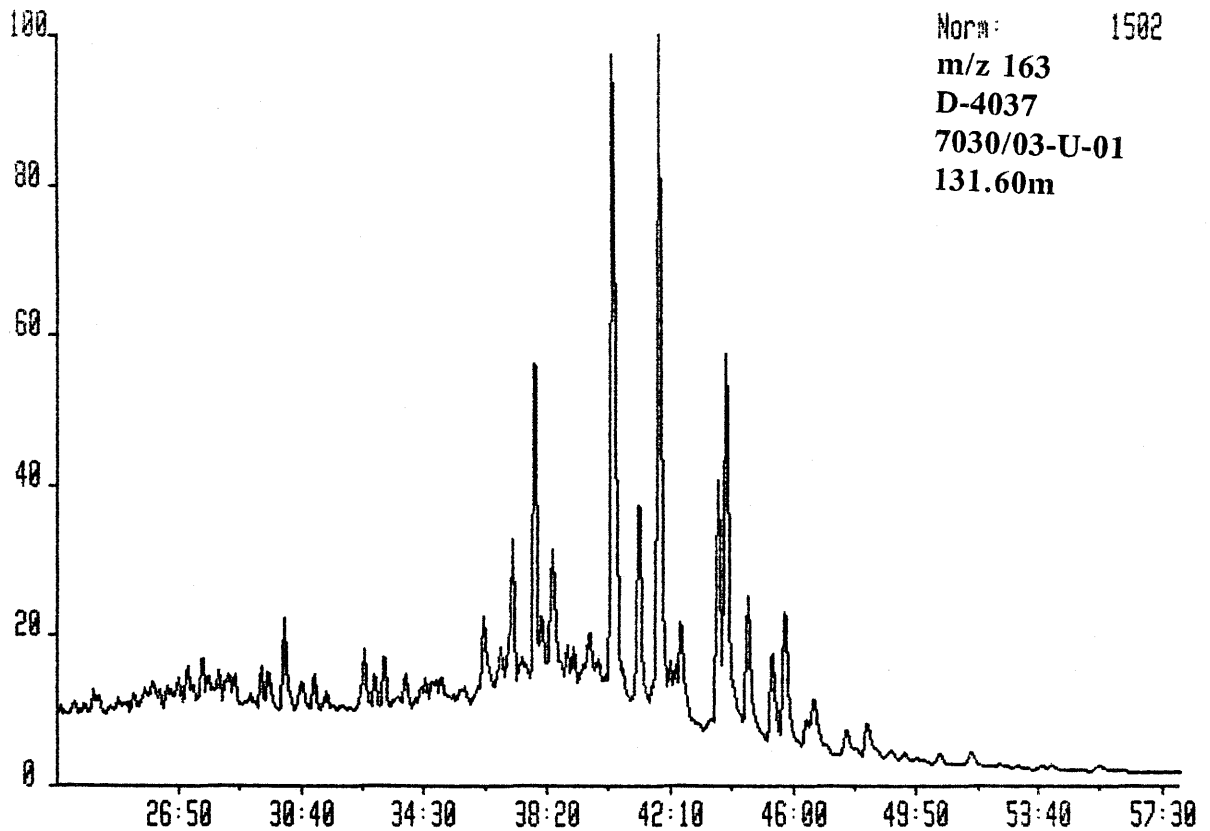




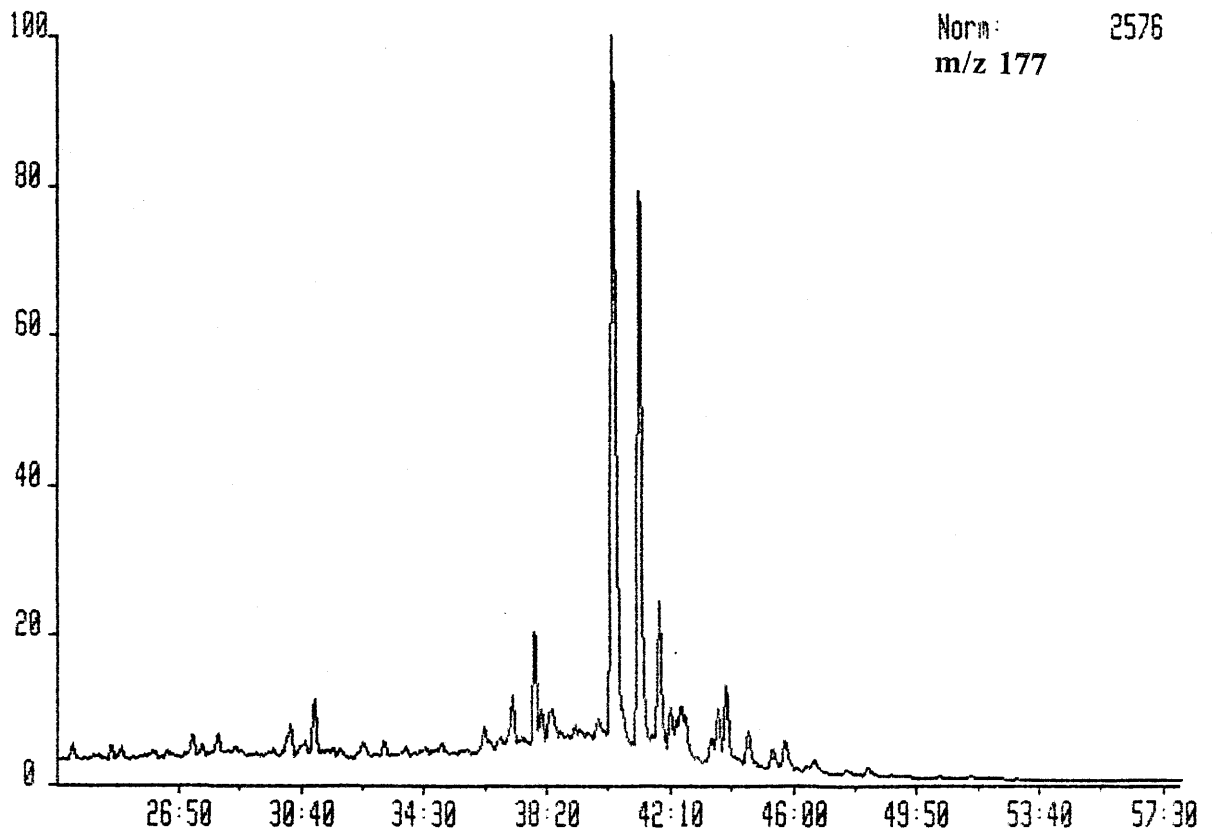
IKU
SINTEF-GRUPPEN

- 99 -

D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

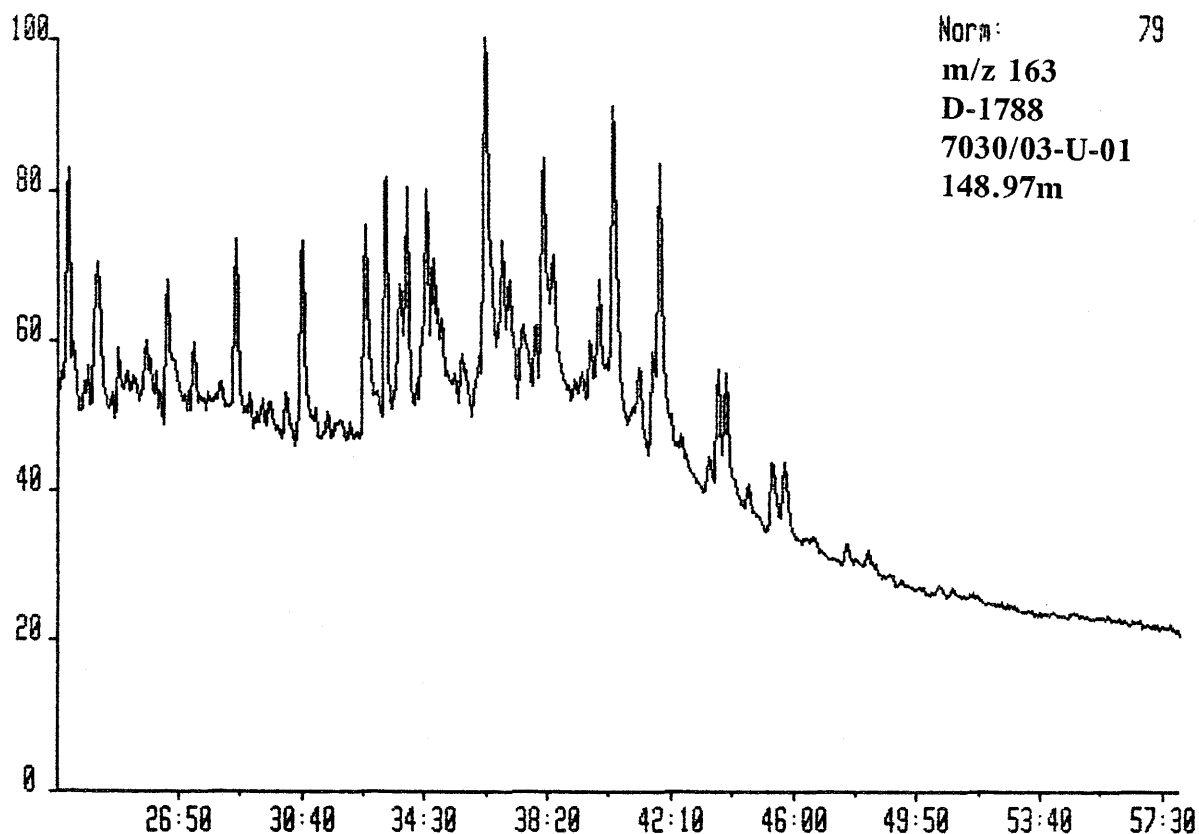




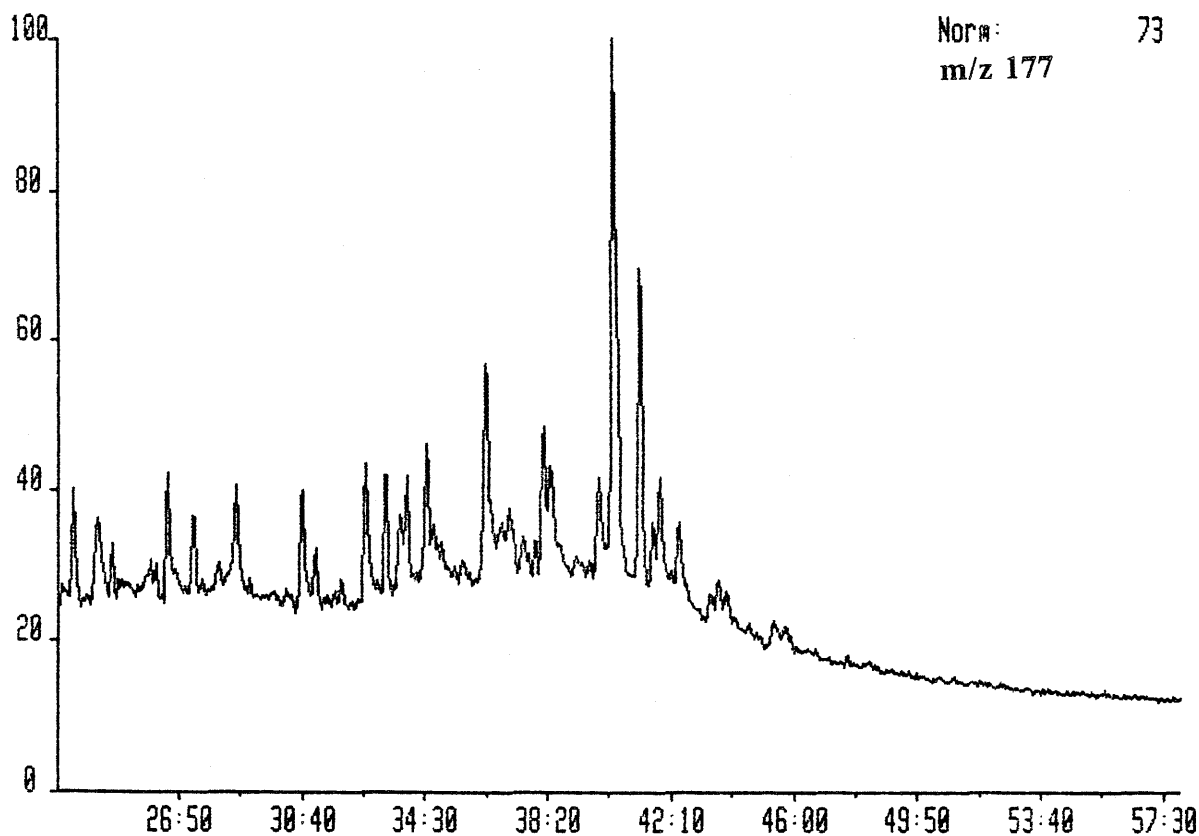
IKU
SINTEF-GRUPPEN

- 100 -

01788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23

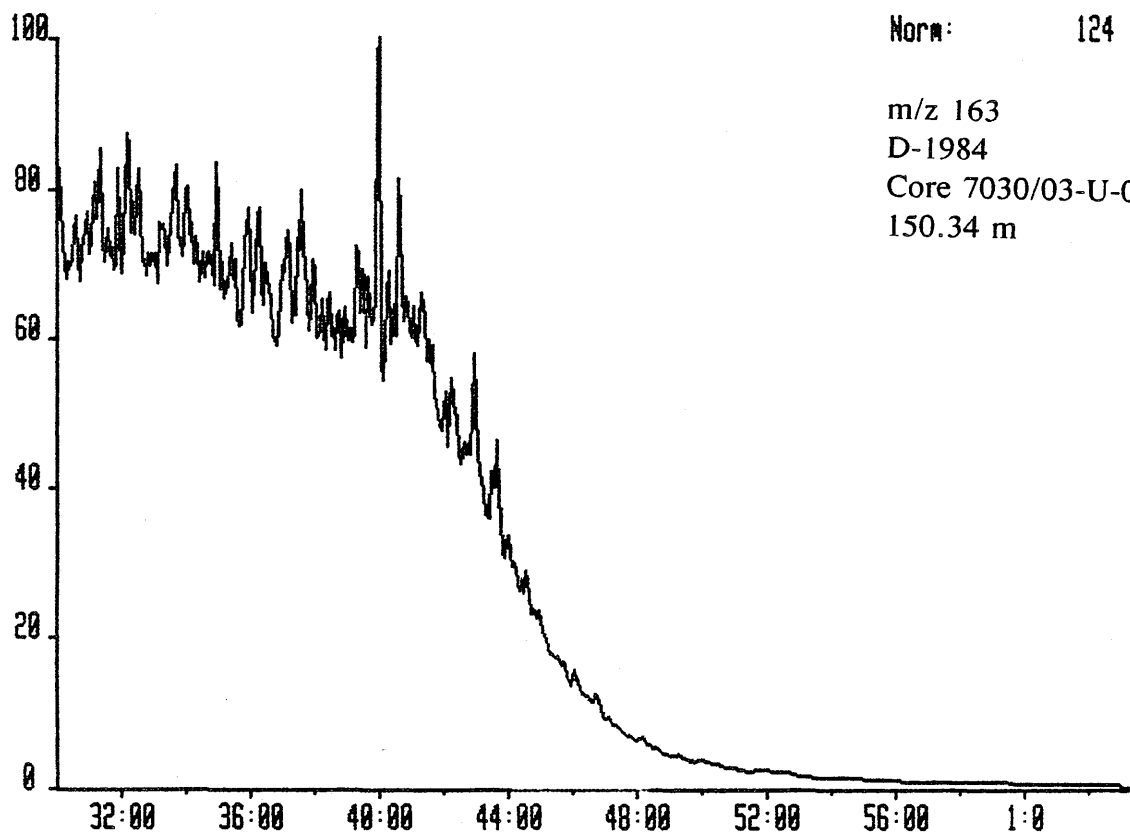


01788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



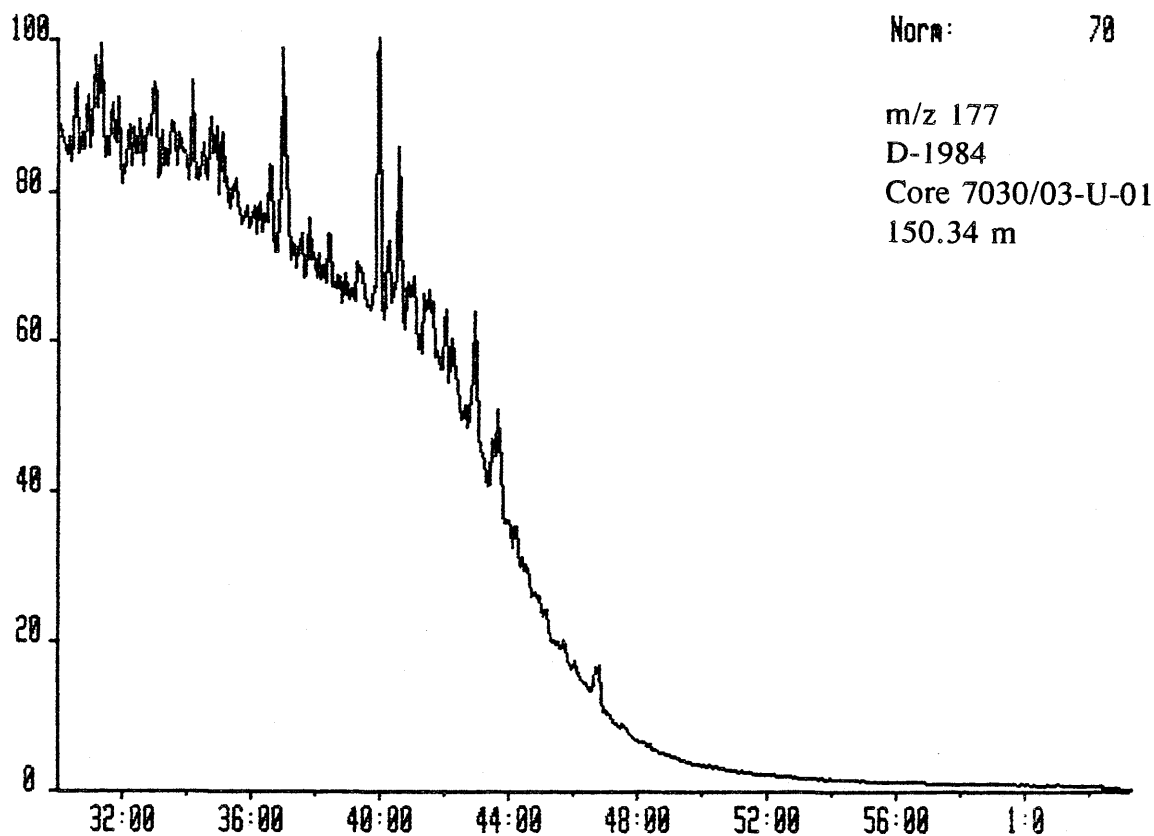
D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:

System:QUADSAT



D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

System:QUADSAT

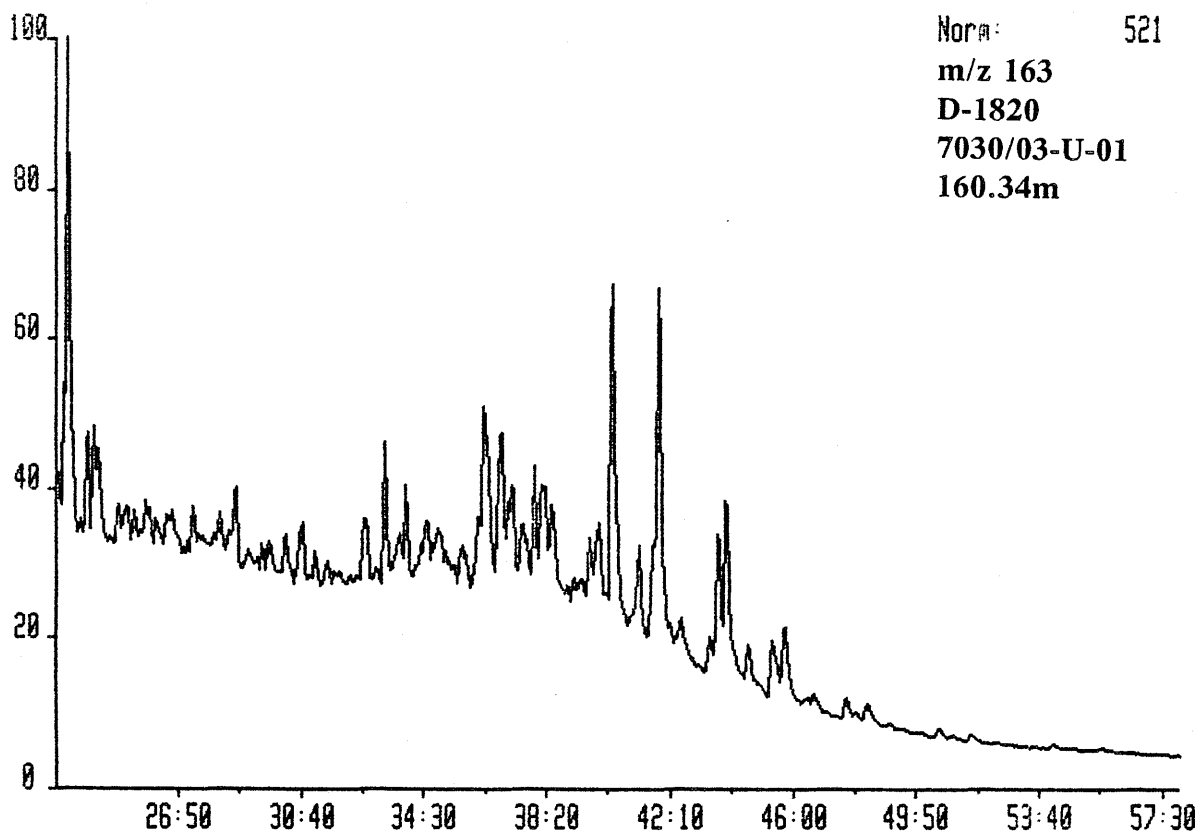




IKU
SINTEF-GRUPPEN

- 102 -

D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

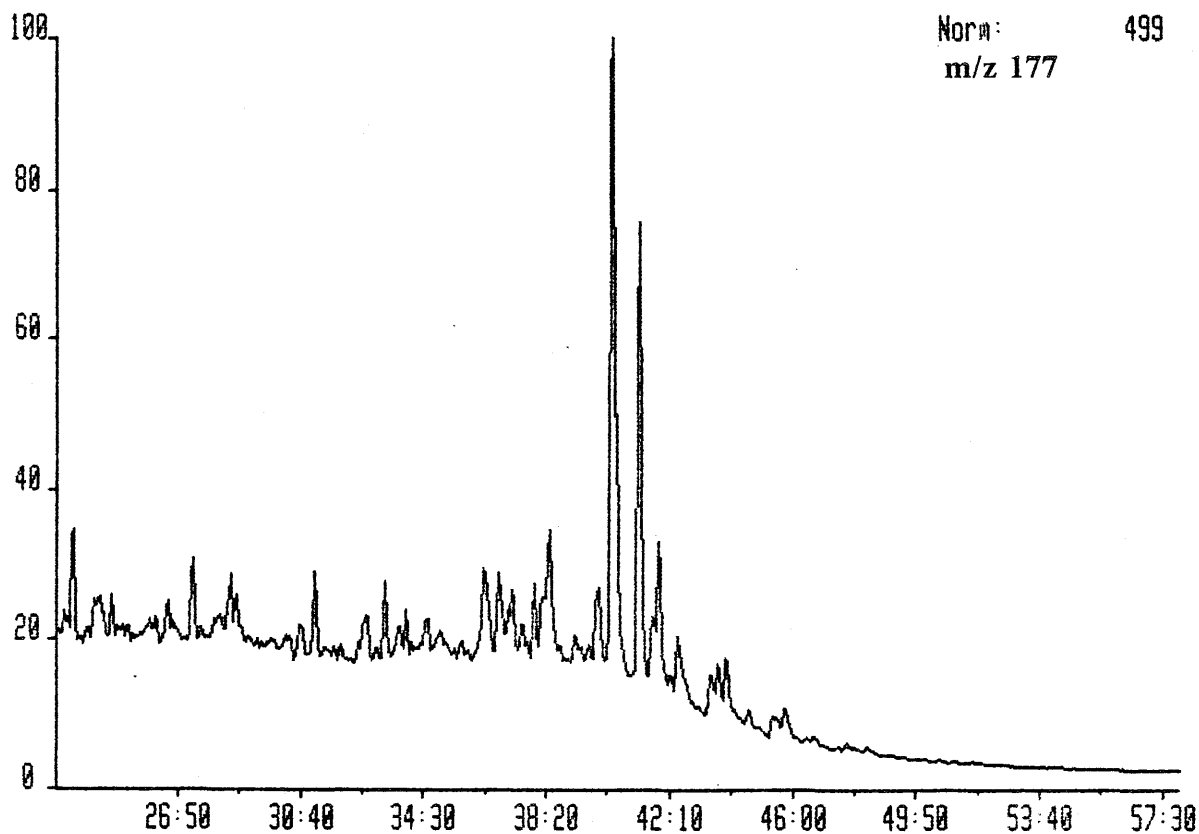
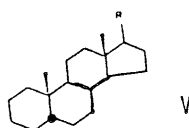
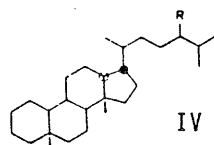
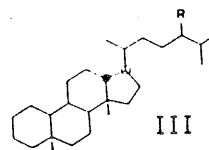
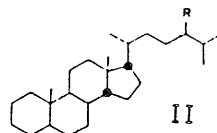
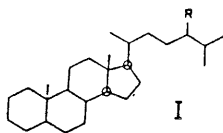


Figure A.II.1.4:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)

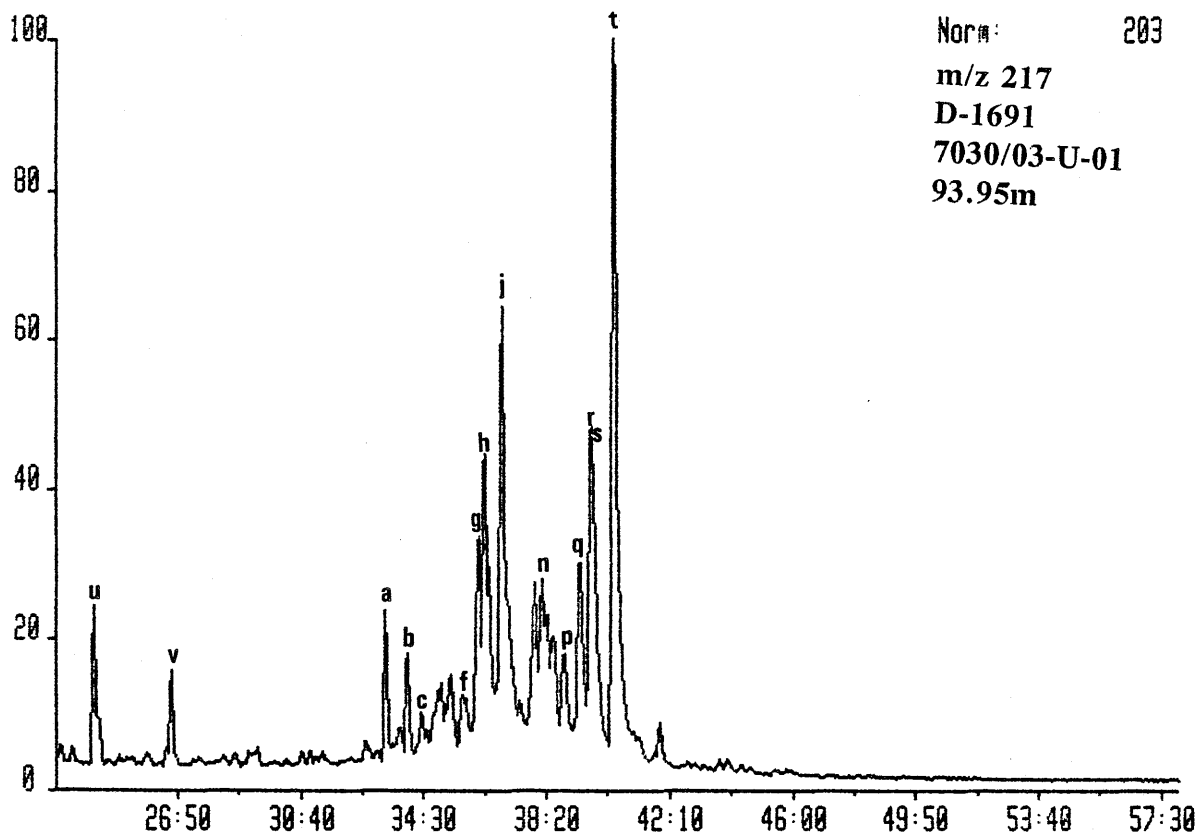




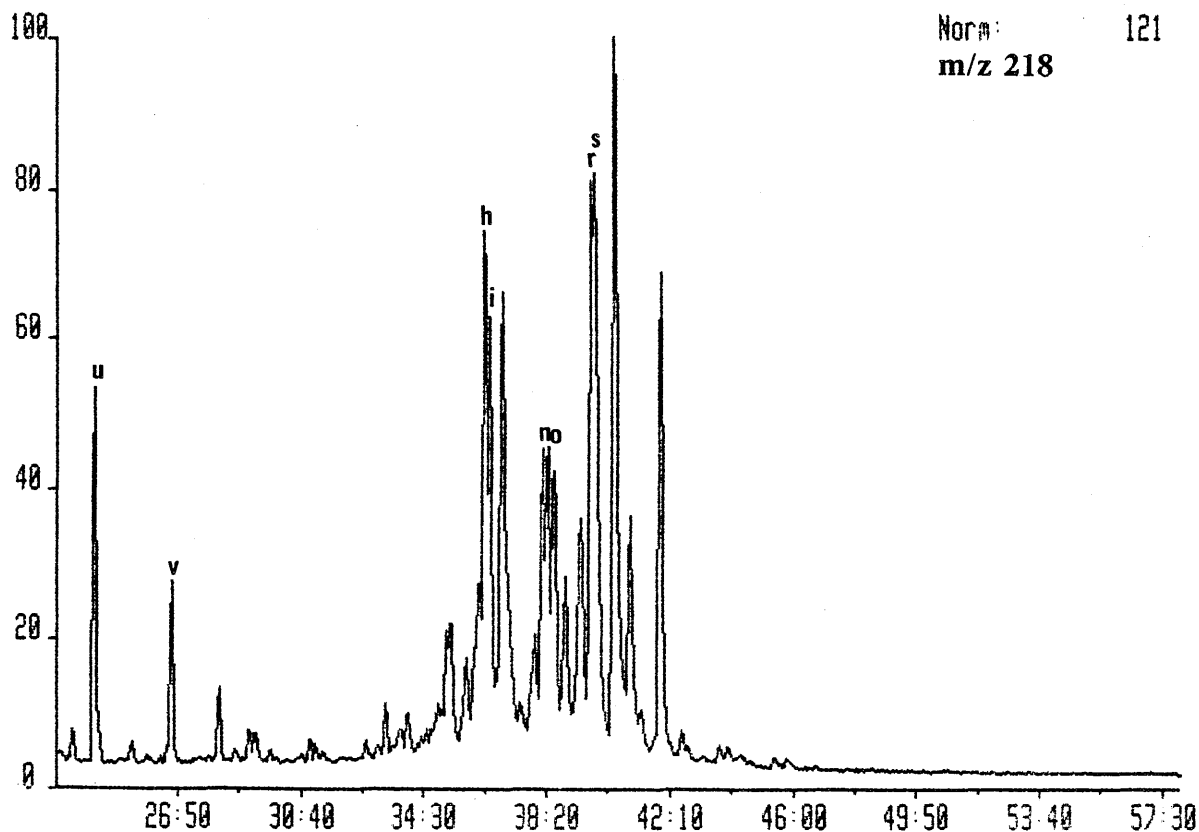
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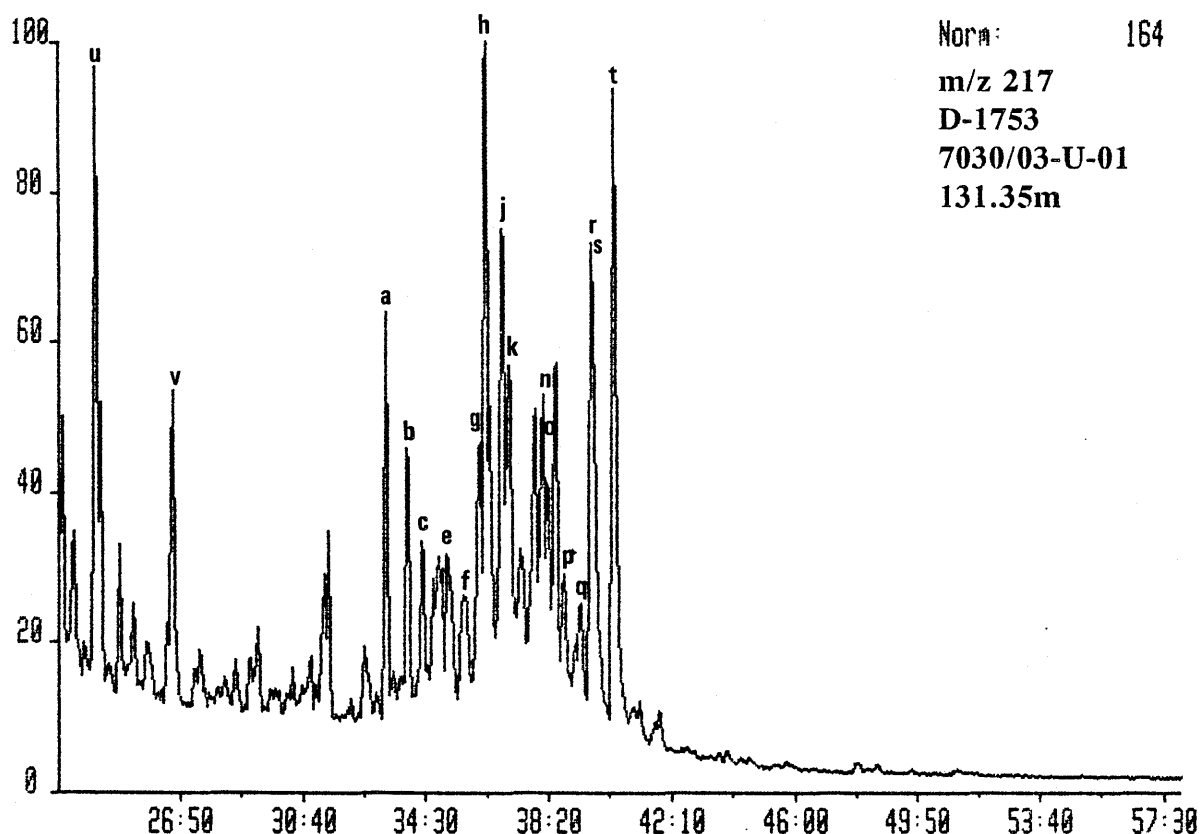
D1691SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



D1691SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23

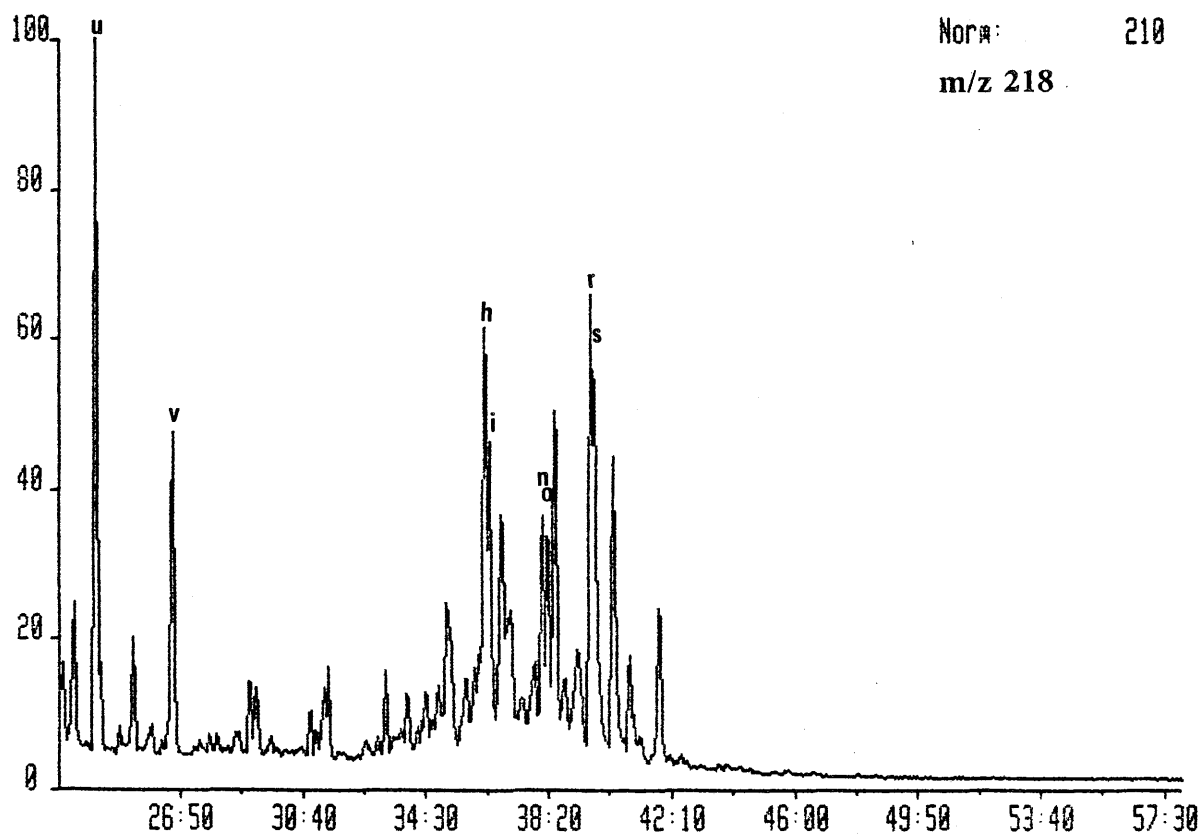


D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



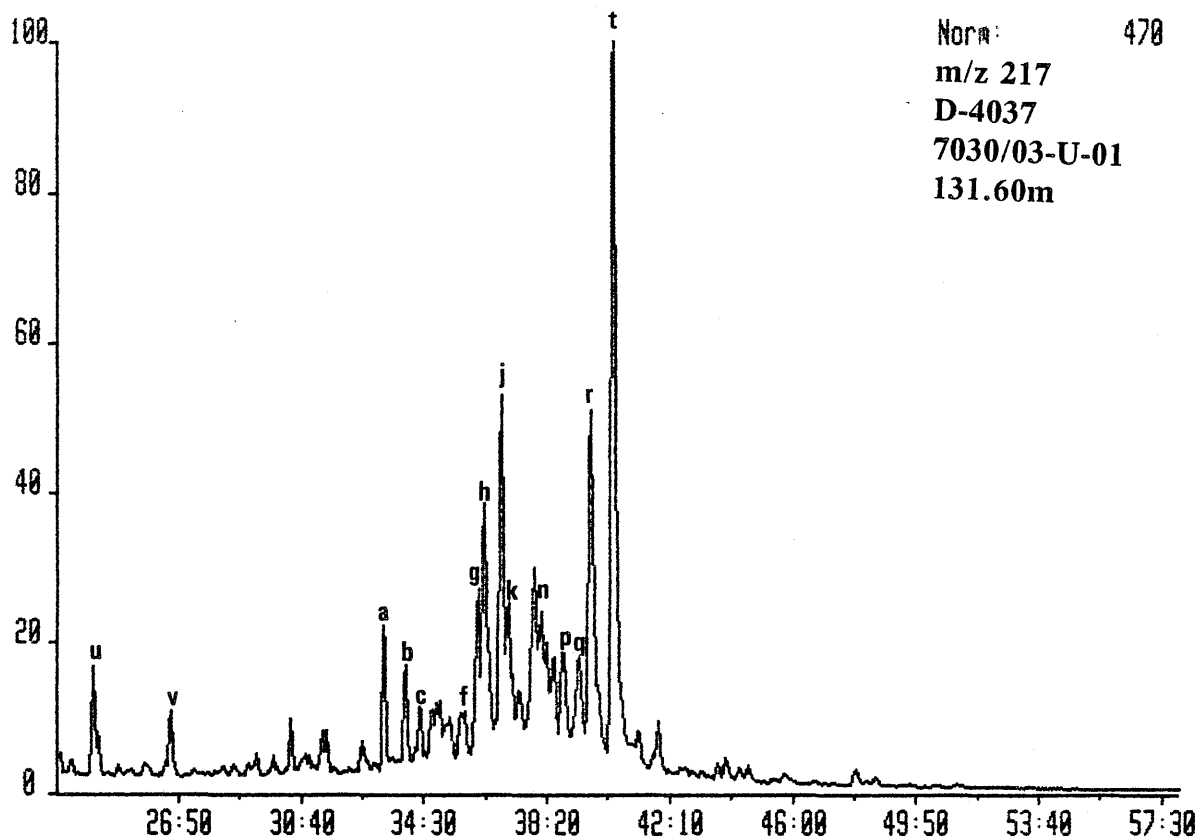
Norm: 164
m/z 217
D-1753
7030/03-U-01
131.35m

D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23

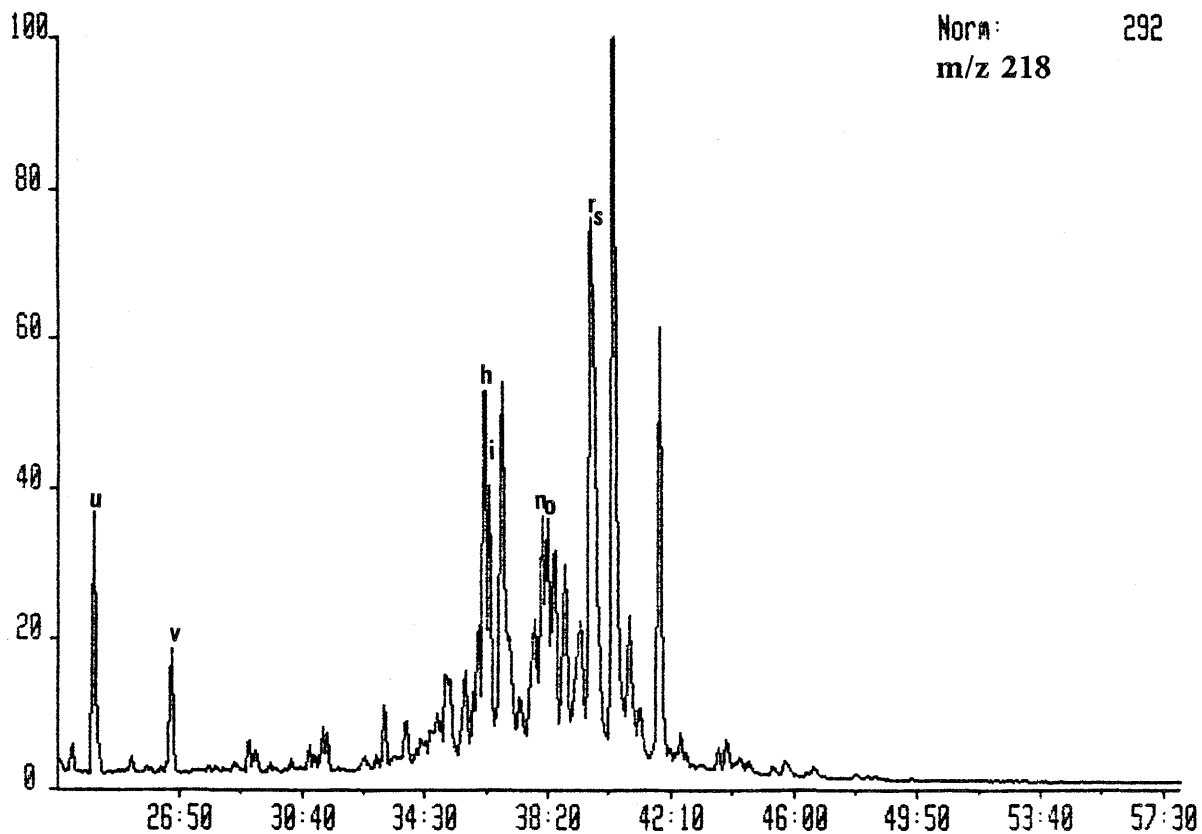


Norm: 210
m/z 218

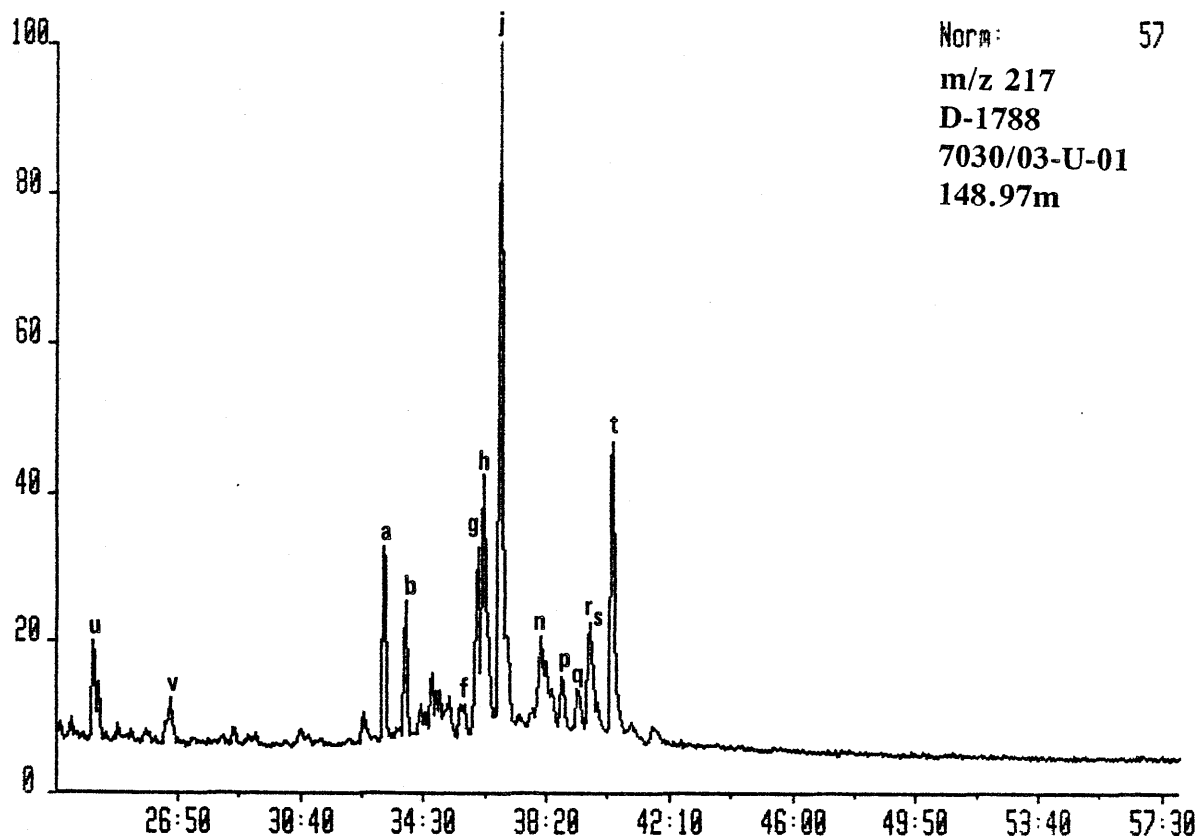
D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



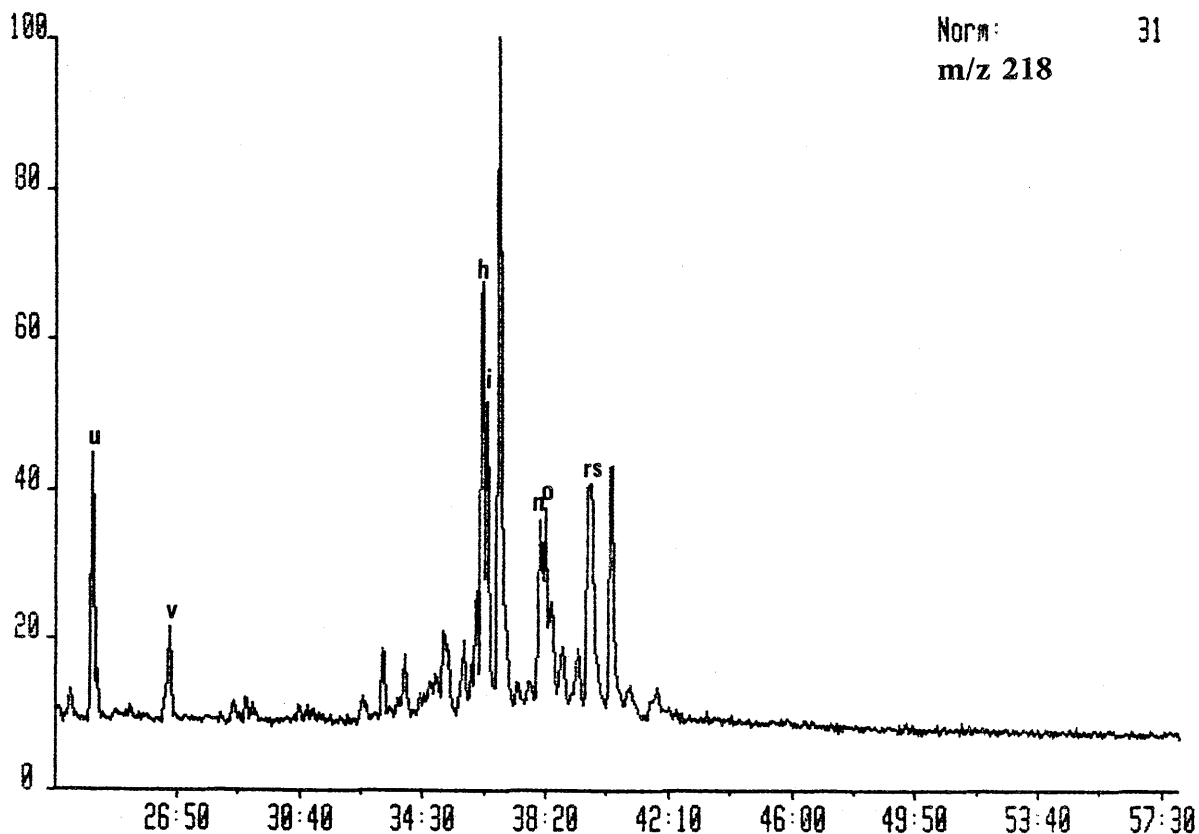
D4037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23

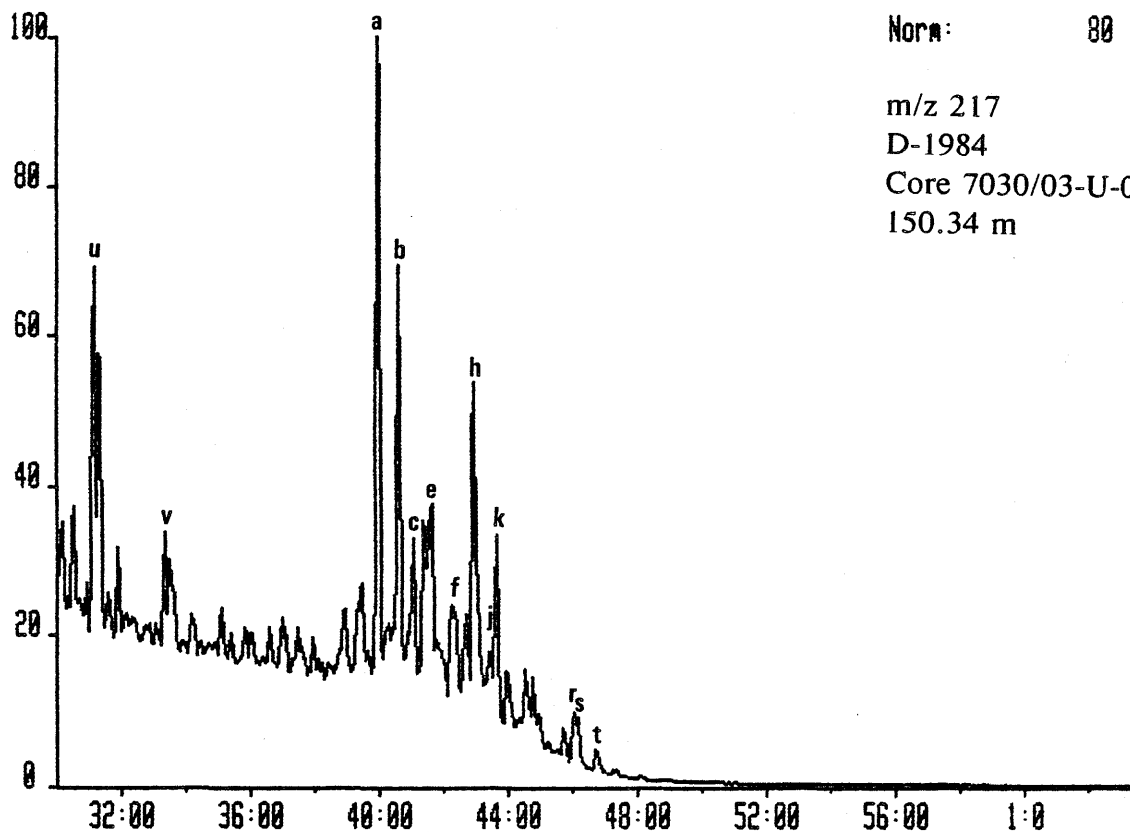


D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:

System:QUADSAT

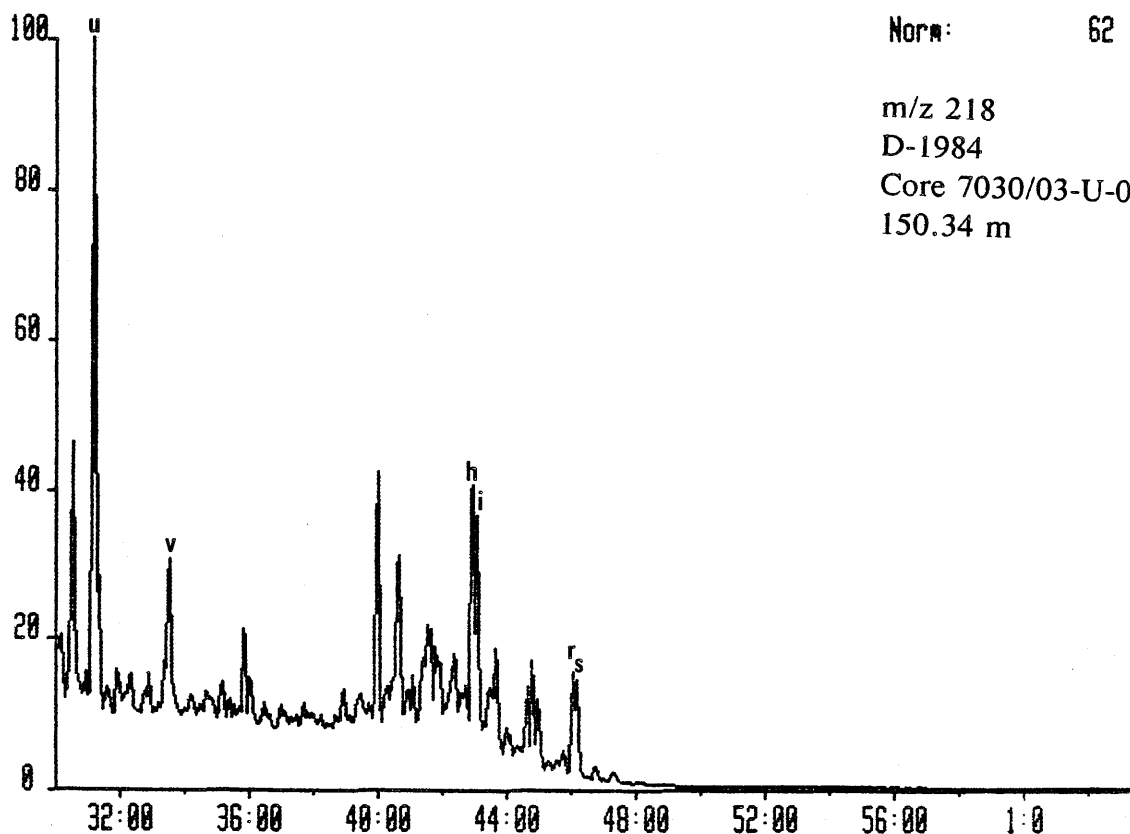


Norm: 80

m/z 217
D-1984
Core 7030/03-U-01
150.34 m

D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:

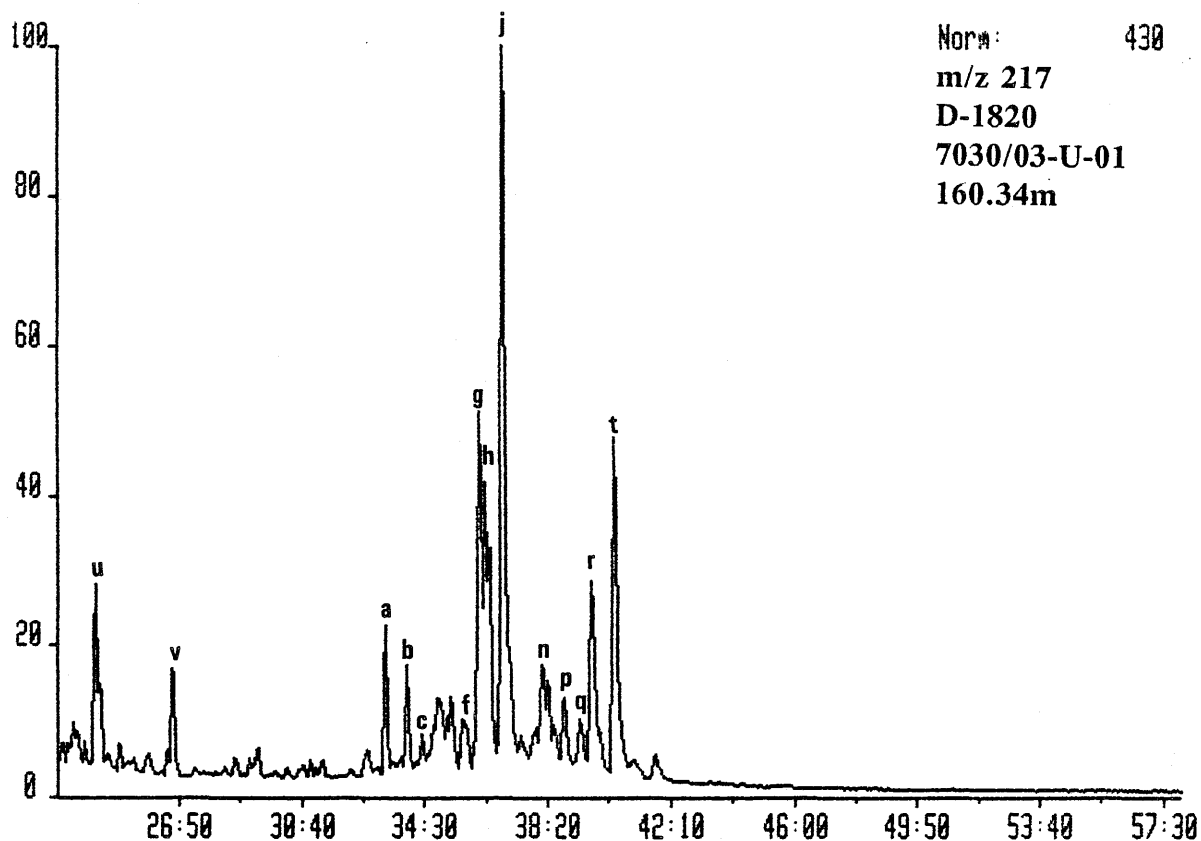
System:QUADSAT



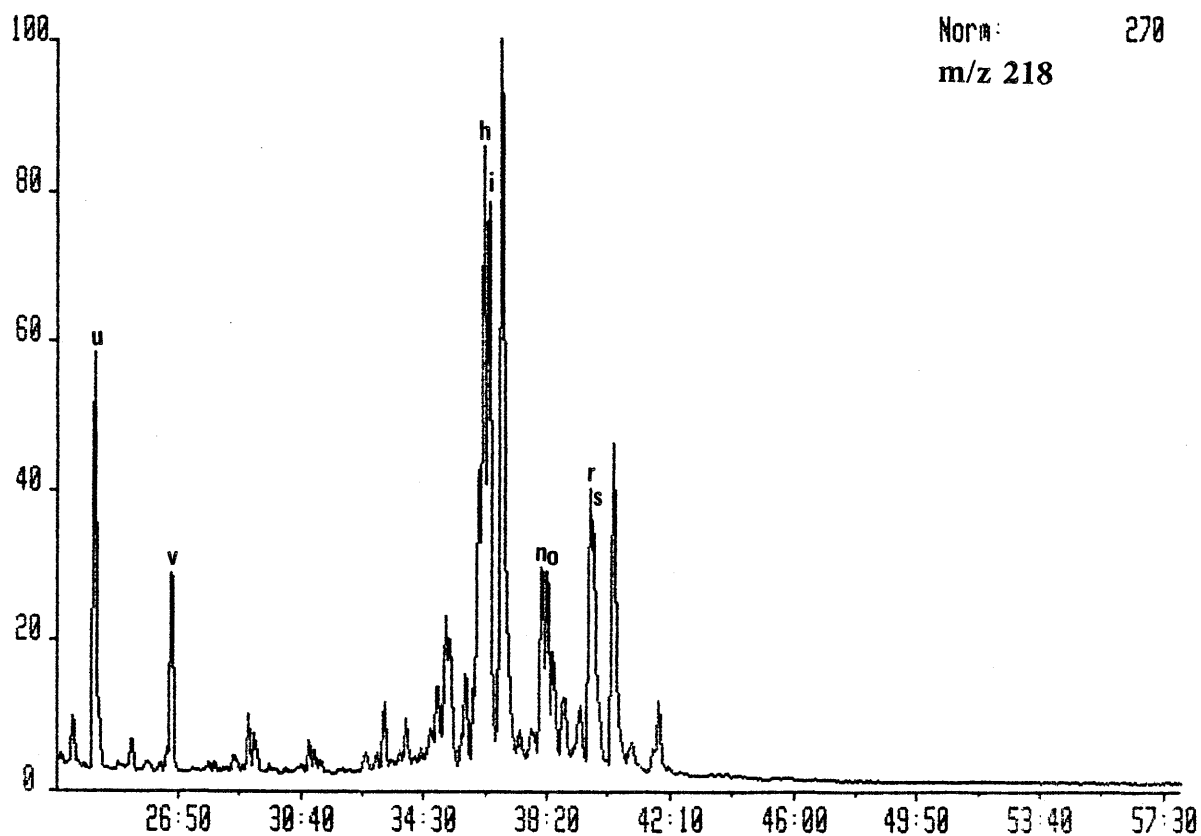
Norm: 62

m/z 218
D-1984
Core 7030/03-U-01
150.34 m

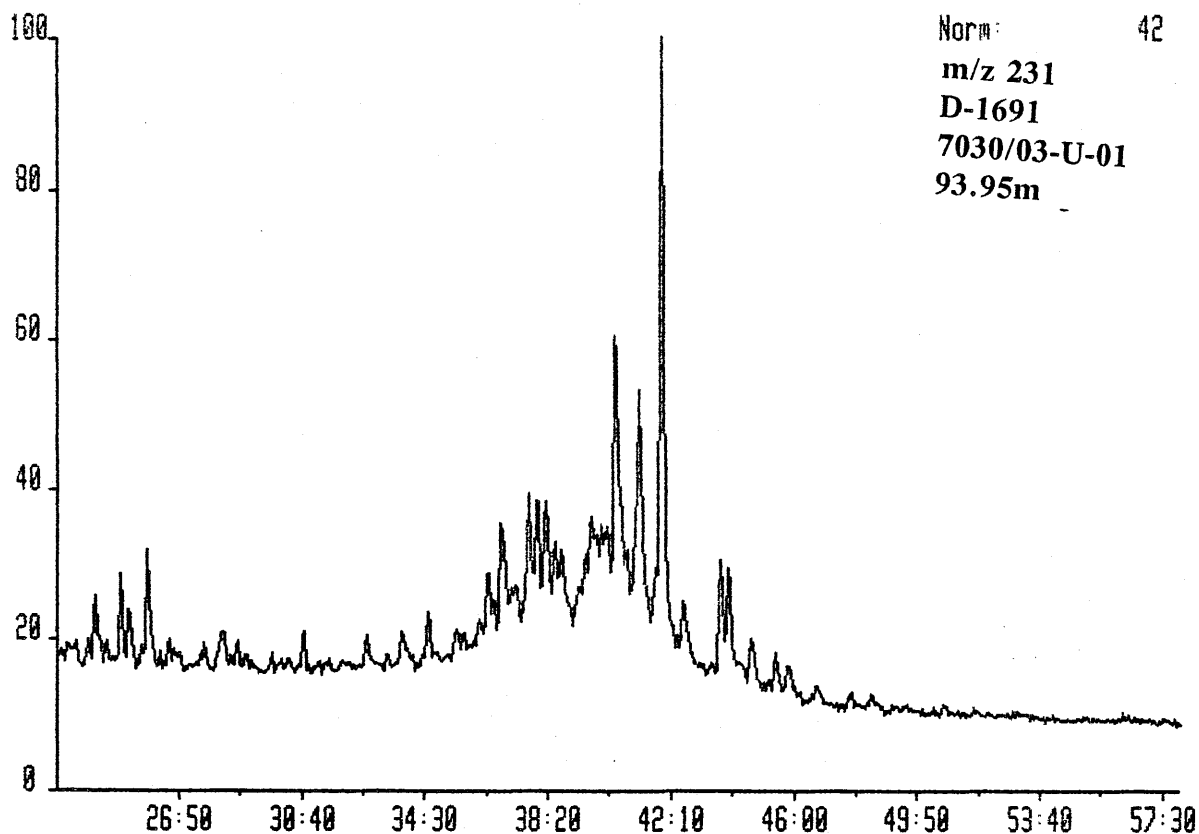
D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:21.3427.23



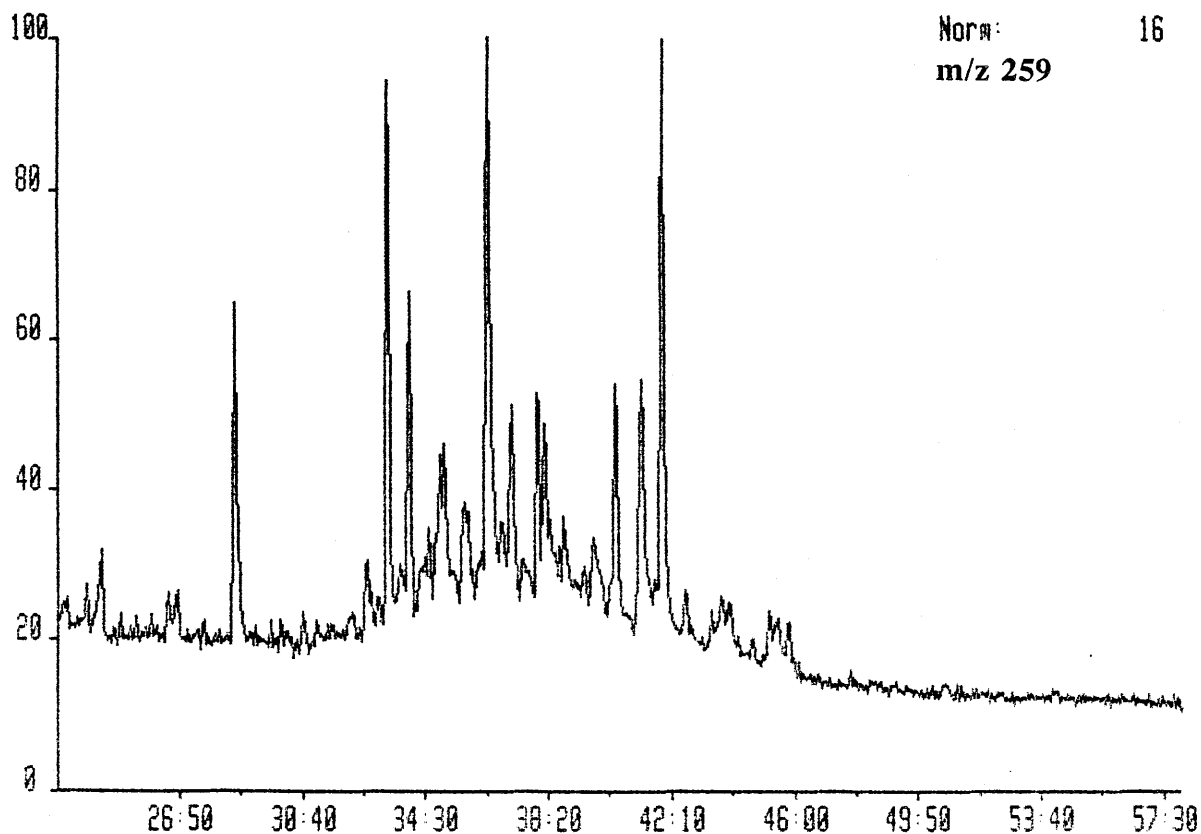
D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:21.3427.23



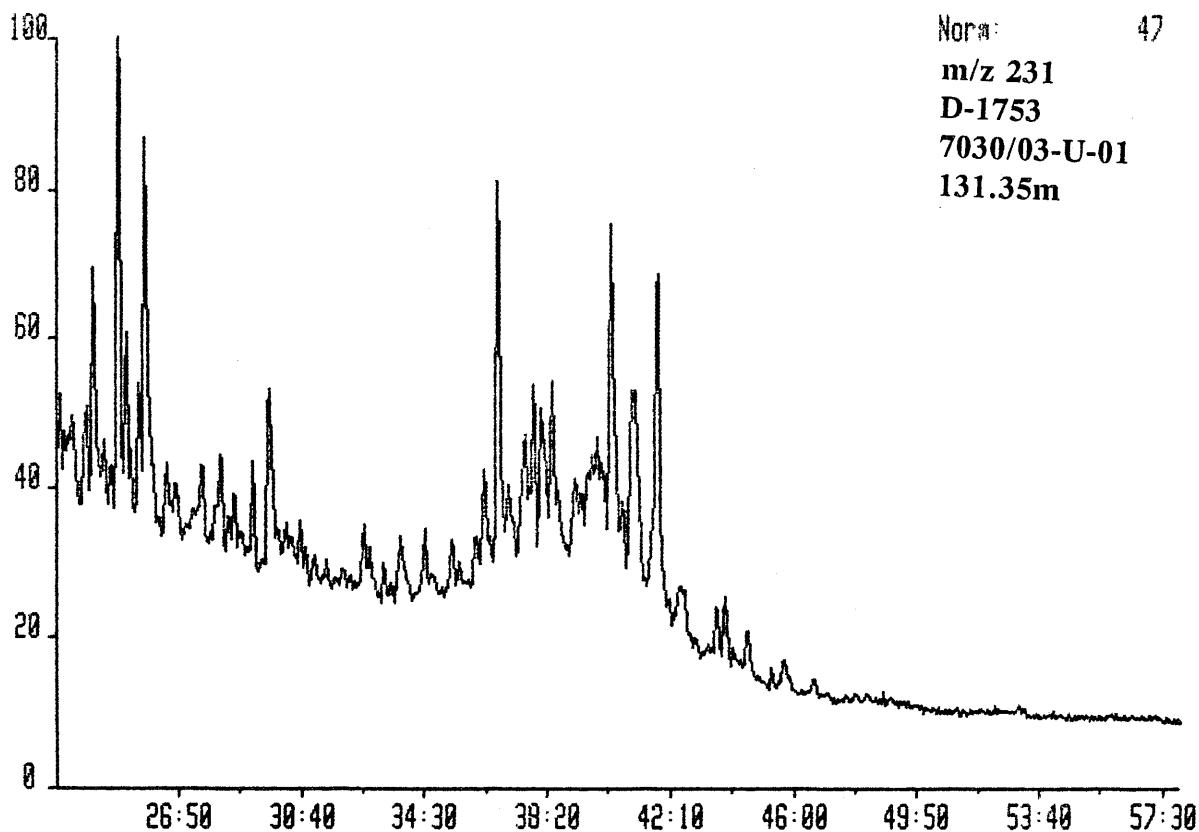
D1691SAT 18-FEB-88 Str:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



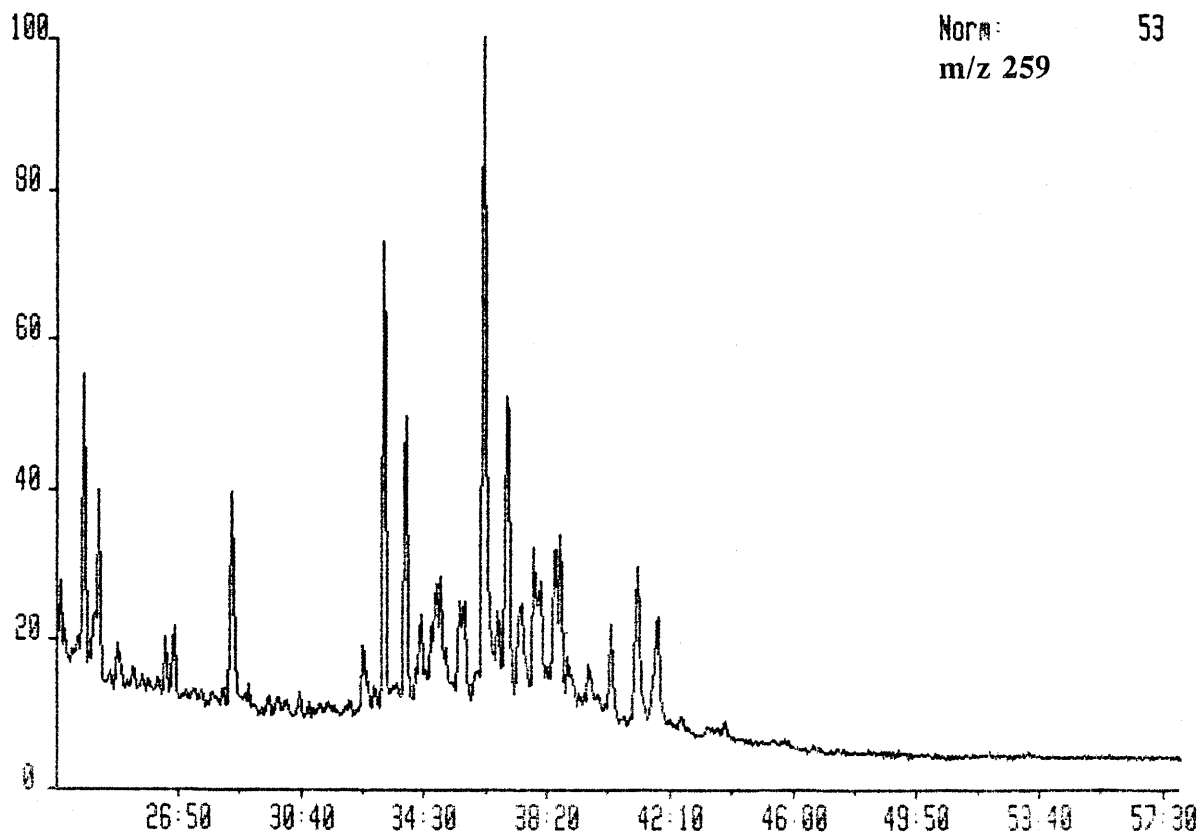
D1691SAT 18-FEB-88 Str:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



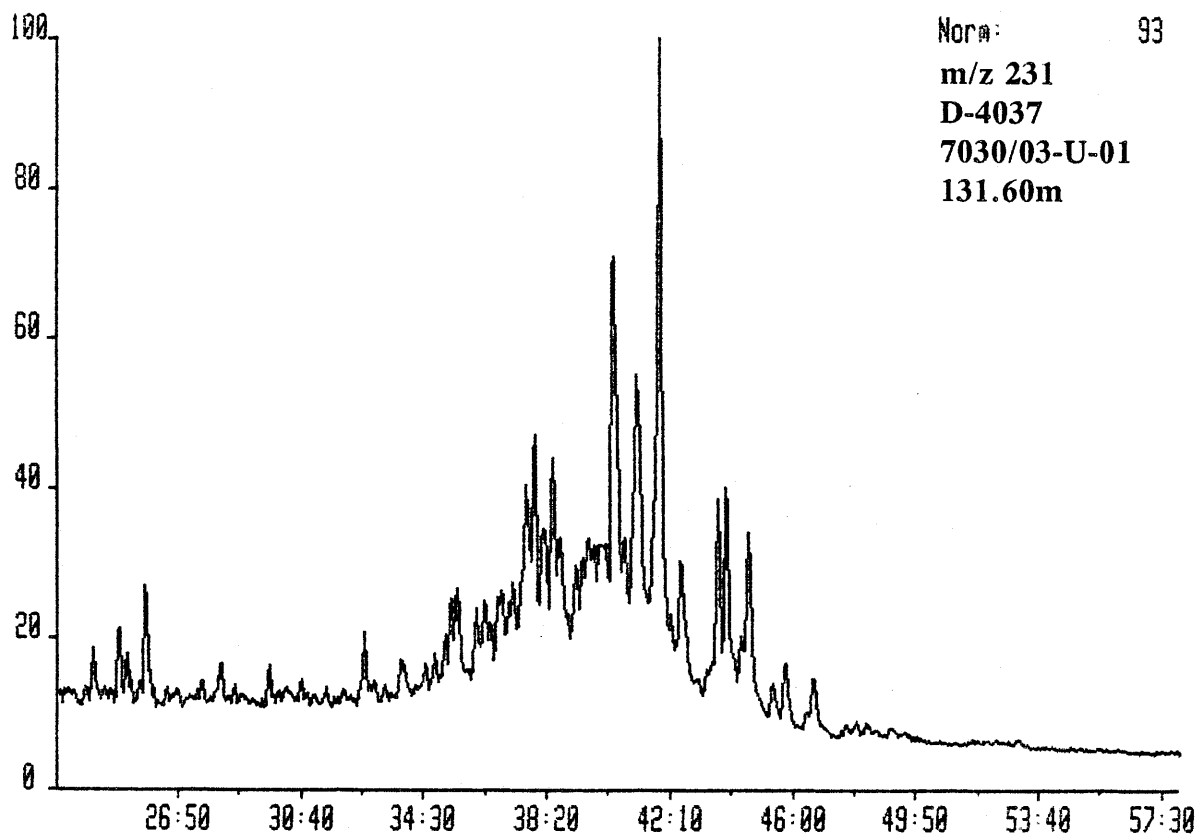
D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



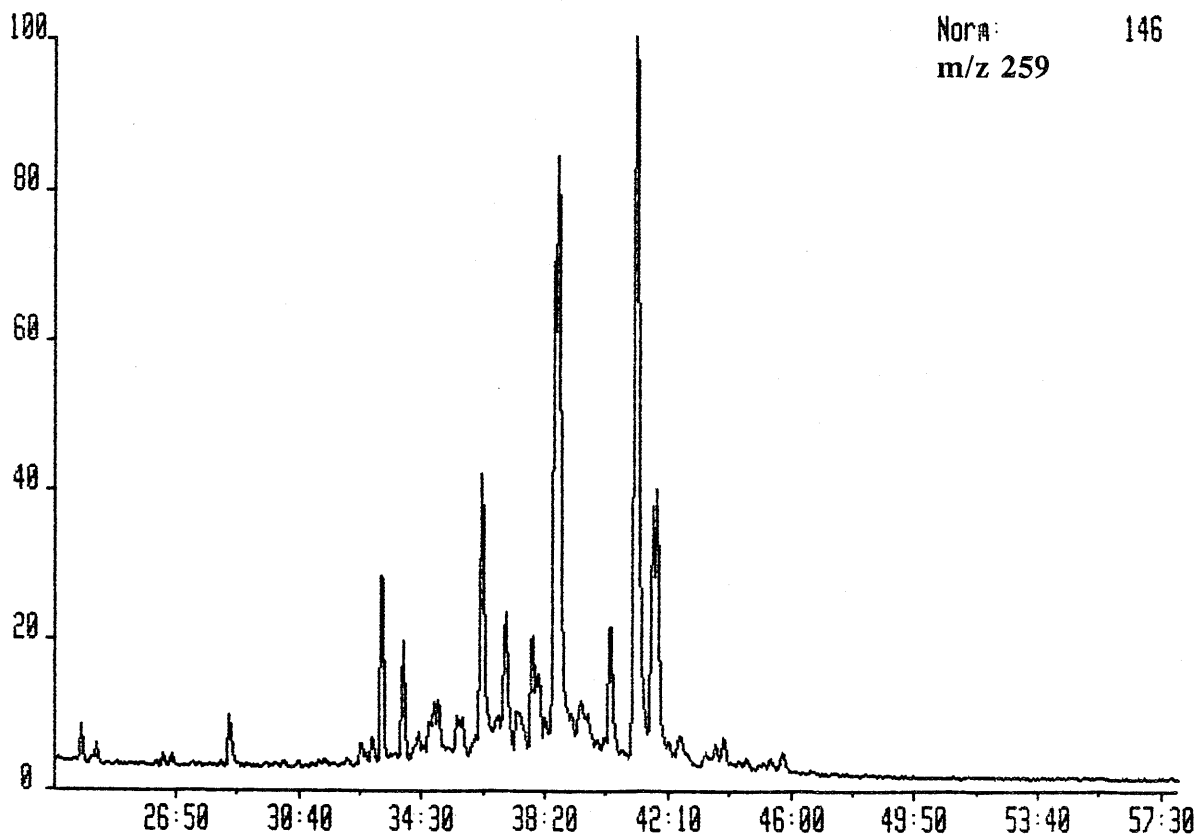
D1753SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



04037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



04037SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

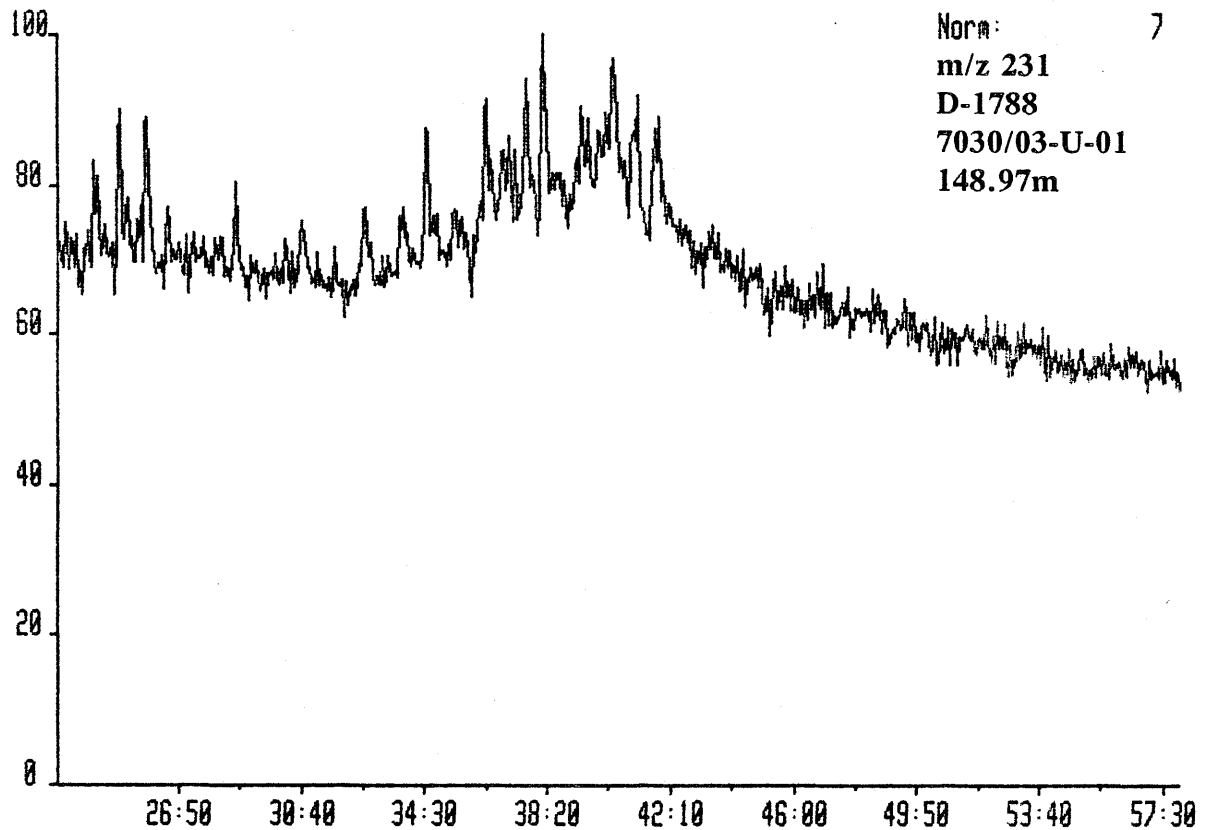




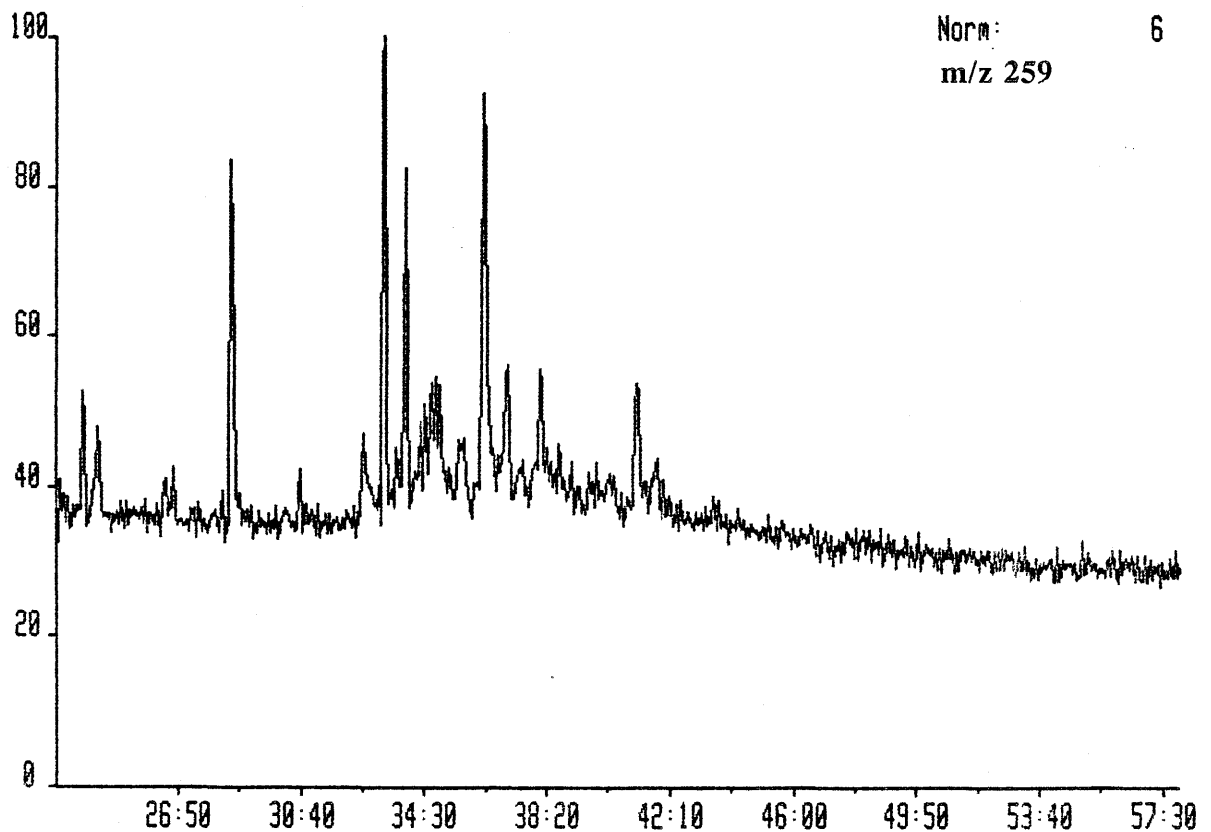
IKU
SINTEF-GRUPPEN

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D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23

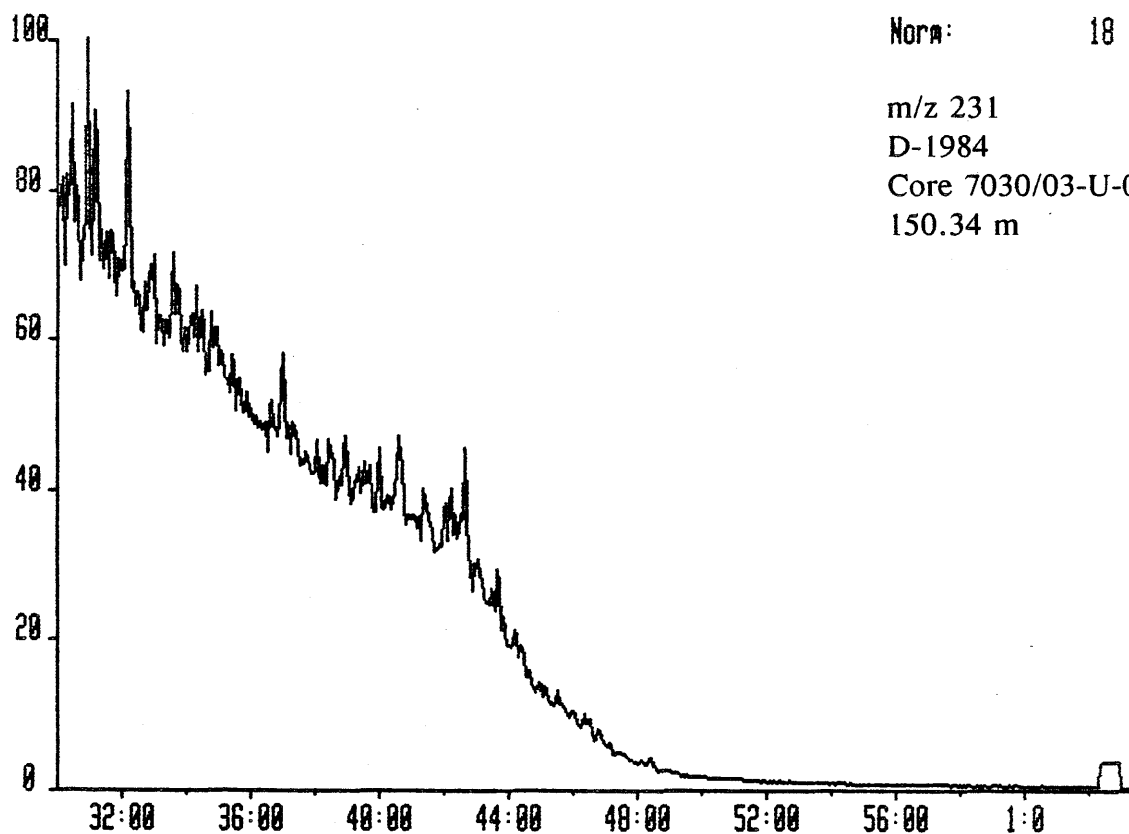


D1788SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:

System:QUADSAT

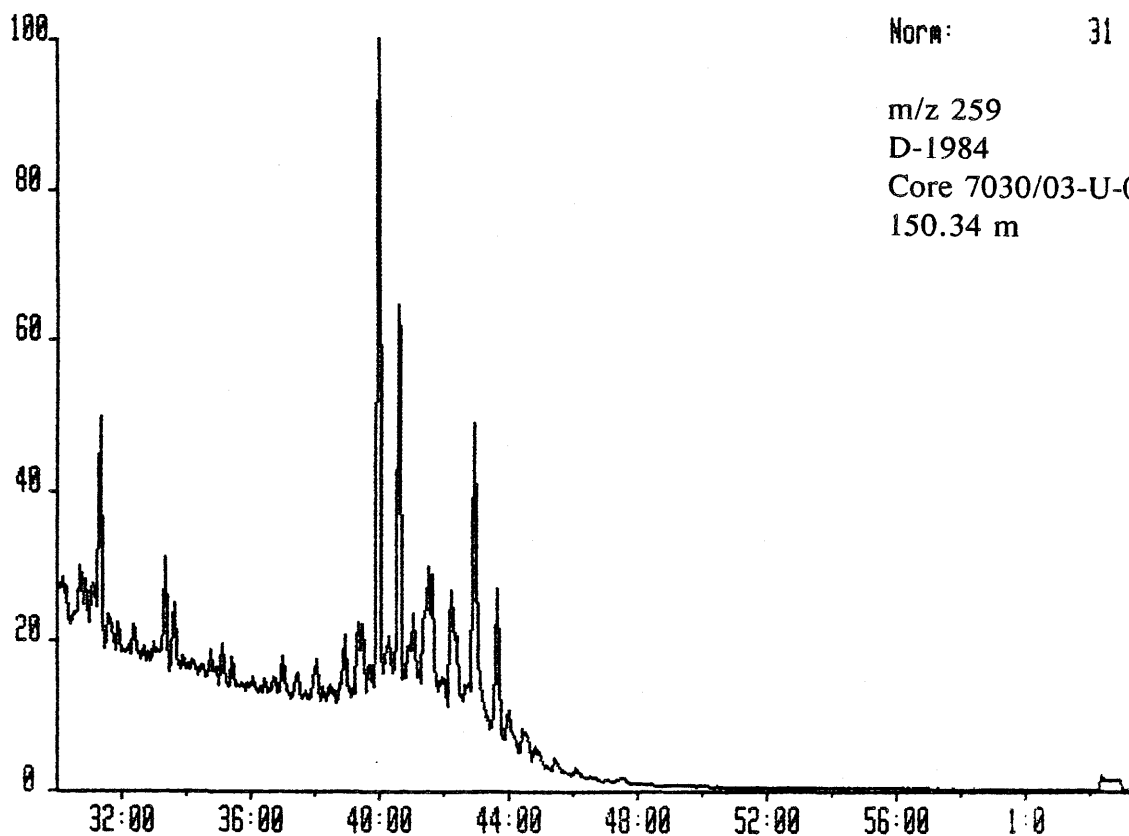


Norm: 18

m/z 231
D-1984
Core 7030/03-U-01
150.34 m

D1984SAT1 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:

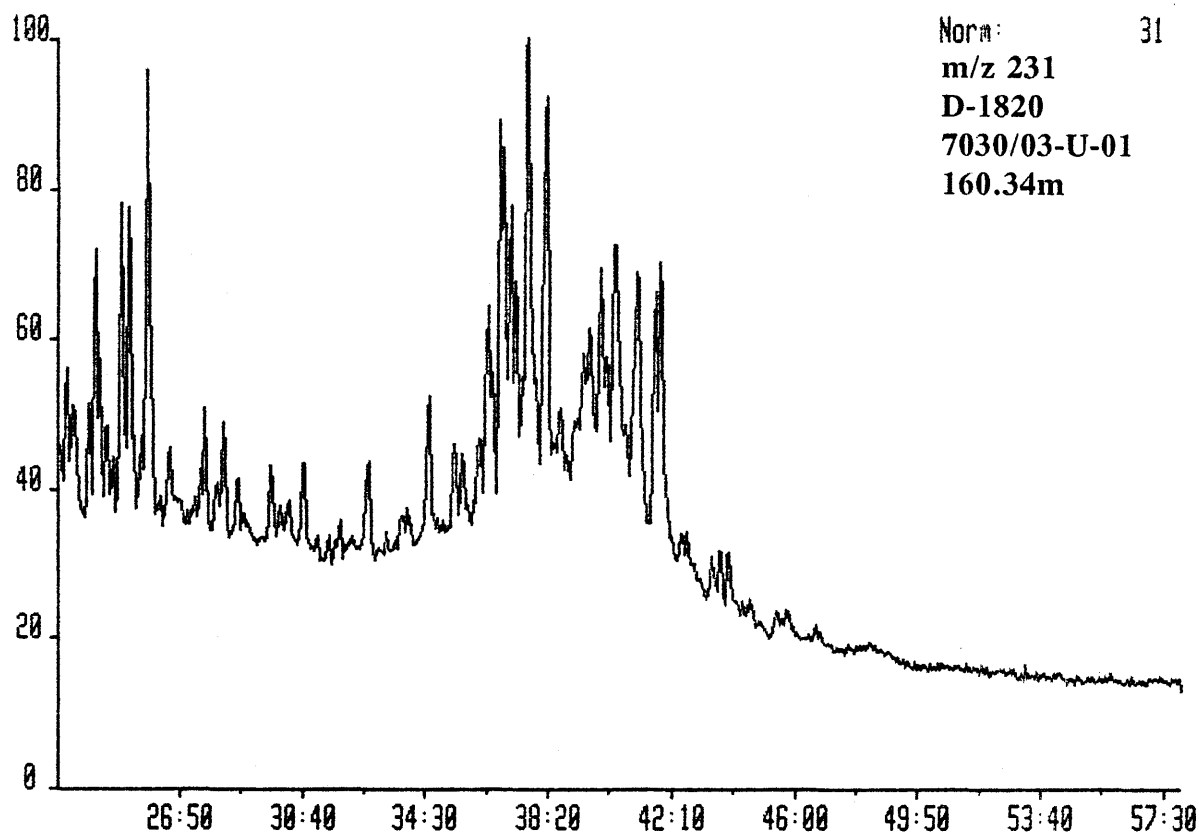
System:QUADSAT



Norm: 31

m/z 259
D-1984
Core 7030/03-U-01
150.34 m

D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D1820SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

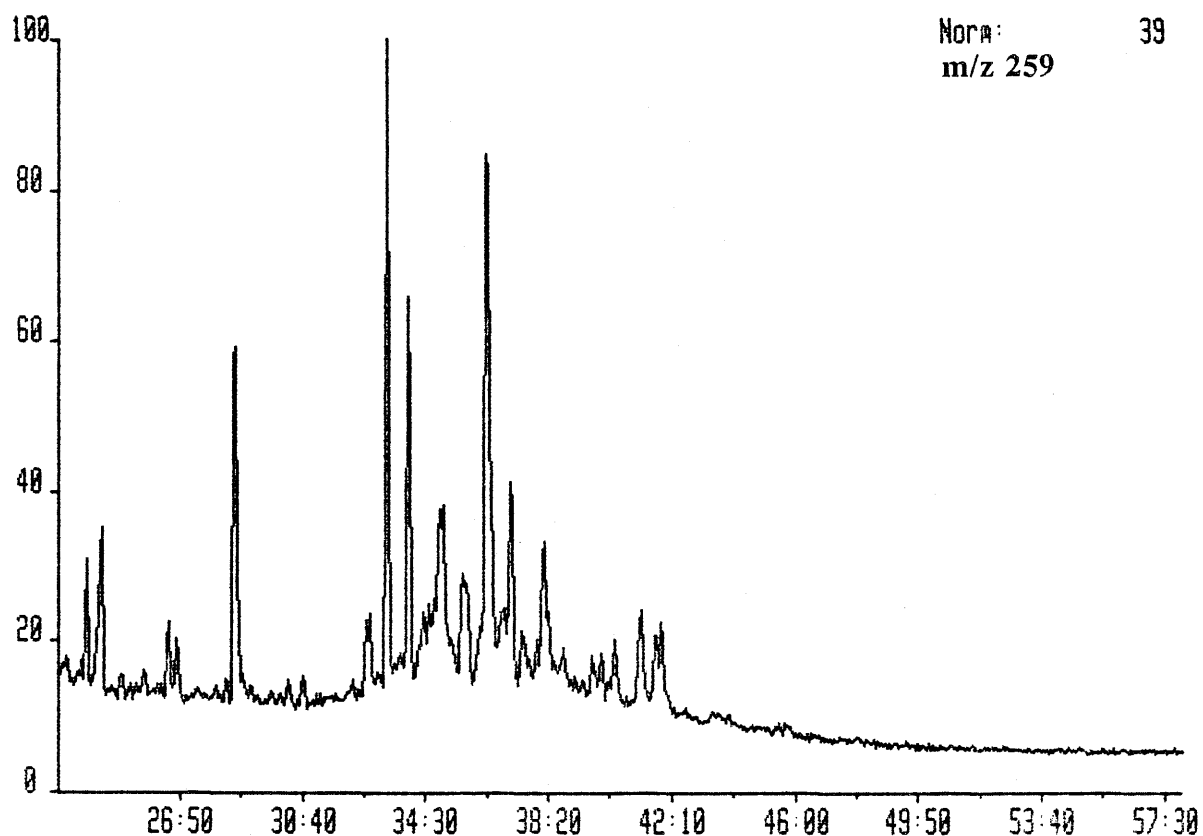


Figure A.II.1.5:

Mass fragmentograms of m/z 231, 239, 253 (aromatic steranes)

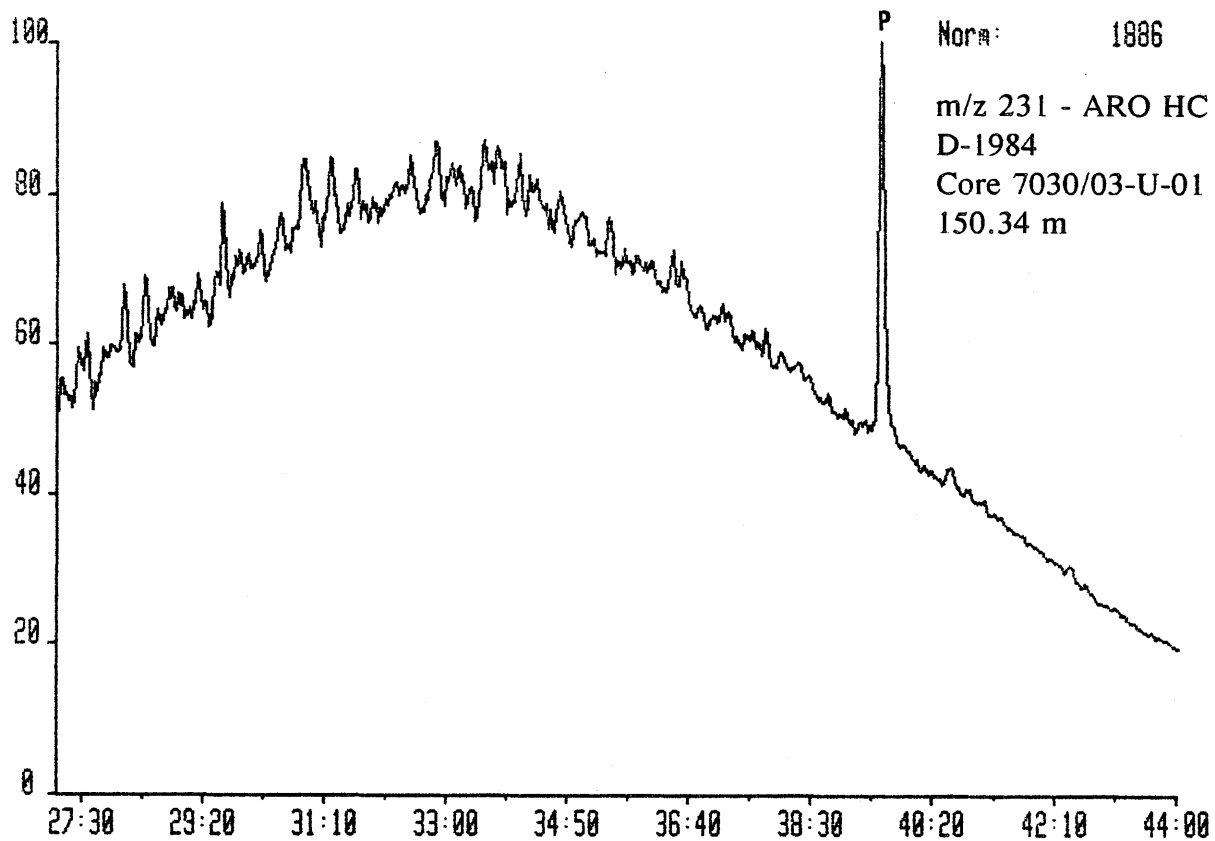
 m/z 231

M	C_{20} triaromatic sterane
N	C_{21} triaromatic sterane
O	C_{26} triaromatic sterane
P	$C_{26} + C_{27}$ triaromatic sterane
Q	C_{28} triaromatic sterane
R	C_{27} triaromatic sterane
S	C_{28} triaromatic sterane

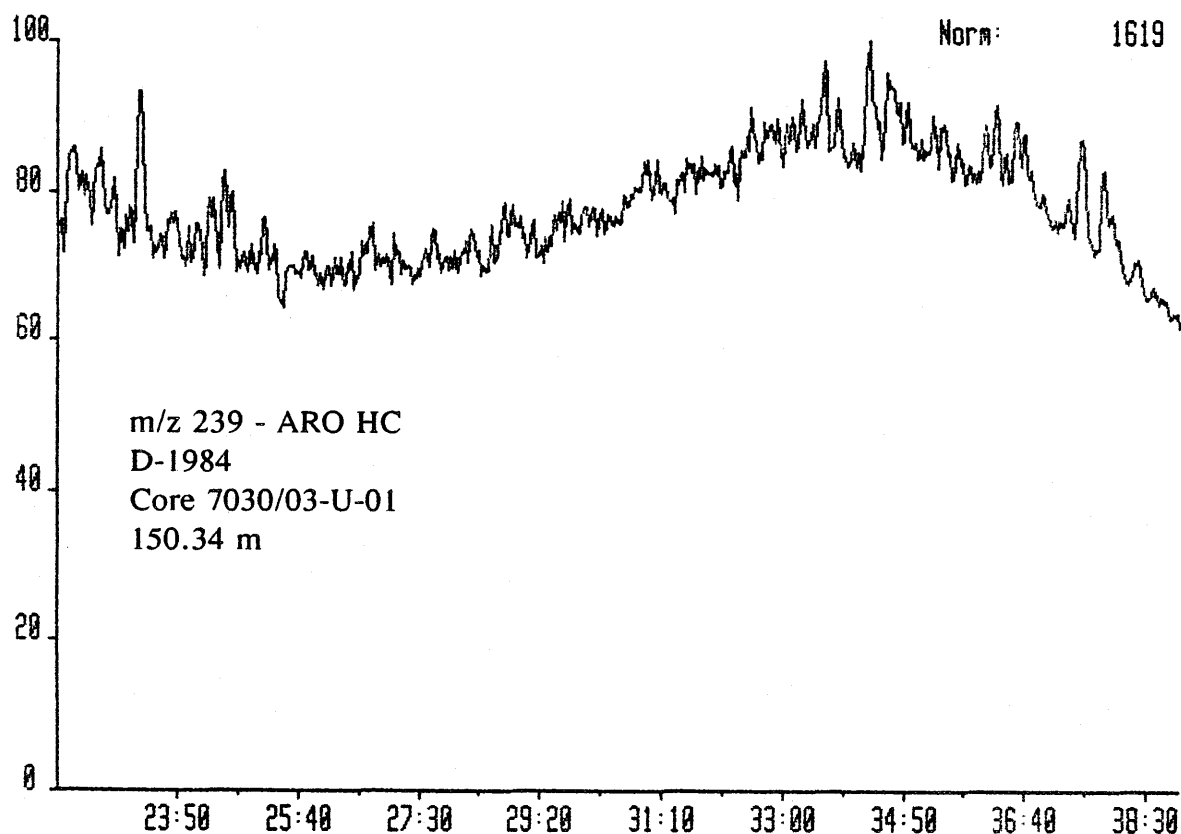
 m/z 253

a	C_{21} monoaromatic sterane
b	C_{22} monoaromatic sterane
c	unidentified
d	C_{27} monoaromatic sterane
e	C_{27} monoaromatic sterane
f	C_{28} monoaromatic sterane
g	C_{27} monoaromatic sterane
h	$C_{28}+C_{29}$ monoaromatic sterane
i	C_{29} monoaromatic sterane
j	C_{29} monoaromatic sterane
k	unidentified
l	unidentified

D1984AR01 9-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23 D-1984



D1984AR01 9-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 239.1000
Text:21.3427.23 D-1984



D1984AR01 9-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 253.1000
Text:21.3427.23 D-1984

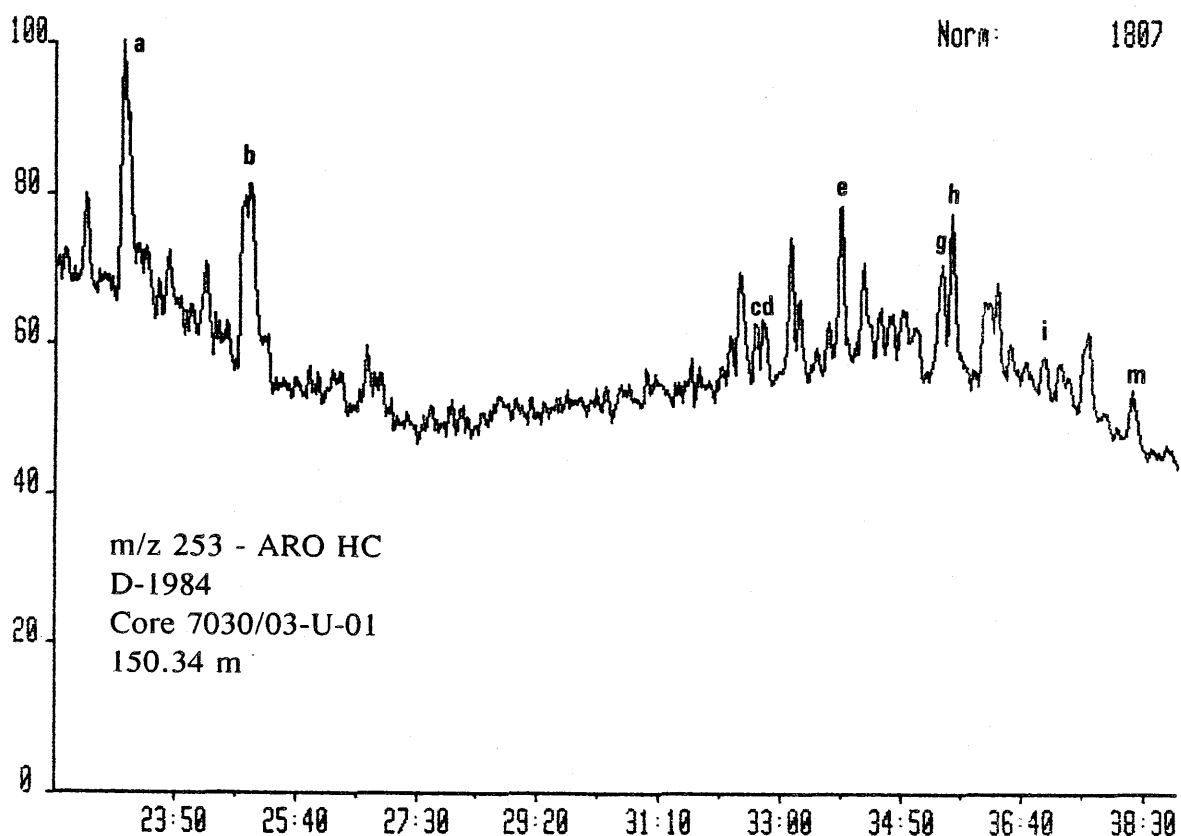


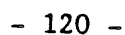
Figure A.II.1.6: Vitrinite reflectance histograms.

Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X



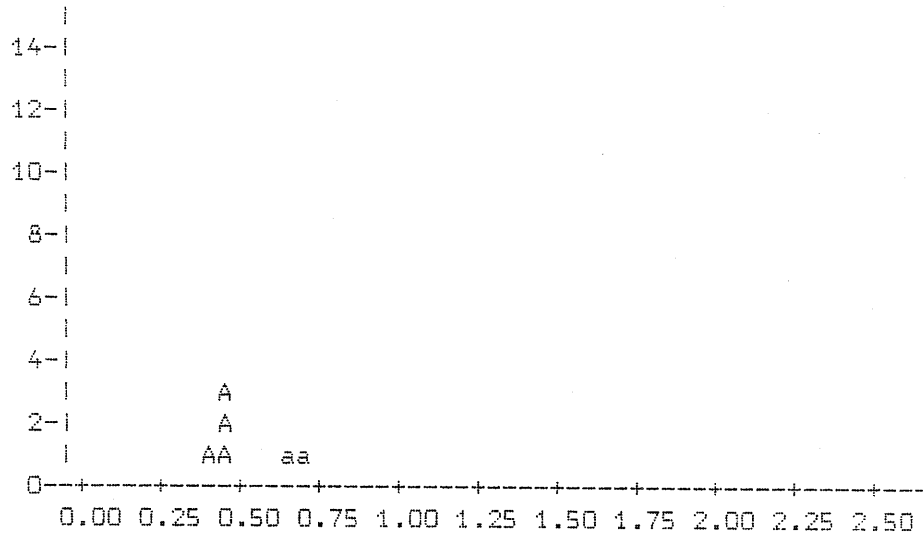
Days (X)	Eggs (Y)
0.50	1
0.60	1
0.65	1
0.70	1
0.75	1
0.80	1
0.85	1
0.70	2
0.90	2

PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
N	0.41	0.69	ALL	7	0.56	0.10
N	0.86	0.88	ALL	2	0.87	0.01
			OVERALL	9	0.63	0.16

ORDERED VALUES FOLLOW:

0.41a 0.46a 0.52a 0.55a 0.63a 0.65a 0.68a 0.86a 0.87a

IKU# D-1993 130.6M 7030/3-1

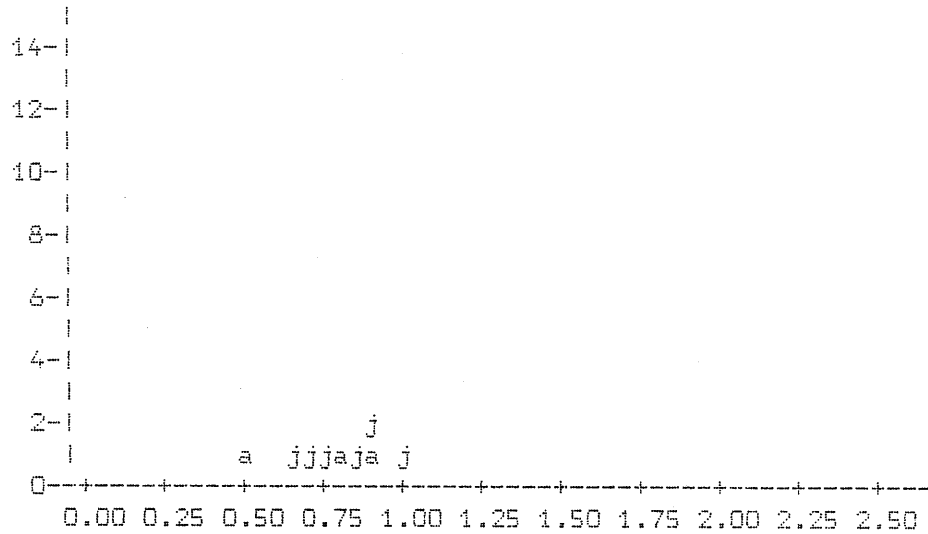


PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.40 0.50 ALL 4 0.45 0.04
 N 0.65 0.72 ALL 2 0.68 0.04
 OVERALL 6 0.53 0.12

ORDERED VALUES FOLLOW:

0.40A 0.45A 0.47A 0.49A 0.65a 0.71a

IKU# D-1994 160.0M 7030/3-1



PP LOW HIGH LIT #VAL MEAN STDV
 N 0.54 1.05 ALL 9 0.81 0.15
 OVERALL 9 0.81 0.15

ORDERED VALUES FOLLOW:

0.54a 0.66j 0.74j 0.79j 0.80a 0.85j 0.91a 0.92j 1.04j

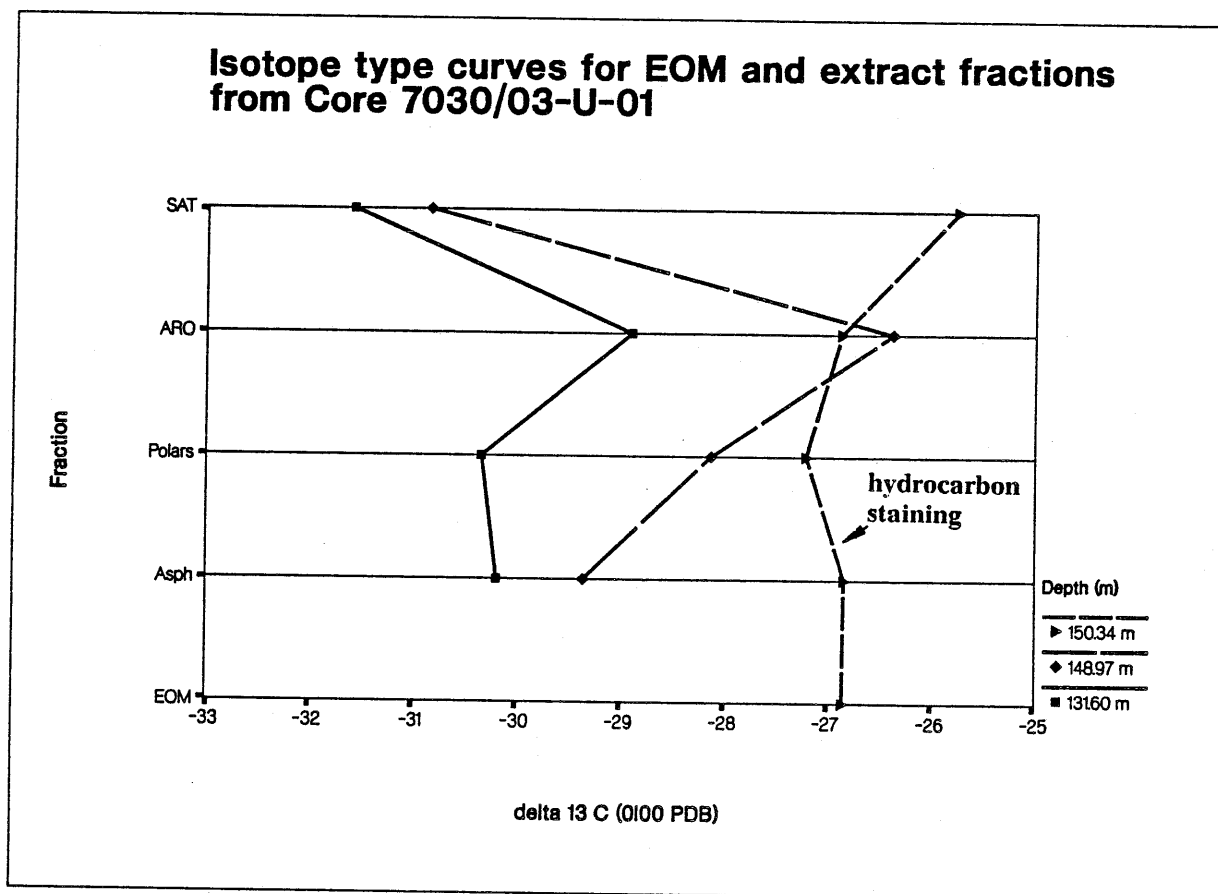


Figure A.II.1.7: Carbon isotope type curves of sediment extracts.

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Core 7129/10-U-02

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Figure A.II.2.6:	Vitrinite reflectance histograms.

CORE 7129/10-U-02

I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4		
	no.	m							C1-C4	C2-C4	NESS	-----		
											(%)	nC4		
I	D 0634	32.04	284	2					286	2	0.70	*****	I	
I	D 0641	37.35	305	2					308	2	0.74	*****	I	
I	D 0649	40.40	1053	5	7	2			1067	14	1.33	*****	I	
I	D 0655	42.76	1384	5	6				1395	11	0.78	*****	I	
I	D 0661	46.47	1193	4	2				1199	7	0.56	*****	I	
I	D 0667	49.47	1412	6	6	2	1		1427	15	1.04	1.06	I	
I	D 0673	52.47	4972	24	11	3	2		5011	39	0.78	1.47	I	
I	D 0679	55.44	3384	19	7	2	2		3414	30	0.87	1.05	I	
I	D 0683	58.15	2523	19	7	2			2551	28	1.10	*****	I	
I	D 0696	61.15	2370	31	12	3	3		2419	49	2.04	1.09	I	
I	D 0702	62.23	7102	162	31	4	4	30	7302	201	2.75	0.84	I	
I	D 0711	67.15	8937	182	35	5	6	71	9165	228	2.48	0.98	I	
I	D 0721	69.64	8830	468	106	15	11	100	9431	600	6.37	1.30	I	
I	D 0729	72.74	23187	301	29	3	2	14	23523	336	1.43	1.50	I	
I	D 0735	73.60	32295	1145	142	17	11	94	33609	1314	3.91	1.61	I	
I	D 0739	77.21	21143	331	31	4	2	18	21510	367	1.71	1.98	I	
I	D 0744	79.79	15684	264	27	4		24	15980	296	1.85	*****	I	
I	D 0749	83.24	11712	475	85	15	8	74	12294	582	4.73	1.89	I	
I	D 0754	86.32	8727	466	94	18	10	100	9315	589	6.32	1.70	I	
I	D 0760	87.12	2503	230	47	10	5	42	2795	293	10.47	2.05	I	
I	D 0759	89.37	3524	79	9	2		13	3614	90	2.49	*****	I	
I	D 0767	92.39	1371	20	2				1394	22	1.59	*****	I	
I	D 0773	95.39	5766	68	4				5838	72	1.24	*****	I	

CORE 7129/10-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	I	I	I	I	I	I	I	I	SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I	I												
I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	D 0782	98.36	361	6					367	6	1.72	*****	I
I	D 0790	101.43	151	34					185	34	18.51	*****	I
I	D 0797	104.38	48	8					56	8	14.07	*****	I
I	D 0804	107.07	136	44					180	44	24.54	*****	I
I	D 0811	110.29	236	51					288	51	17.81	*****	I
I	D 0819	113.44	351	108					459	108	23.45	*****	I
I	D 0825	114.39	109	4					113	4	3.13	*****	I
I	D 0826	119.49	93	7					101	7	7.35	*****	I
I													I

Table A.II.2.1b

CORE 7129/10-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

[illegible]

Table A.II.2.1b (continued)

CORE 7129/10-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I													I
I	D 0782	98.36	863	30	10			28	904	40	4.45	*****	I
I	D 0790	101.43	310	40	12			41	361	51	14.21	*****	I
I	D 0797	104.38	195	24	10			19	229	35	15.13	*****	I
I	D 0804	107.07	414	85	14			26	512	98	19.17	*****	I
I	D 0811	110.29	298	43	14	9			364	66	18.14	*****	I
I	D 0819	113.44	415	75	17	13		24	519	104	20.13	*****	I
I	D 0825	114.39	198	15	11	8		21	232	34	14.63	*****	I
I	D 0826	119.49	419	27	10			33	456	37	8.18	*****	I

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Table A.II.2.1c

CORE 7129/10-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	
no.	m							C1-C4	C2-C4	NESS	-----	
										(%)	nC4	
I D 0634	32.04	1151	26	16			29	1193	42	3.53	*****	
I D 0641	37.35	1036	21	14	11		17	1082	46	4.25	*****	
I D 0649	40.40	3394	35	69	11	10	43	3520	126	3.57	1.06	
I D 0655	42.76	3445	37	32	2	1	56	3518	73	2.07	1.48	
I D 0661	46.47	5609	36	15	16		22	5675	67	1.17	*****	
I D 0667	49.47	3270	36	26	11	16	37	3360	90	2.68	0.72	
I D 0673	52.47	5697	45	30	17	2	33	5790	93	1.61	9.77	
I D 0679	55.44	6485	69	18	21	14	54	6607	122	1.84	1.49	
I D 0683	58.15	4712	61	36	9	18	71	4836	123	2.55	0.48	
I D 0696	61.15	3495	63	27	13	11	38	3609	114	3.17	1.18	
I D 0702	62.23	9404	324	141	24	30	318	9923	519	5.23	0.79	
I D 0711	67.15	9194	207	49	15	6	209	9471	277	2.92	2.65	
I D 0721	69.64	9097	517	163	23	30	496	9831	734	7.46	0.76	
I D 0729	72.74	27622	596	172	29	27	666	28446	825	2.90	1.07	
I D 0735	73.60	34643	2095	672	101	93	1751	37605	2961	7.88	1.08	
I D 0739	77.21	27219	694	182	30	25	715	28149	931	3.31	1.20	
I D 0744	79.79	27731	576	144	28	18	573	28497	766	2.69	1.57	
I D 0749	83.24	12056	503	104	22	18	380	12703	647	5.09	1.25	
I D 0754	86.32	9172	502	110	18	13	385	9815	643	6.55	1.35	
I D 0760	87.12	2765	258	59	16	12	243	3111	346	11.13	1.36	
I D 0759	89.37	8225	224	84	27	22	240	8580	356	4.15	1.24	
I D 0767	92.39	3373	64	13	3		36	3453	80	2.32	*****	
I D 0773	95.39	13219	155	20	1	3	56	13397	178	1.33	0.35	

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Table A.II.2.1c (continued)

CORE 7129/10-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I	I	I	I	I	I	I	I	I	I	I	I	I	I
									SUM	SUM	WET-	iC4	
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	
	no.	m									(%)	nC4	
I	D 0782	98.36	1224	37	10			28	1271	47	3.66	*****	I
I	D 0790	101.43	460	74	12			41	546	86	15.67	*****	I
I	D 0797	104.38	243	32	10			19	286	43	14.92	*****	I
I	D 0804	107.07	550	129	14			26	692	142	20.57	*****	I
I	D 0811	110.29	534	94	14	9			651	117	18.00	*****	I
I	D 0819	113.44	766	183	17	13		24	978	212	21.69	*****	I
I	D 0825	114.39	307	18	11	8		21	345	37	10.87	*****	I
I	D 0826	119.49	512	35	10			33	557	45	8.03	*****	I

Table A.II.2.2

Core 7129/10-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)			(%)	(mg/g TOC)		S1+S2	S1+S2	(C)	I
I			:										I
I	D 634	32.04	:	****	****	****	0.11	*****	****	*****	*****	***	I
I	D 636	32.84	:	****	****	****	0.13	*****	****	*****	*****	***	I
I	D 640	34.30	:	****	****	****	0.13	*****	****	*****	*****	***	I
I	D 644	35.93	:	****	****	****	0.20	*****	****	*****	*****	***	I
I	D 641	37.35	:	****	****	****	0.10	*****	****	*****	*****	***	I
I	D 650	37.92	:	****	****	****	0.25	*****	****	*****	*****	***	I
I	D 649	40.40	:	****	****	****	0.17	*****	****	*****	*****	***	I
I	D 658	40.67	:	0.04	0.29	0.72	0.35	83	206	0.33	0.12	426	I
I	D 655	42.76	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D 662	43.62	:	****	****	****	0.19	*****	****	*****	*****	***	I
I	D 664	45.29	:	****	****	****	0.14	*****	****	*****	*****	***	I
I	D 670	48.51	:	0.05	0.00	1.61	0.30	0	537	0.05	1.00	***	I
I	D 667	49.47	:	****	****	****	0.15	*****	****	*****	*****	***	I
I	D 673	52.47	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D 680	54.30	:	****	****	****	0.24	*****	****	*****	*****	***	I
I	D 679	55.44	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D 698	58.43	:	****	****	****	0.18	*****	****	*****	*****	***	I
I	D 696	61.15	:	****	****	****	0.15	*****	****	*****	*****	***	I
I	D 702	63.23	:	****	****	****	0.36	*****	****	*****	*****	***	I
I	D 715	64.54	:	****	****	****	0.25	*****	****	*****	*****	***	I
I	D 716	65.88	:	****	****	****	0.28	*****	****	*****	*****	***	I
I	D 717	66.45	:	0.06	0.04	0.79	0.29	14	272	0.10	0.60	437	I

Table A.II.2.2 (continued)

Core 7129/10-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)
I			:									
I	D 711	67.15	:	****	****	****	0.26	*****	****	*****	*****	***
I	D 722	67.67	:	0.10	0.02	0.81	0.34	6	238	0.12	0.83	418
I	D 723	68.54	:	0.07	0.08	0.69	0.47	17	147	0.15	0.47	(328)
I	D 724	69.43	:	0.11	0.11	0.82	0.40	28	205	0.22	0.50	(278)
I	D 721	69.64	:	****	****	****	0.41	*****	****	*****	*****	***
I	D 732	71.20	:	0.10	0.19	0.53	0.61	31	87	0.29	0.34	420
I	D 734	71.62	:	0.06	0.06	0.63	0.39	15	162	0.12	0.50	(378)
I	D 729	72.74	:	****	****	****	0.29	*****	****	*****	*****	***
I	D 736	72.82	:	0.05	0.12	0.63	0.38	32	166	0.17	0.29	(379)
I	D 735	73.60	:	0.17	0.94	1.11	0.89	106	125	1.11	0.15	425
I	D 742	74.32	:	0.14	0.56	0.66	0.60	93	110	0.70	0.20	426
I	D 741	76.74	:	0.16	0.00	0.60	0.27	0	222	0.16	1.00	***
I	D 739	77.21	:	****	****	****	0.39	*****	****	*****	*****	***
I	D 745	77.53	:	0.12	0.11	0.49	0.41	27	120	0.23	0.52	444
I	D 1981	77.98	:	0.23	0.38	0.75	0.91	42	82	0.61	0.38	412
I	D 744	79.79	:	****	****	****	0.30	*****	****	*****	*****	***
I	D 752	82.61	:	0.09	0.16	0.53	0.42	38	126	0.25	0.36	409
I	D 749	83.24	:	****	****	****	0.37	*****	****	*****	*****	***
I	D 1982	84.10	:	0.05	0.02	0.45	0.38	5	118	0.07	0.71	(362)
I	D 1983	85.69	:	0.06	0.05	0.60	0.48	10	125	0.11	0.55	(293)
I	D 756	86.11	:	0.07	0.09	0.43	0.46	20	93	0.16	0.44	(327)
I	D 754	86.32	:	****	****	****	0.45	*****	****	*****	*****	***

Table A.II.2.2 (continued)

Core 7129/10-U-02

DATA FROM ROCK EVAL PYROLYSIS

IKU	DEPTH	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
No.	m	(mg/g ROCK)	(%)	(mg/g TOC)	S1+S2	S1+S2	(C)			
D 760	87.12	****	****	****	0.49	*****	****	*****	*****	***
D 1980	87.15	0.09	0.11	0.46	0.52	21	88	0.20	0.45	416
D 762	87.70	0.05	0.01	0.06	0.21	5	29	0.06	0.83	(278)
D 771	92.19	0.07	0.01	0.25	0.10	10	250	0.08	0.88	(278)
D 767	92.39	****	****	****	0.10	*****	****	*****	*****	***
D 773	95.39	****	****	****	0.12	*****	****	*****	*****	***
D 782	98.36	****	****	****	0.08	*****	****	*****	*****	***
D 790	101.43	****	****	****	0.10	*****	****	*****	*****	***
D 803	103.62	****	****	****	0.15	*****	****	*****	*****	***
D 797	104.38	****	****	****	0.10	*****	****	*****	*****	***
D 809	106.72	0.08	0.10	0.80	0.53	19	151	0.18	0.44	403
D 804	107.07	****	****	****	0.15	*****	****	*****	*****	***
D 817	108.51	0.10	0.02	0.27	0.09	22	300	0.12	0.83	(326)
D 811	110.29	****	****	****	0.10	*****	****	*****	*****	***
D 821	111	****	****	****	0.17	*****	****	*****	*****	***
D 819	113.44	****	****	****	0.12	*****	****	*****	*****	***
D 825	114.39	****	****	****	0.10	*****	****	*****	*****	***
D 828	114.45	****	****	****	0.17	*****	****	*****	*****	***
D 826	119.49	****	****	****	0.09	*****	****	*****	*****	***

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Table A.II.2.3

Core number: 7129/10-U-02
 Reference number: 21.3427.23
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VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-732	-----	71.20	0.69 (15)	R	0.15	3-4?
D-1990	-----	84.07	0.93 (9)	R	0.14	3-4?
D-762	-----	87.70	0.46 (7)	P	0.04	2-4?
			0.72 (11)	R	0.08	
			0.99 (1)	R	0.00	
D-800	-----	102.69	0.44 (8)	P	0.05	---

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
 S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.2.4
Well no.: 7129/10-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 0731	70.60	Am: 15% Lm: 5-10% W: 5-10% C: 55-60%	F-M	Fair-Good	3.0-3.5	Organic residue dominated by small-medium sized black, angular coaly fragments.
D 0748	79.18	Am: 25-30% Lm: 5% W: 5% C: 60-65%	F-M	Fair	3.0-3.5	Comparable with sample D 0731 (70.60 m).
D 0757	84.97	Am: 25-30% Lm: 5% W: 10% C: 55-60%	F-M-L	Fair-Poor	?3.0-3.5	Comparable with sample D 0731 (70.60 m) and D 0748 (79.18 m) above.
D 0764	88.60	Am: 15-20% Lm: 10% W: 10% C: 60-65%	F-M-L	Poor	?3.0-3.5	Organic residue dominated by small-medium sized angular, black coaly fragments.
D 0816	109.49	Am: <5% Lm: <5% W: <5% C: >90%	F-M	No palynomorphs observed	N.D.P.	Sieved residue* ¹ totally dominated by opaque, angular coaly fragments. * only sieved residue available.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.2.4
Well no.: 7129/10-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 0829	118.85	-	-	-	-	Too little organic residue to give any semi quantitative estimates of kerogen composition.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.2.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7129/10-U-02

I			:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:		:		I
I		(m)	:	(mg)	:	(mg)	I
I			:		:		I
I			:		:		I
I	D 732	71.20	:	3.4	:	2.0	I
I			:		:		I
I	D 745	77.53	:	2.8	:	1.1	I
I			:		:		I
I	D 1981	77.98	:	12.5	:	7.3	I
I			:		:		I
I	D 1982	84.10	:	8.3	:	3.7	I
I			:		:		I
I	D 1983	85.69	:	8.7	:	6.1	I
I			:		:		I
I	D 1980	87.15	:	8.1	:	4.3	I
I			:		:		I
I	D 817	108.51	:	3.5	:	1.2	I
I			:		:		I

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Table A.II.2.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

I	I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	: Rock	EOM	Sat.	Aro.	HC	Non HC	TOC	I
I			: Extr.							I
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	I
I			:							I
I	D 732	71.20	: 19.4	5.4	0.1	0.7	0.8	4.6	0.61	I
I			:							I
I	D 745	77.53	: 15.0	4.7	0.2	0.5	0.7	4.0	0.42	I
I			:							I
I	D 1981	77.98	: 39.2	28.9	1.8	4.7	6.5	22.4	0.91	I
I			:							I
I	D 1982	84.10	: 60.1	14.4	0.6	2.0	2.6	11.8	0.38	I
I			:							I
I	D 1983	85.69	: 52.2	14.9	0.8	2.3	3.1	11.8	0.48	I
I			:							I
I	D 1980	87.15	: 56.3	16.8	3.2	3.5	6.7	10.1	0.52	I
I			:							I
I	D 817	108.51	: 20.7	2.4	0.4	0.5	0.9	1.5	0.09	I
I			:							I

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Table A.II.2.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 732	71.20	278	5	36	41	237
D 745	77.53	313	13	33	47	266
D 1981	77.98	738	46	120	165	573
D 1982	84.10	240	10	34	44	196
D 1983	85.69	285	16	44	60	226
D 1980	87.15	298	58	62	119	179
D 817	108.51	116	19	24	43	72

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Table A.II.2.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 732	71.20	45.6	0.8	5.9	6.7	38.8
D 745	77.53	74.4	3.2	7.9	11.1	63.3
D 1981	77.98	81.1	5.1	13.1	18.2	62.9
D 1982	84.10	63.1	2.6	8.9	11.6	51.5
D 1983	85.69	59.5	3.4	9.1	12.5	47.0
D 1980	87.15	57.3	11.1	11.9	22.9	34.4
D 817	108.51	128.7	21.5	26.8	48.3	80.4

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Table A.II.2.9

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I	I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	:	Sat	Aro	HC	SAT	Non HC	HC	I
I			:	---	---	---	---	---	---	I
I		(m)	:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I			:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 732	71.20	:	1.9	13.0	14.8	14.3	85.2	17.4	I
I	D 745	77.53	:	4.3	10.6	14.9	40.0	85.1	17.5	I
I	D 1981	77.98	:	6.2	16.2	22.4	38.5	77.6	28.9	I
I	D 1982	84.10	:	4.2	14.2	18.3	29.4	81.7	22.4	I
I	D 1983	85.69	:	5.6	15.3	20.9	36.8	79.1	26.5	I
I	D 1980	87.15	:	19.3	20.7	40.0	93.1	60.0	66.7	I
I	D 817	108.51	:	16.7	20.8	37.5	80.0	62.5	60.0	I
I			:							I

Table A.II.2.10

Core 7129/10-U-02

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I	IKU No.	:	-----	A = -----	B = -----	-----	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I		:								I
I		:								I
I	D 732	:	1.2	0.5	0.3	1.6	0.5	1.3	1.2	I
I		:								I
I	D 745	:	1.8	0.3	0.2	2.0	1.6	1.3	1.2	I
I		:								I
I	D 1981	:	1.5	0.3	0.3	0.9	4.3	1.1	1.0	I
I		:								I
I	D 1982	:	1.1	0.6	0.5	1.3	1.1	1.3	1.2	I
I		:								I
I	D 1983	:	1.0	0.6	0.5	1.3	1.0	1.5	1.3	I
I		:								I
I	D 1980	:	1.0	0.5	0.4	1.2	0.6	1.6	1.3	I
I		:								I
I	D 817	:	1.1	0.6	0.4	1.6	0.1	1.1	1.1	I
I		:								I

DATE : 2 - 3 - 88.

Table A.II.2.11a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7129/10-U-02

IKU no.	Depth (m)	$\alpha\beta/\alpha\beta+\beta\alpha^1)$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-0732	71.20	0.83	34.5	59.4	5.0
D-1981	77.98	0.87	27.6	43.4	7.1
D-1982	84.10	0.87	24.0	45.7	9.2
D-1983	85.69	0.87	33.3	44.4	8.9
D-1980	87.15	0.85	36.6	40.6	8.9
D-0817	108.51	0.87	48.5	76.2	34.0

1) $E/(E+F)$ in m/z 191.

2) Average % distribution between first and second eluting isomers of extended hopanes.

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217.

4) $q/(q+t)$ in m/z 217.

Table A.II.2.11b:

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7129/10-U-02

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-0732	71.20	0.10	3.13			0.13
D-1981	77.98	0.20	2.16	0.06	0.12	0.18
D-1982	84.10	0.98	1.57	n.d.p.	n.d.p.	0.36
D-1983	85.69	1.06	1.56	n.d.p.	n.d.p.	0.32
D-1980	87.15	0.15	1.68	n.d.p.	n.d.p.	0.19
D-0817	108.51	0.32	2.50			0.59

¹⁾ Relative abundance of tricyclic terpanes (Q/E in m/z 191).

²⁾ B/A in m/z 191.

³⁾ Relative abundance of unknown (X/E in m/z 191).

⁴⁾ Relative abundance of bisnorhopane (Z/E in m/z 191).

⁵⁾ Relative abundance of C₂₇ rearranged steranes (a/(a+j) in m/z 217).

Table A.II.2.12:

Molecular ratios from aromatic sterane mass chromatograms.

Core 7129/10-U-02

IKU no.	Depth (m)	$\%C_{20}$ ¹⁾	$\%C_{20}$ ²⁾	$\%C_{21}$ ³⁾	$\%C_{27tri}$ ⁴⁾	$\%C_{28tri}$ ⁵⁾
		$\frac{C_{20}}{C_{20}+C_{27}}$	$\frac{C_{20}}{C_{20}+C_{28}}$	$\frac{C_{21}}{C_{21}+C_{28}}$	$\frac{C_{27tri}}{C_{27tri}+C_{28mono}}$	$\frac{C_{28tri}}{C_{28tri}+C_{29mono}}$
D 1981	77.98	47.8	67.4	11.8	19	10
D 1982	84.10	55.2	66.8	11.1	21	17
D 1983	85.69	52.1	66.9	11.4	30	28
D 1980	87.15	51.1	83.5	13.4	36	16

¹⁾ M/(M+P) in m/z 231 (triaromatic side chain cracking)

²⁾ M/(M+S) in m/z 231 (triaromatic side chain cracking)

³⁾ a/(a+h) in m/z 253 (monoaromatic side chain cracking)

⁴⁾ P/(P+h) in m/z 231 and m/z 253

⁵⁾ S/[S+m+k*S/(S+R)] in m/z 231 and m/z 253

The aromatisation ratios (4 and 5) are only approximate as the data were acquired by selective ion monitoring and based on an external calibration of the relative responses of m/z 231 and m/z 253.

Figure A.II.2.1:

Saturated hydrocarbon gas chromatograms

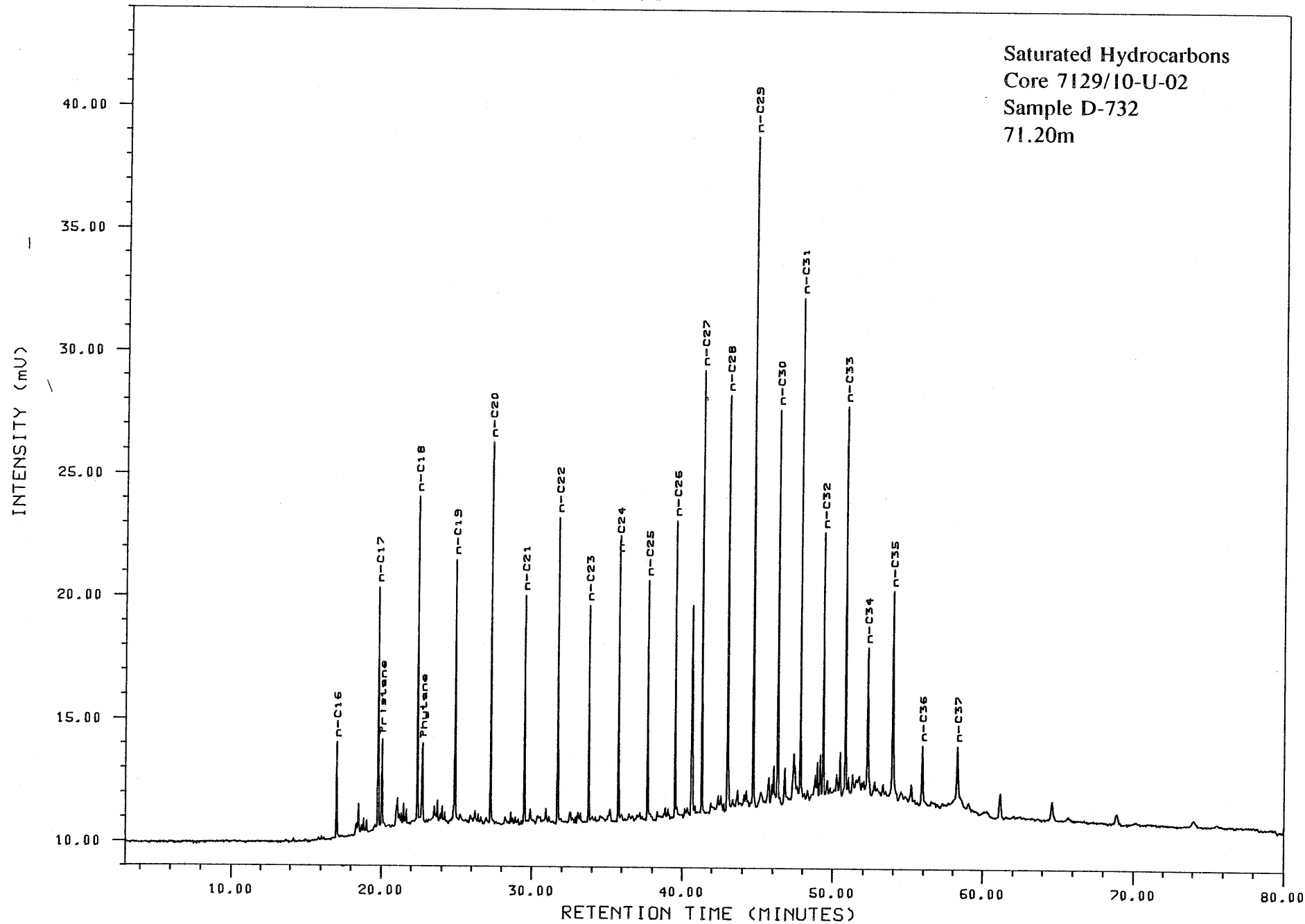
n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D0732S

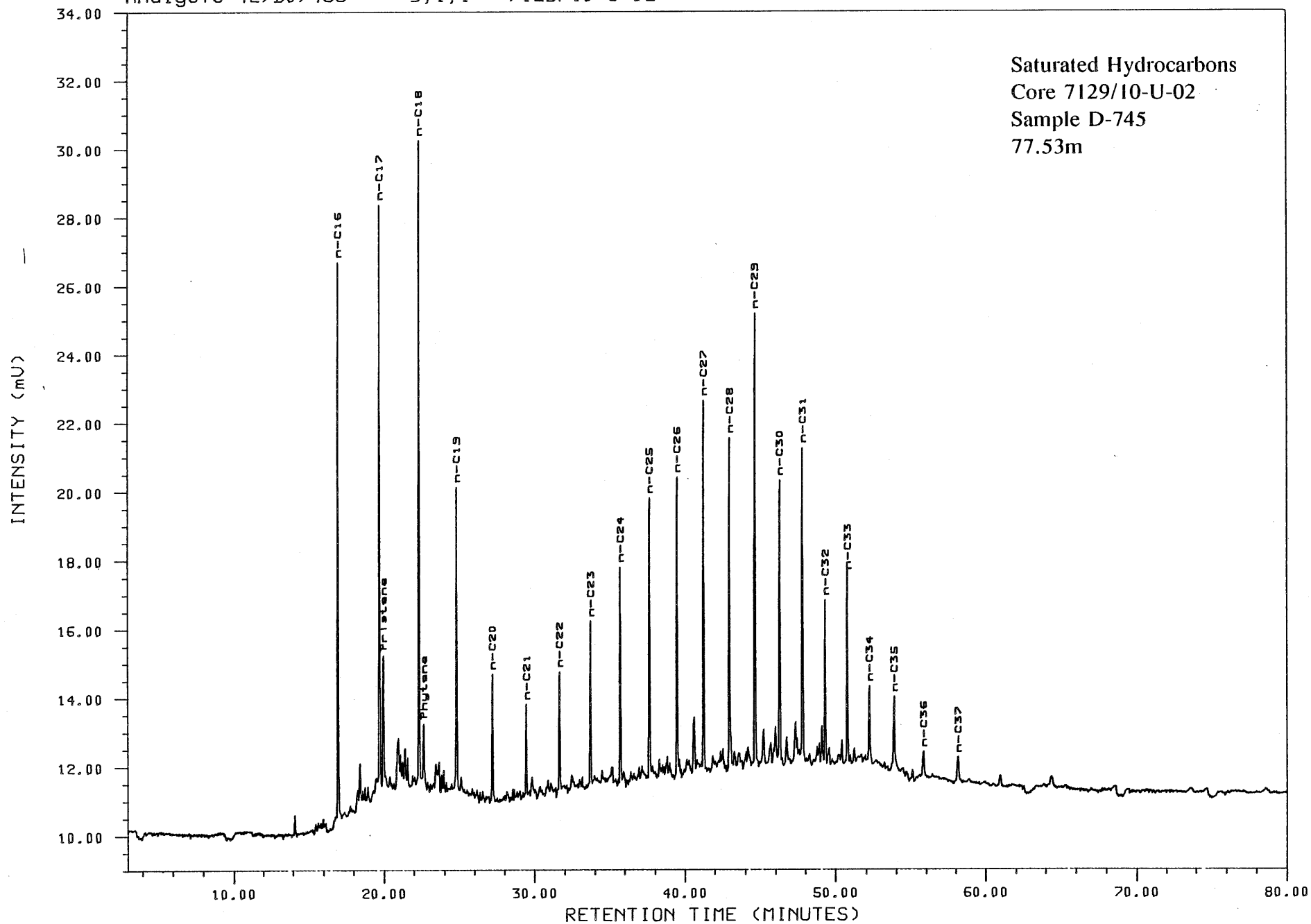
3,1,1

7129/10-U-02

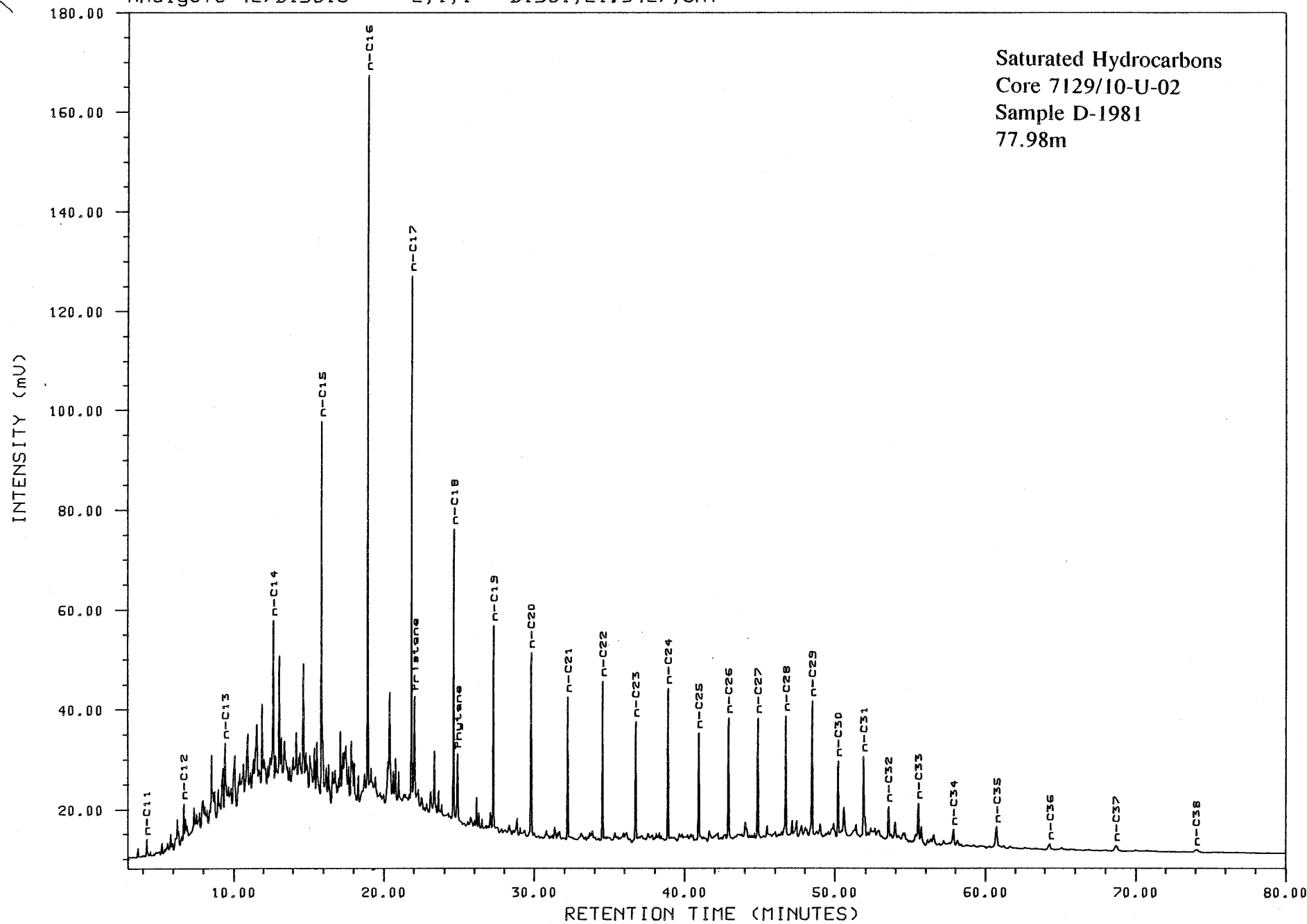
Saturated Hydrocarbons
Core 7129/10-U-02
Sample D-732
71.20m



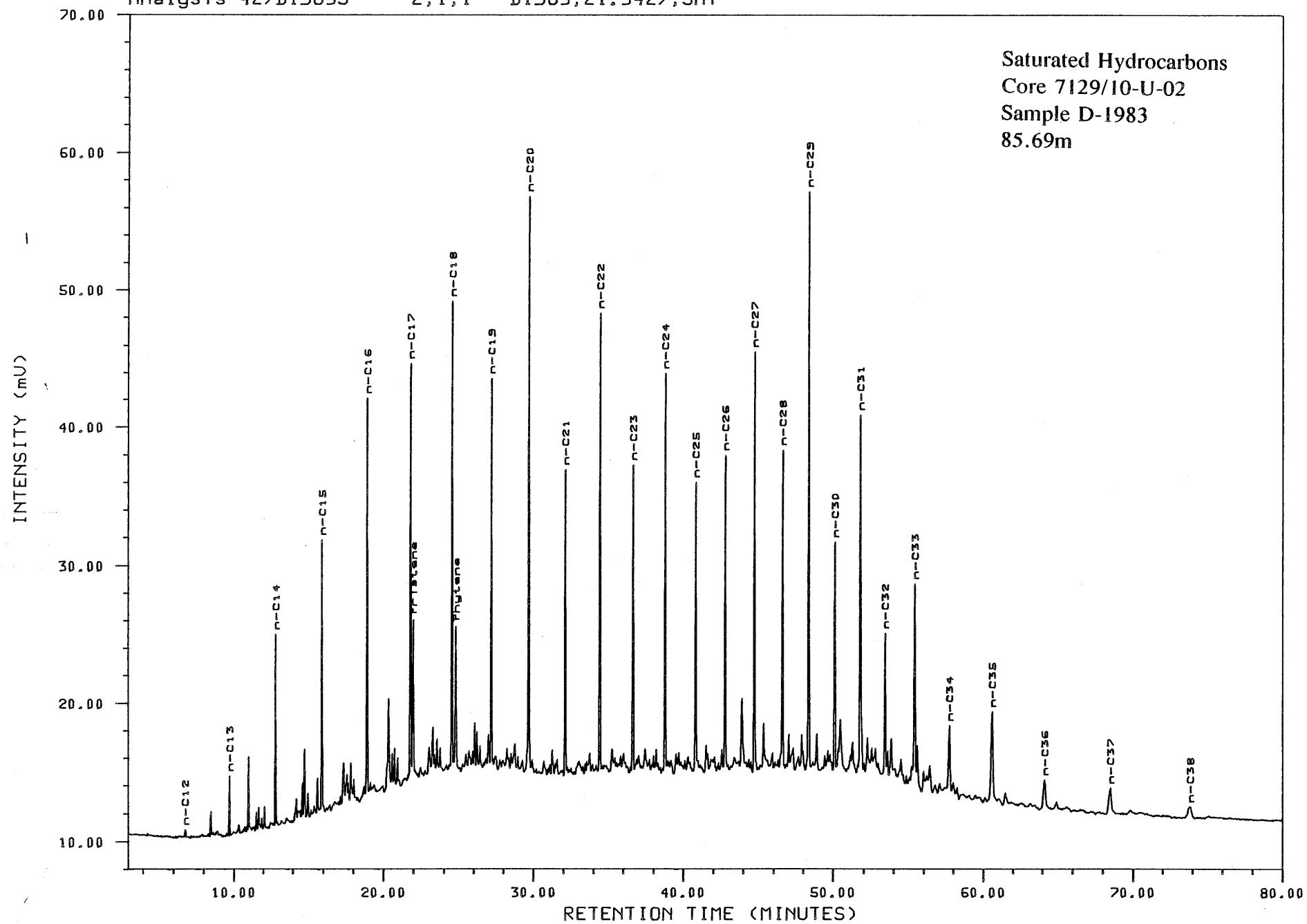
Analysis 427D0745S 3,1,1 7129/10-U-02



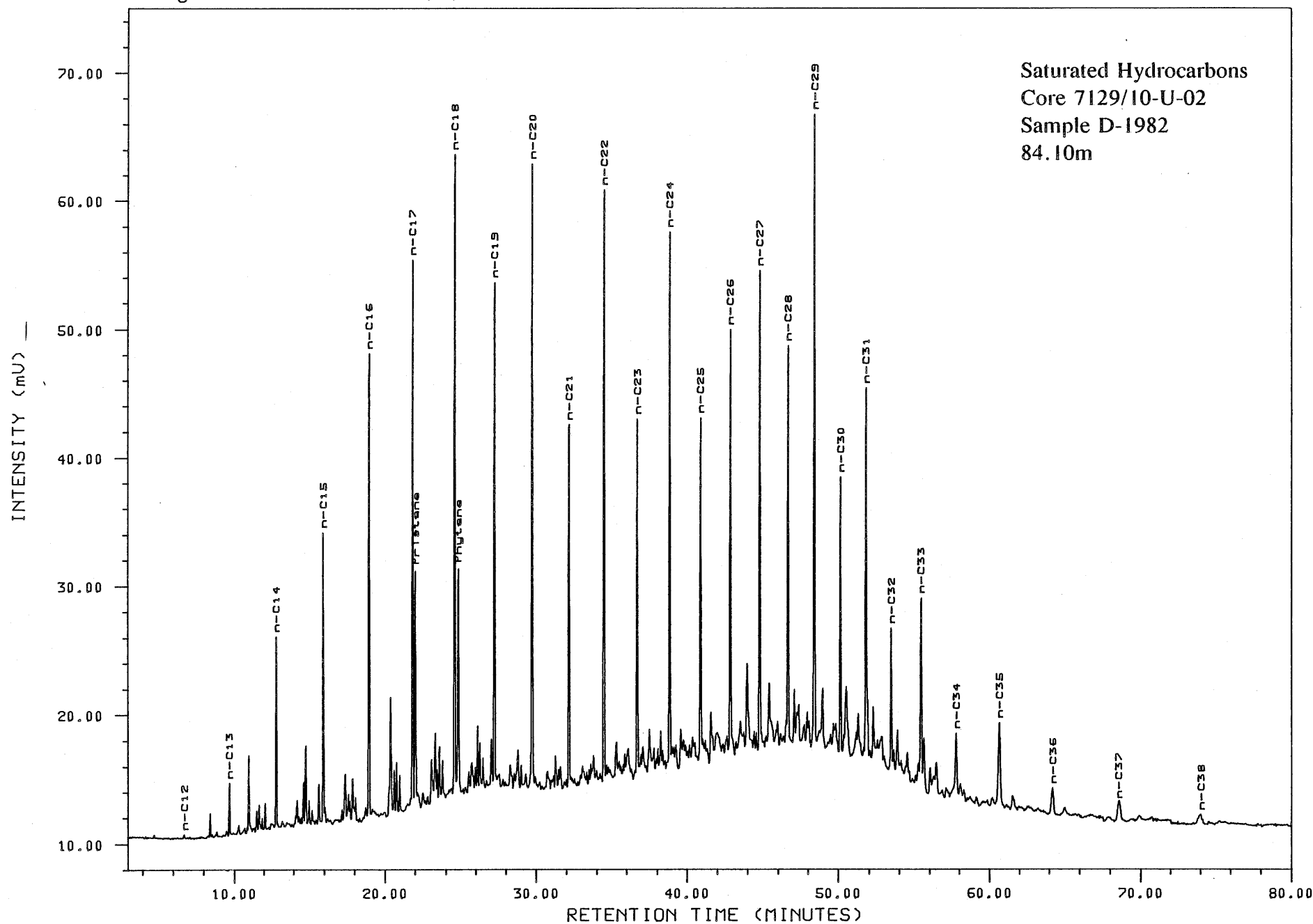
Analysis 427D1981S 2,1,1 D1981,21.3427,SAT



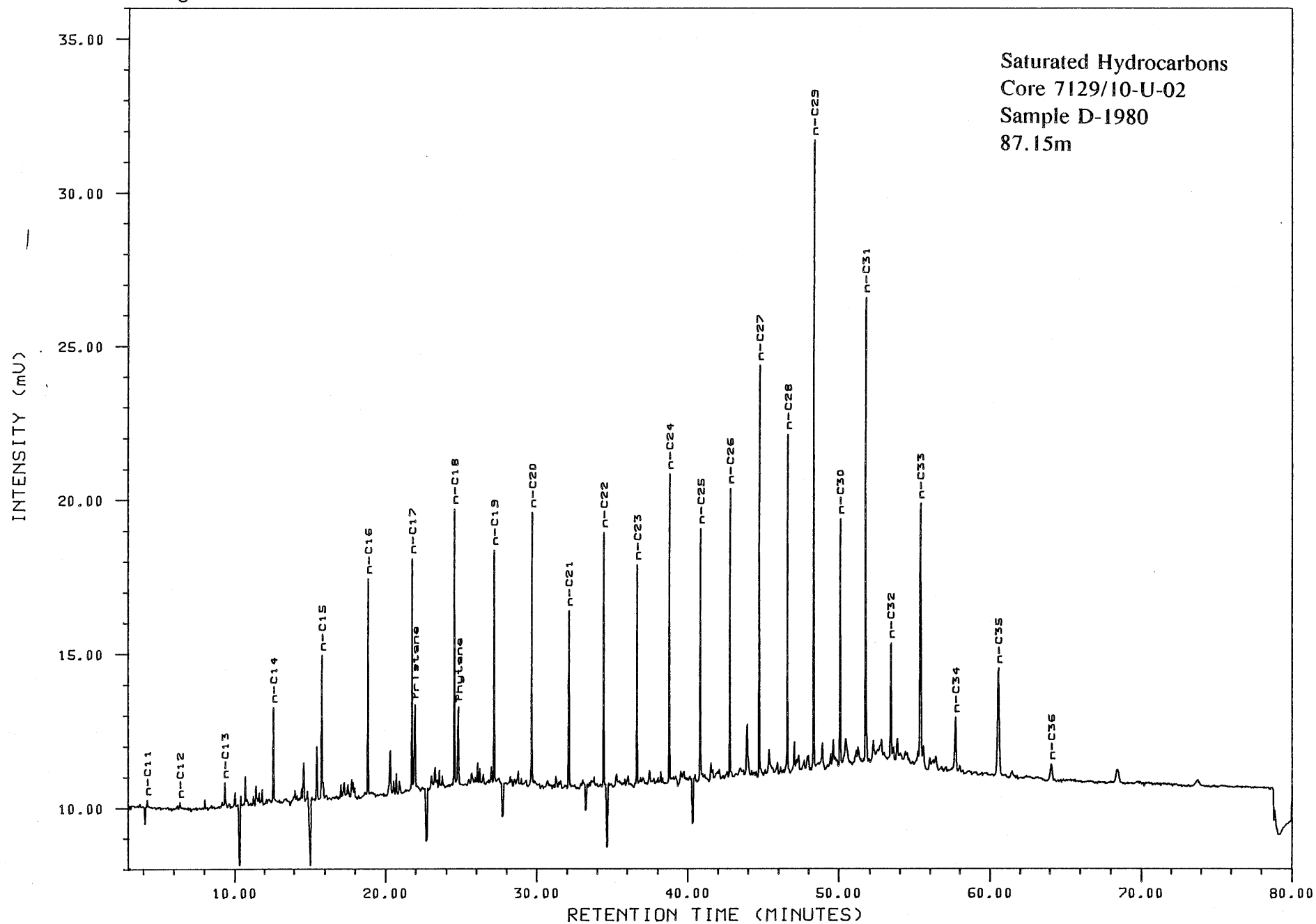
Analysis 427D1983S 2,1,1 D1983,21.3427,SAT



Analysis 427D1982S 2,1,1 D1982,21.3427,SAT



Analysis 427D1980S 2,1,1 D1980,21.3427,SAT



Analysis 427D0817S

3,1,1

7129/10-U-02

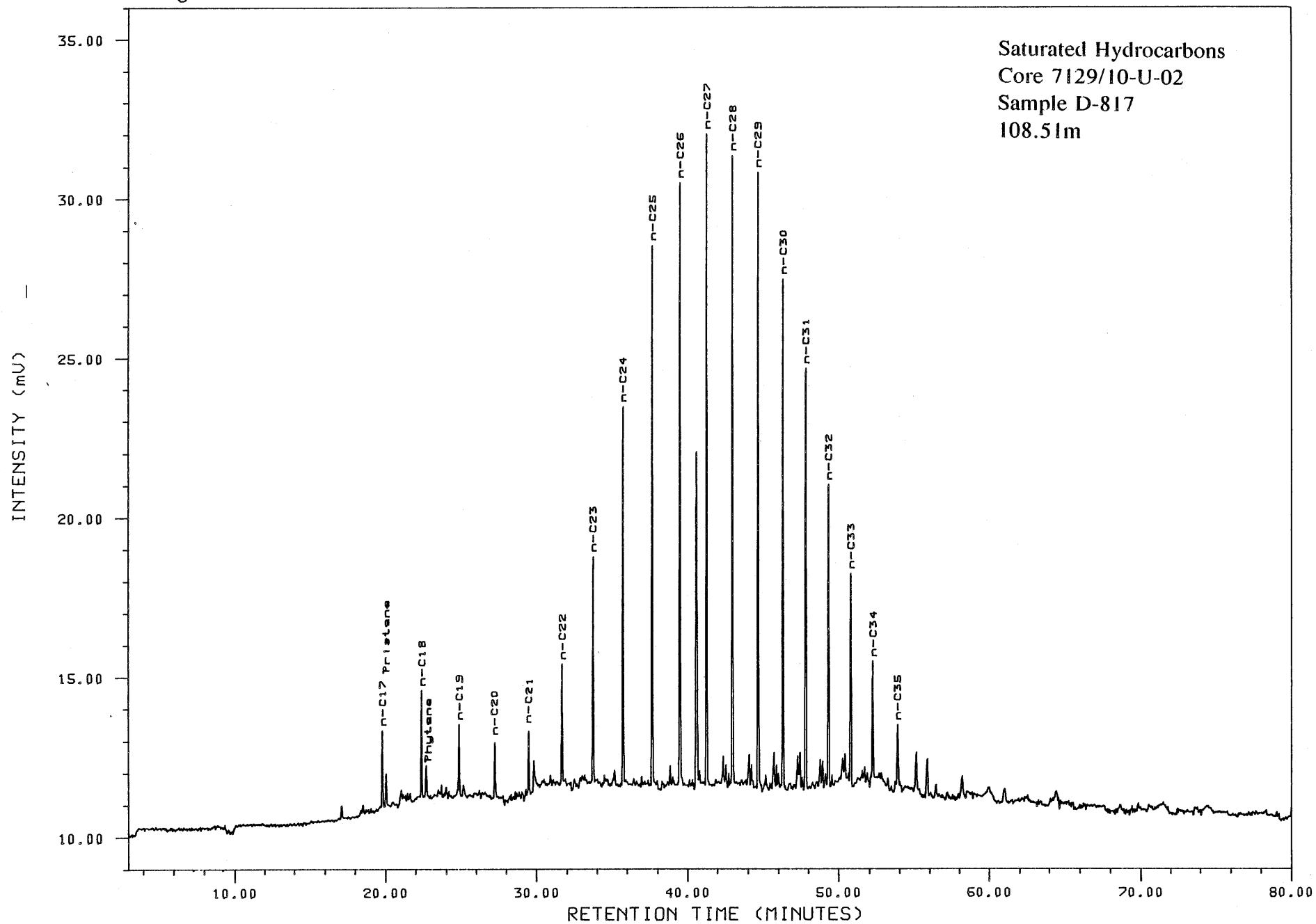


Figure A.II.2.2:

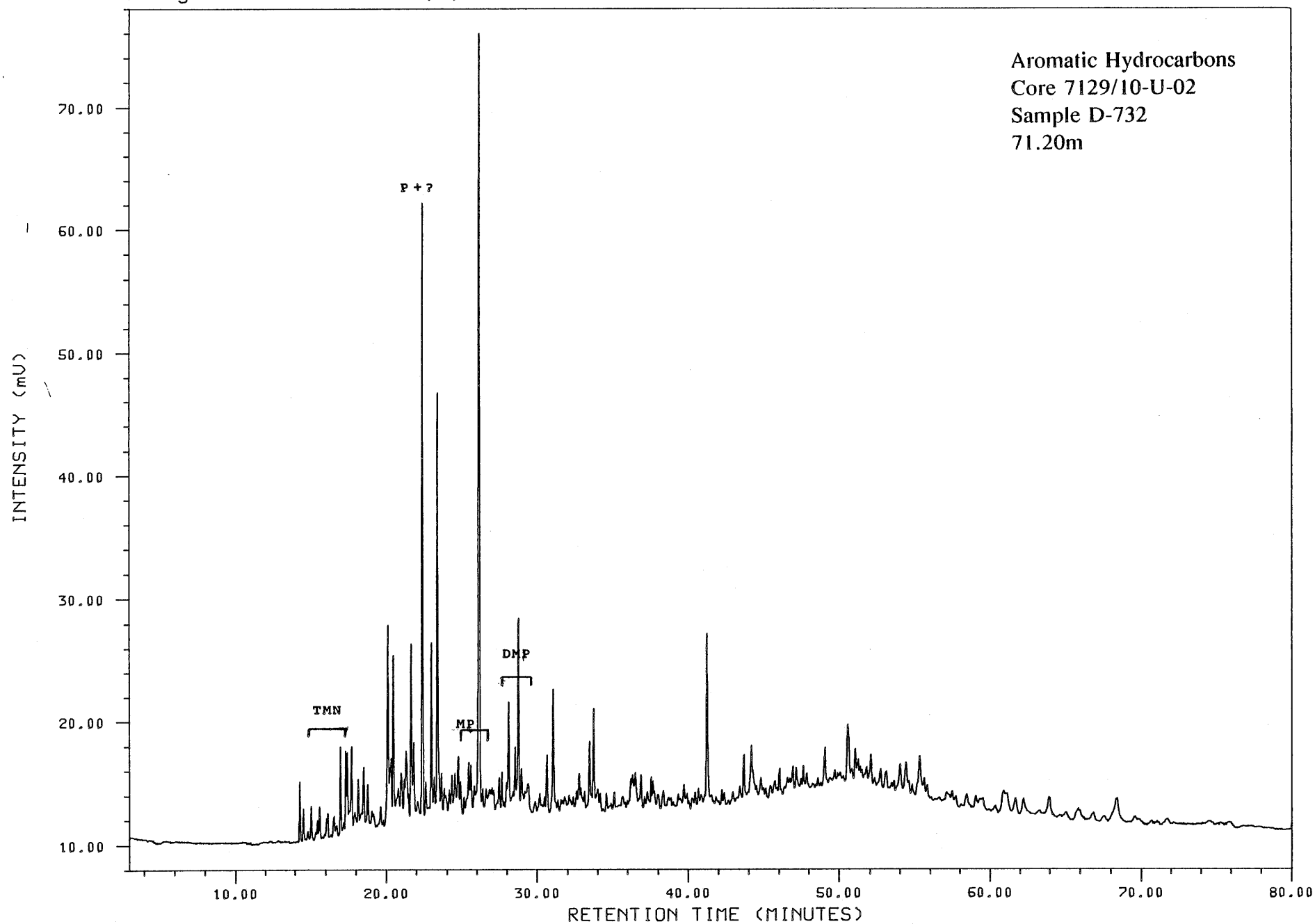
Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

Analysis 427D0732A

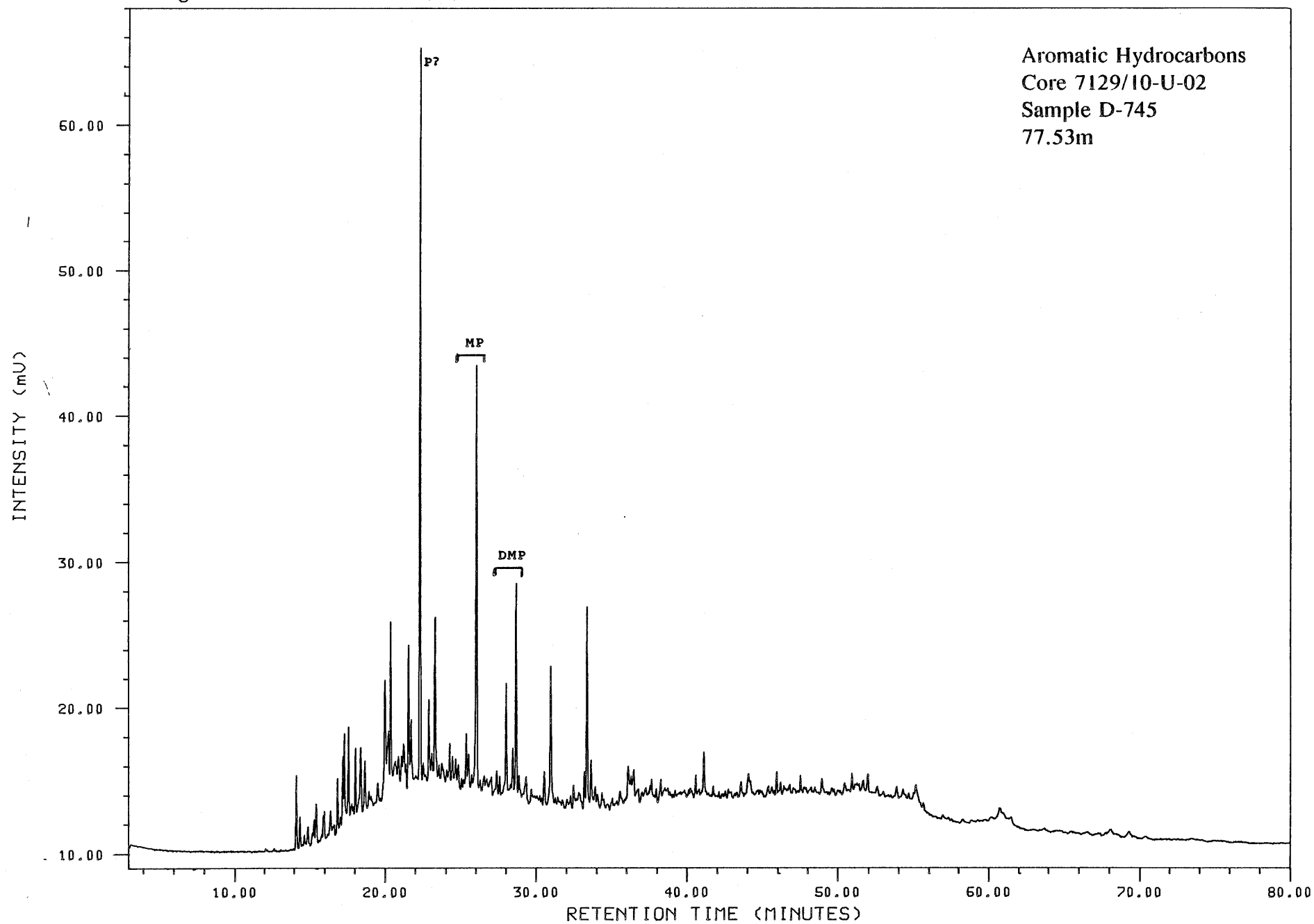
2,1,1

7129/10-U-02

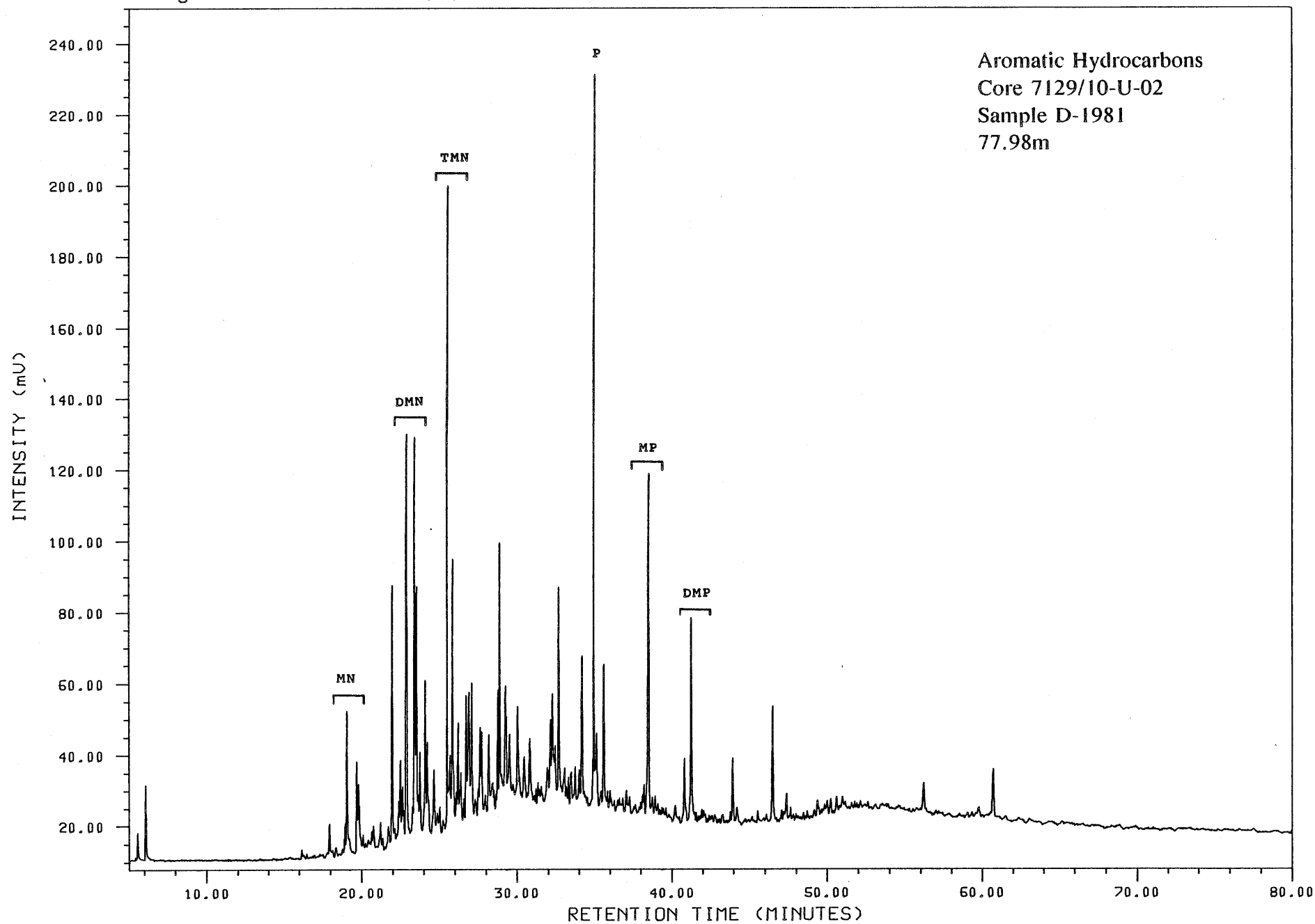


Analysis 427D0745A 2,1,1 7129/10-U-02

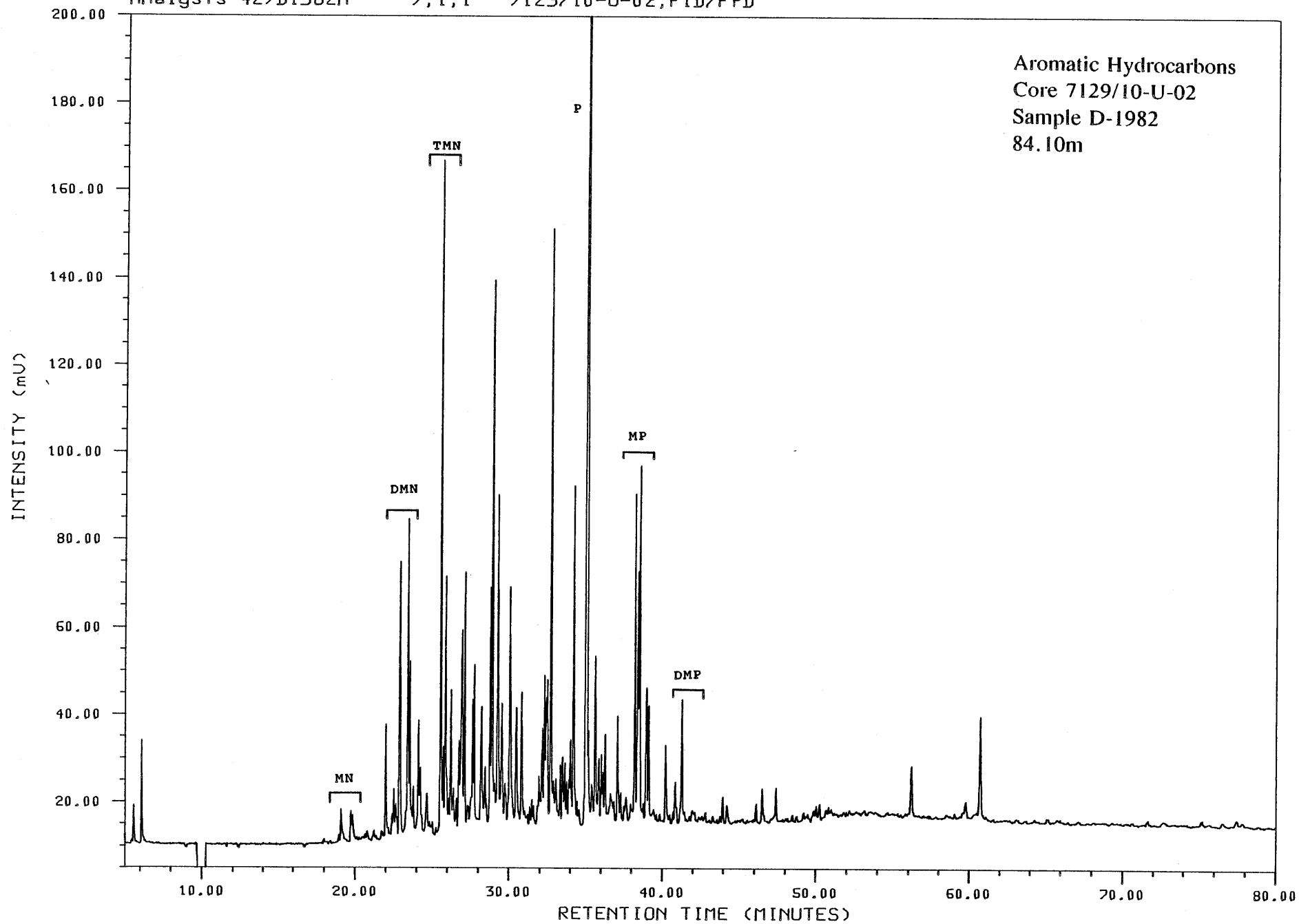
Aromatic Hydrocarbons
Core 7129/10-U-02
Sample D-745
77.53m



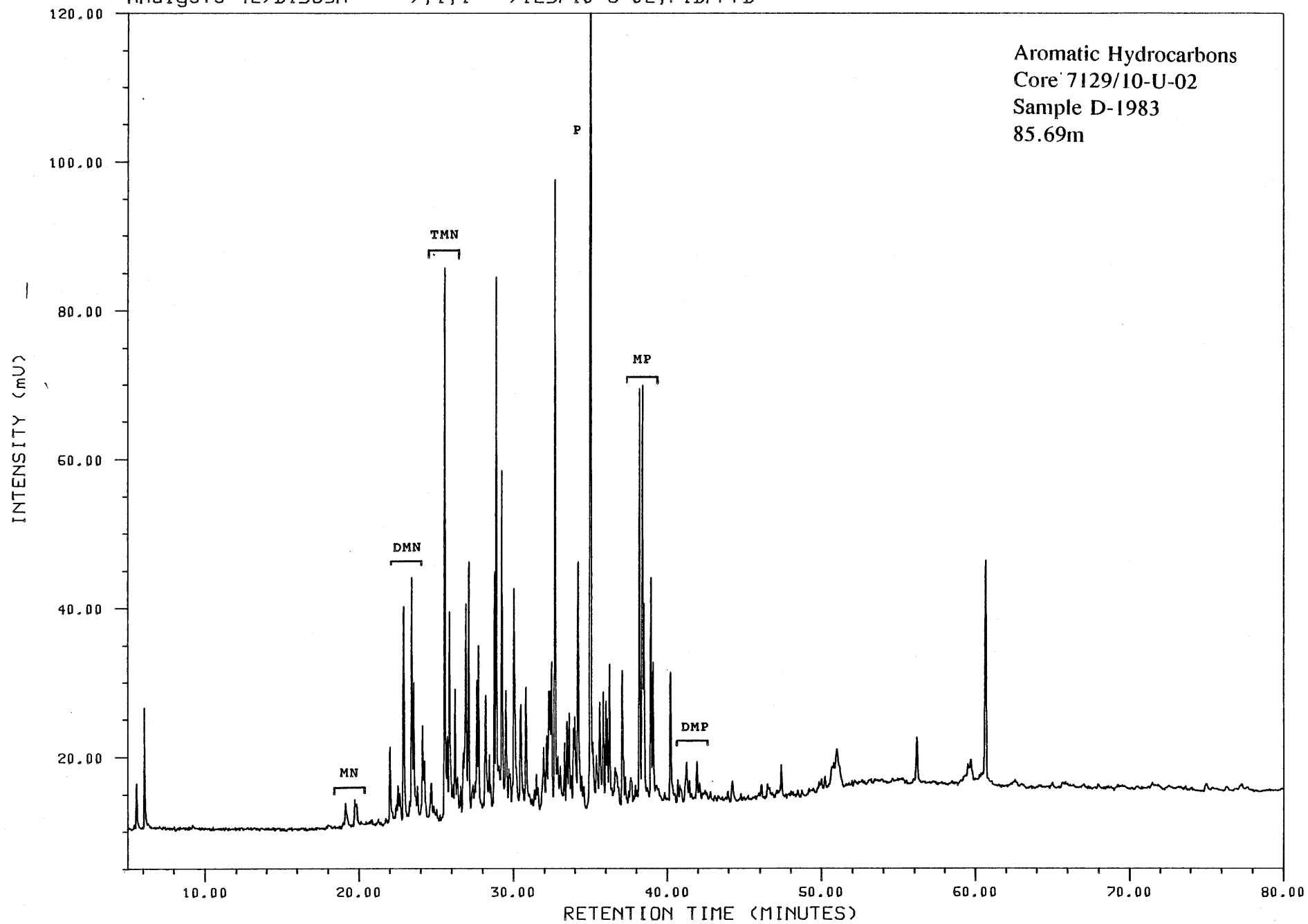
Analysis 427D1981A 7,1,1 7129/10-U-02,FID/FPD



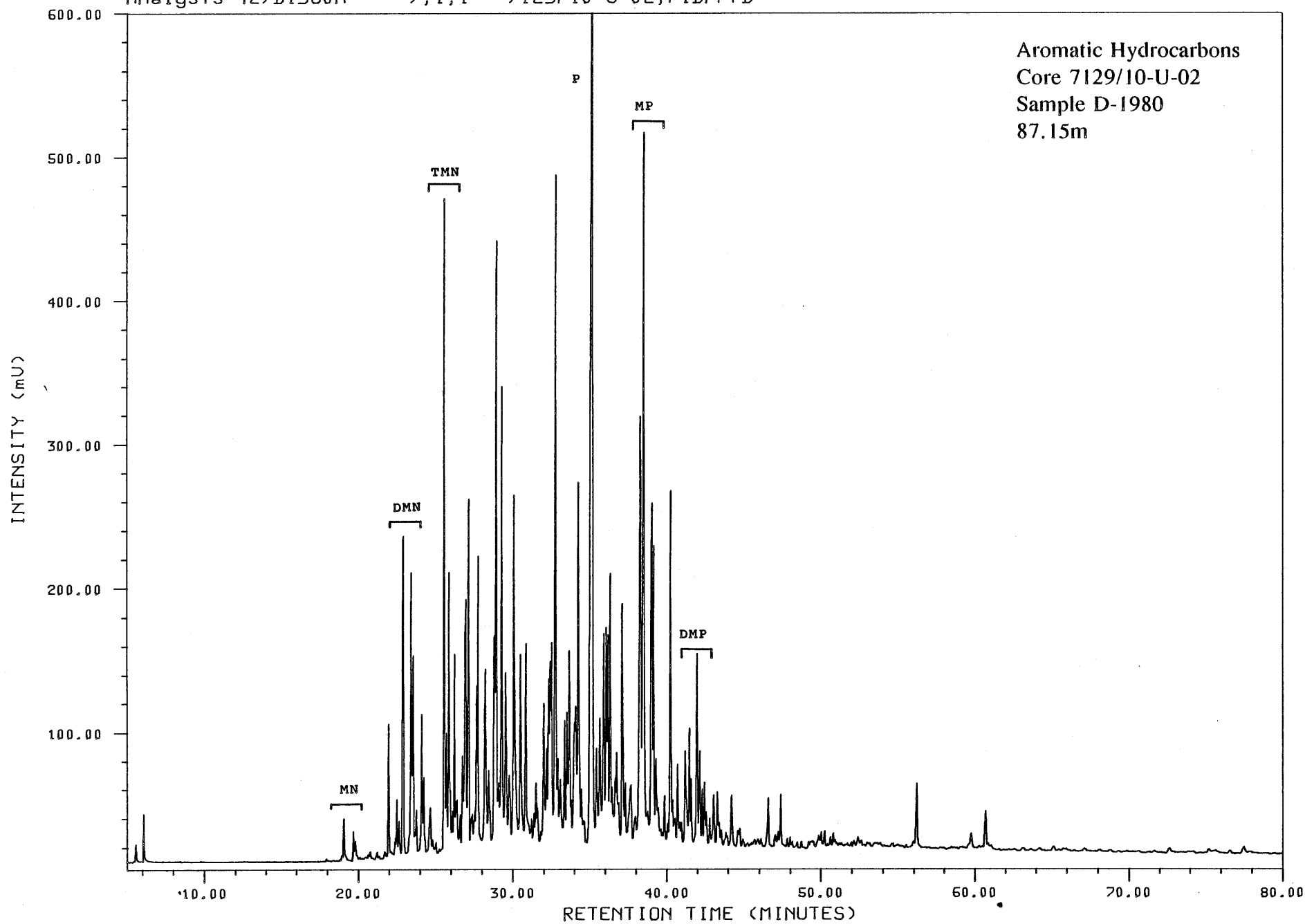
Analysis 427D1982A 7,1,1 7129/10-U-02,FID/FPD



Analysis 427D1983A 7,1,1 7129/10-U-02,FID/FPD



Analysis 427D1980A 7,1,1 7129/10-U-02,FID/FPD



Analysis 427D0817A 2,1,1 7129/10-U-02

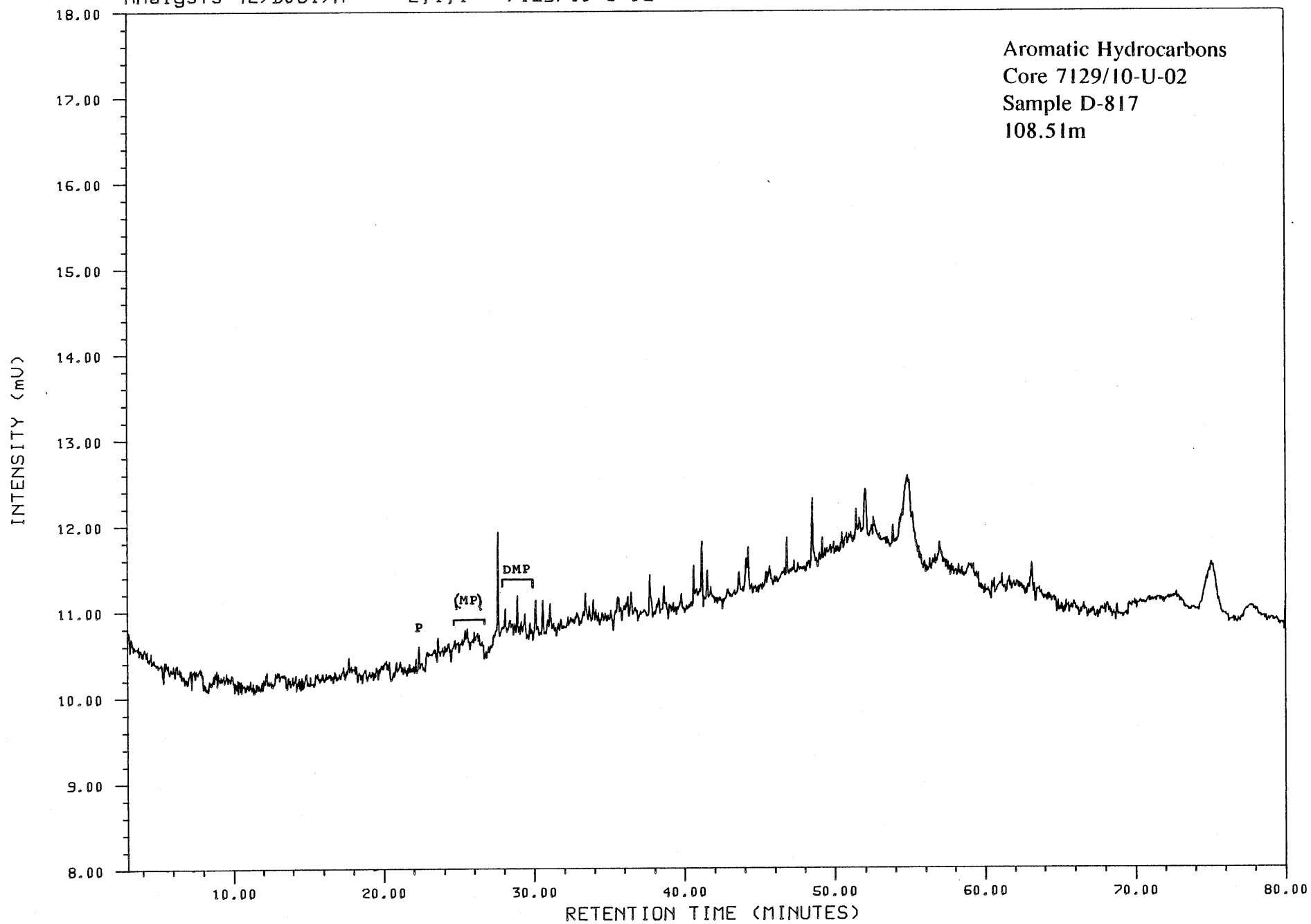
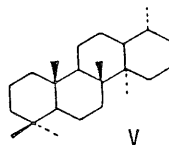
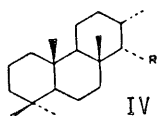
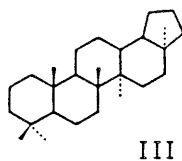
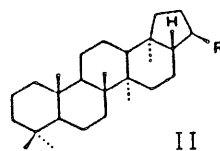
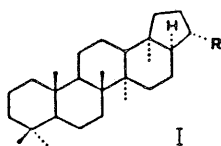


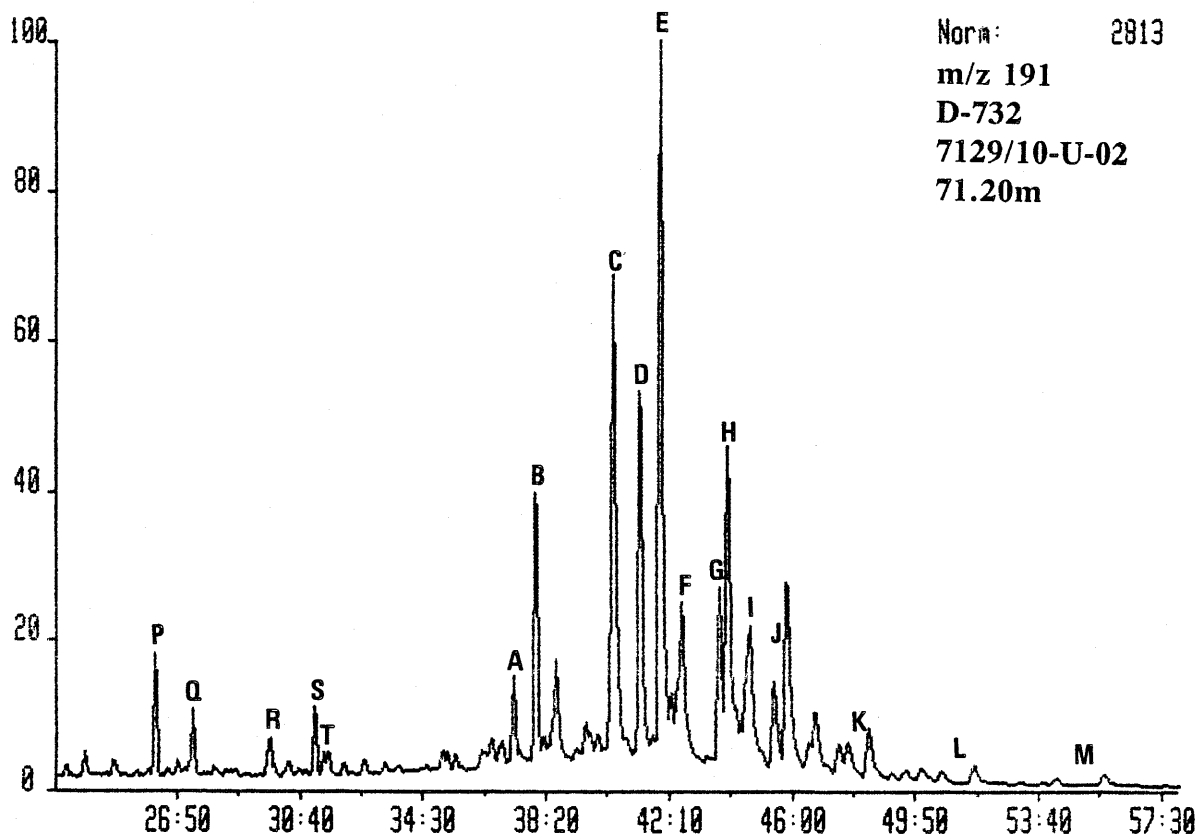
Figure A.II.2.3:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

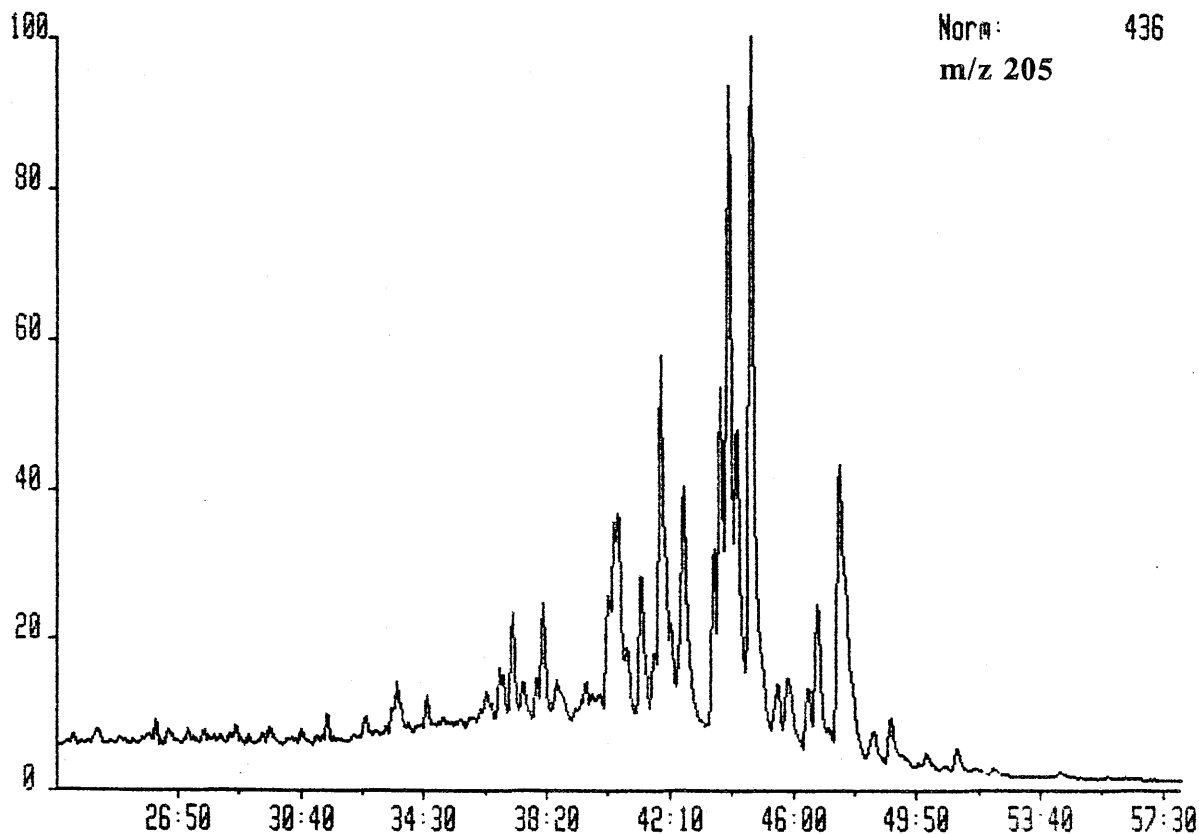
P	tricyclic terpene	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpene	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpene (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpene	$C_{24}H_{42}$	(V)
T	tricyclic terpene (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trisorneohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trisnorhopane	$C_{27}H_{46}$	(I, R=H)
Z	bisnorhopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23

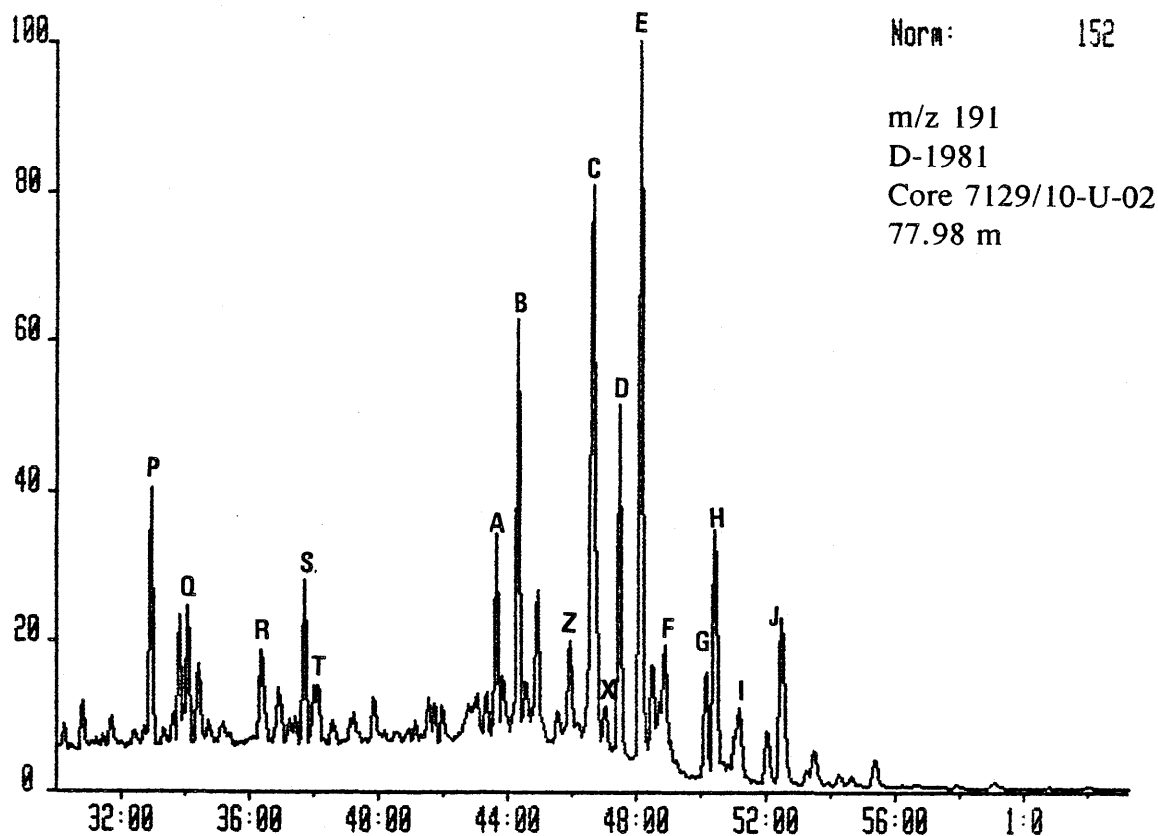


D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



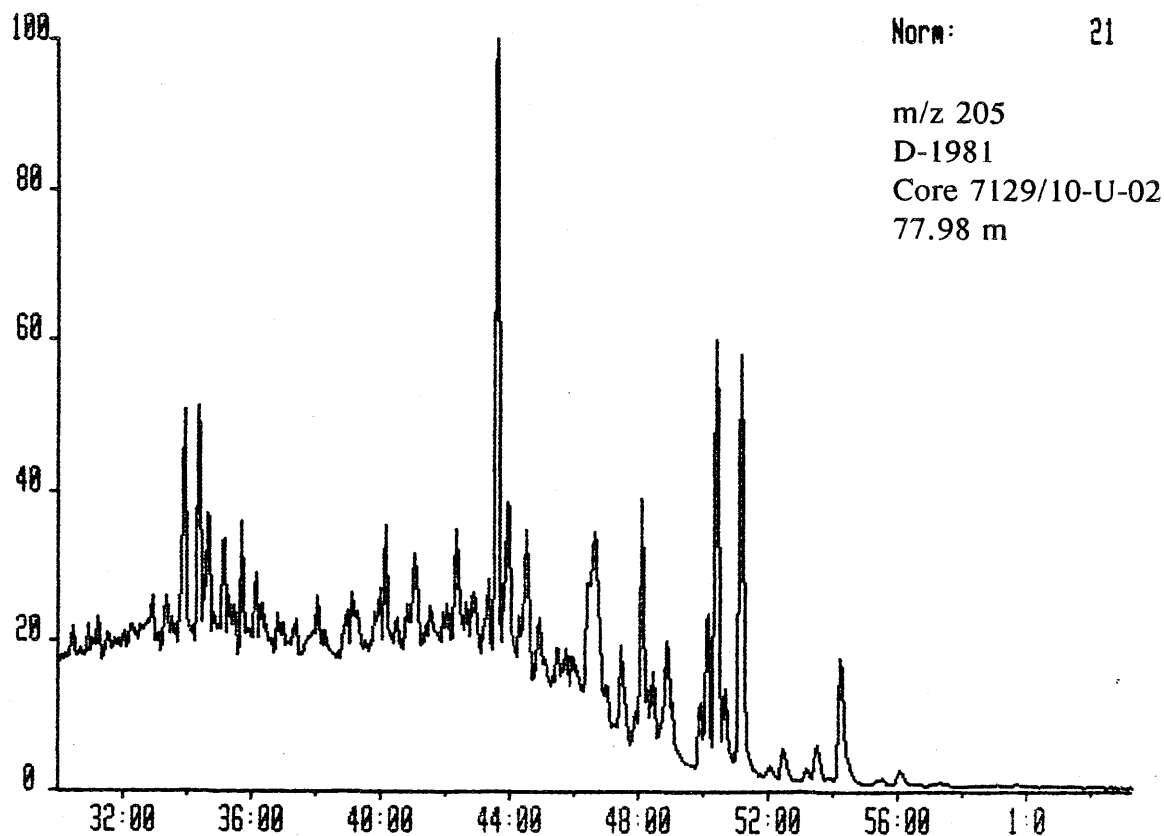
D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:

System:QUADSAT



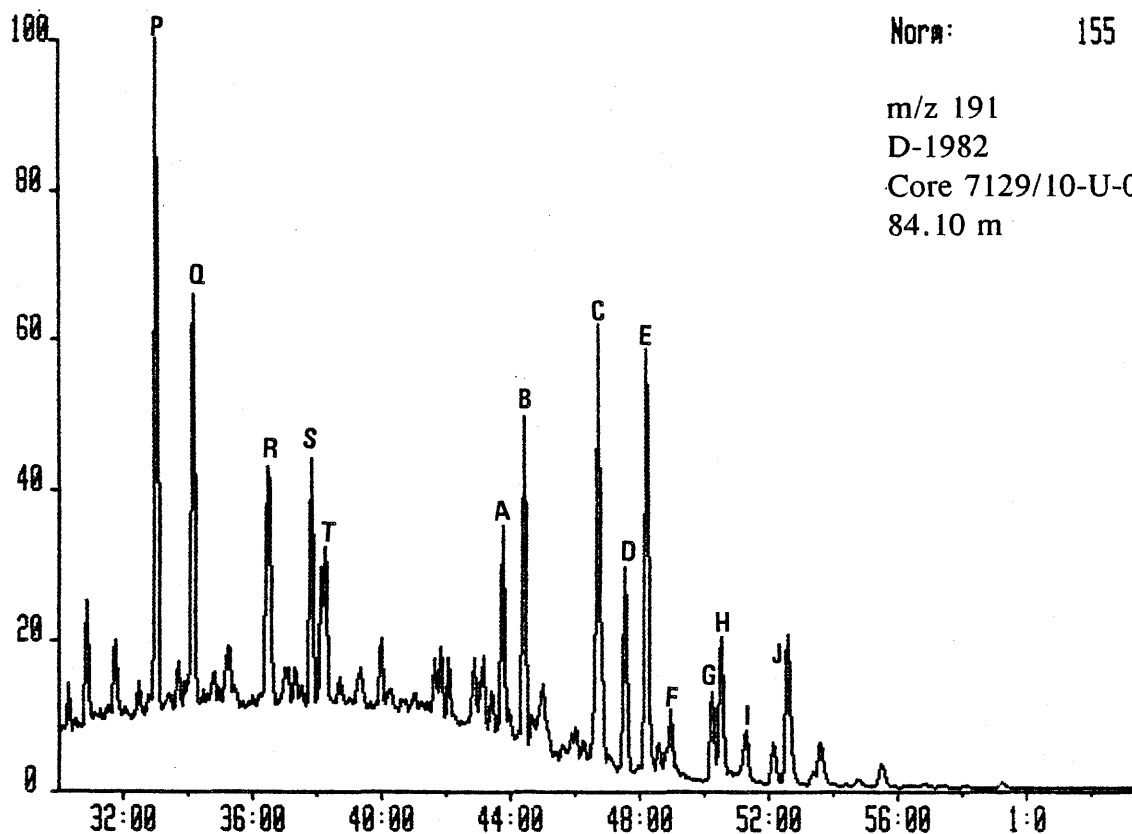
D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:

System:QUADSAT



D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:

System:QUADSAT

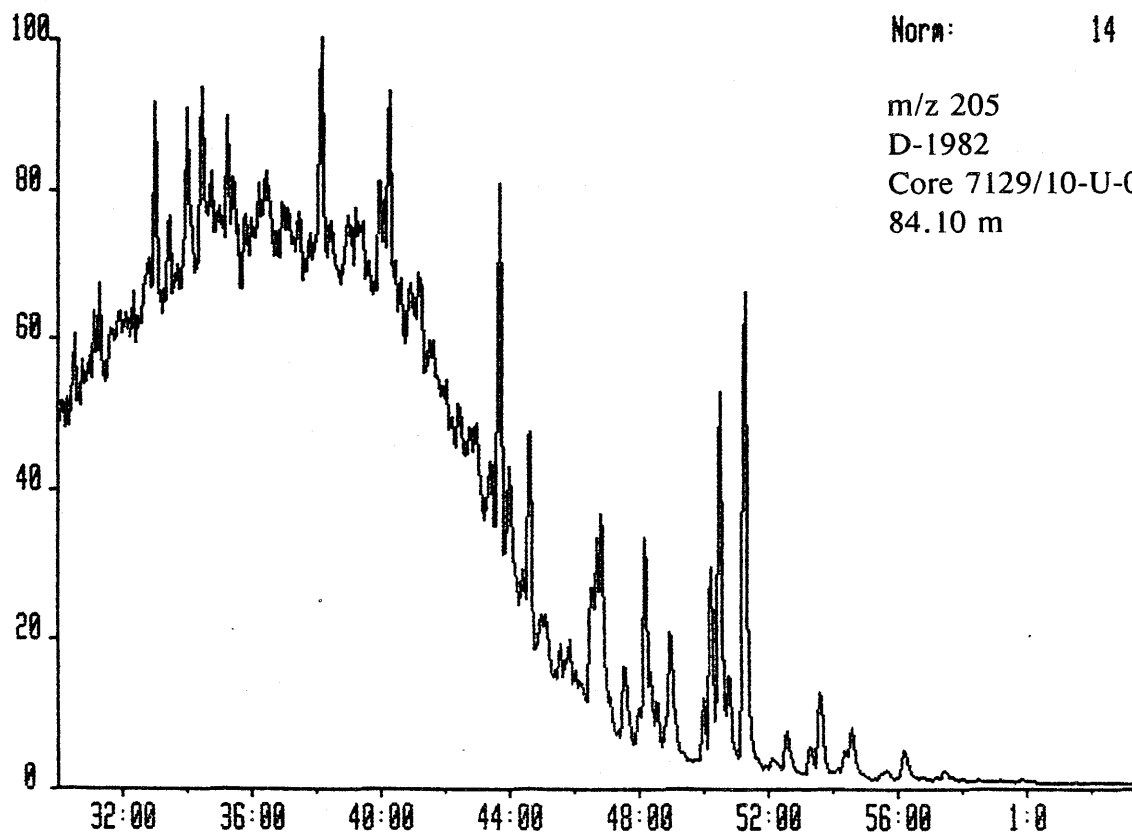


Norm: 155

m/z 191
D-1982
Core 7129/10-U-02
84.10 m

D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:

System:QUADSAT

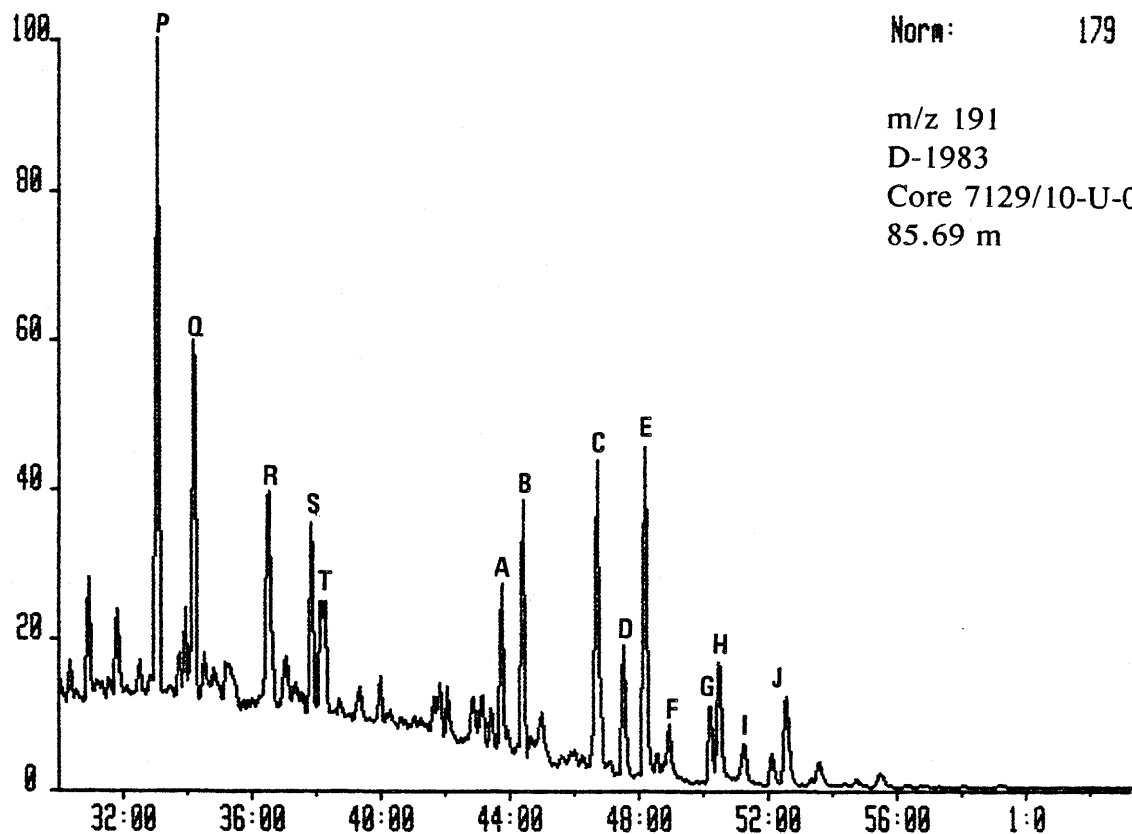


Norm: 14

m/z 205
D-1982
Core 7129/10-U-02
84.10 m

D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:

System:QUADSAT

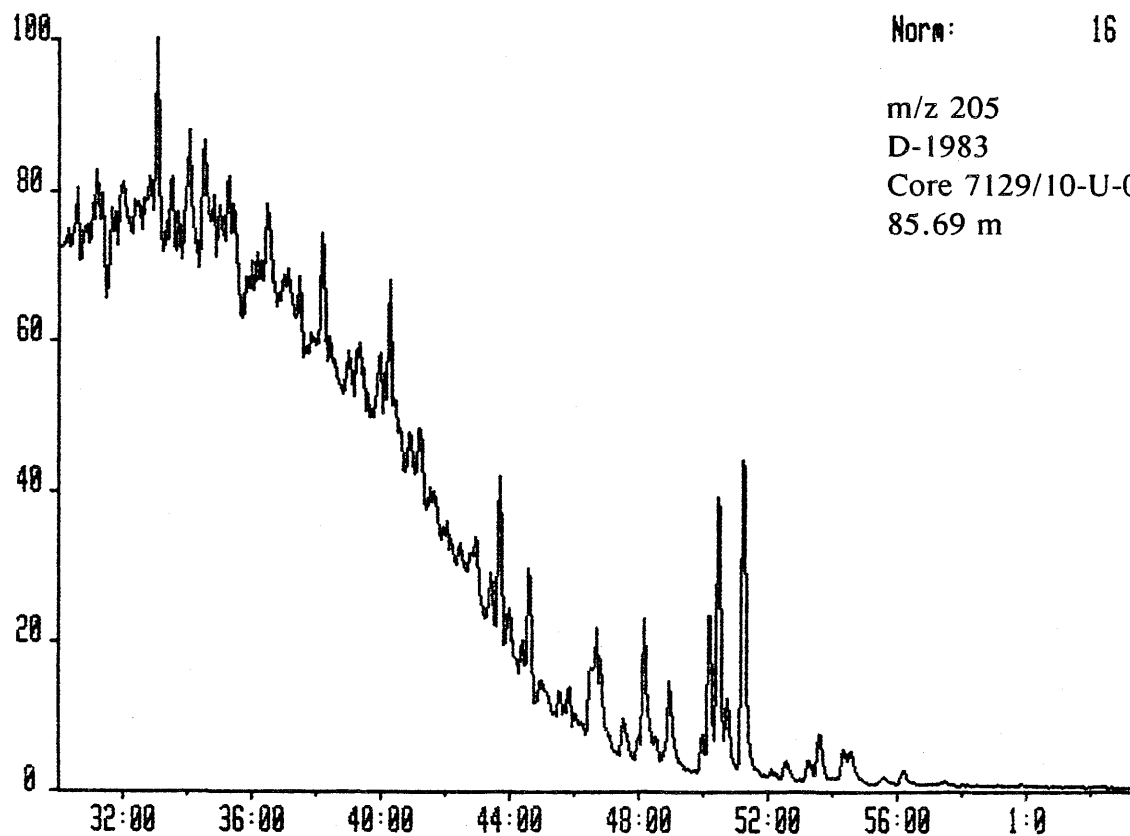


Norm: 179

m/z 191
D-1983
Core 7129/10-U-02
85.69 m

D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:

System:QUADSAT

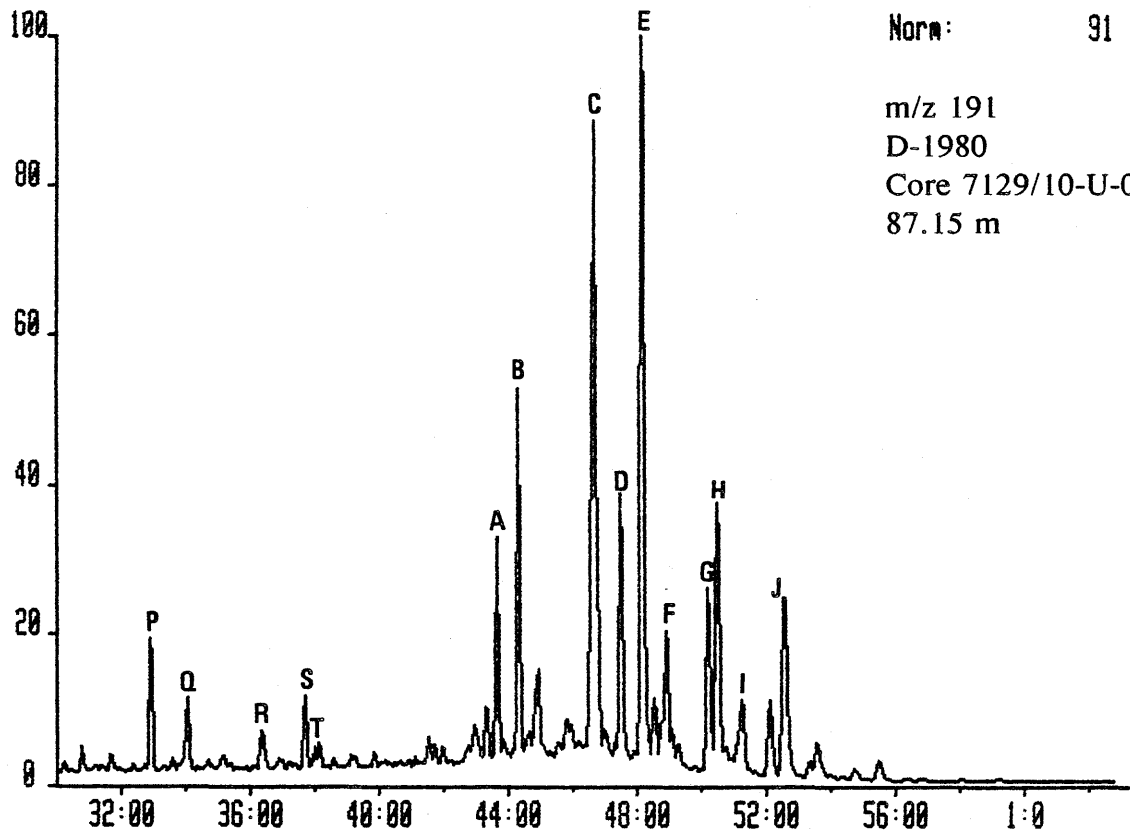


Norm: 16

m/z 205
D-1983
Core 7129/10-U-02
85.69 m

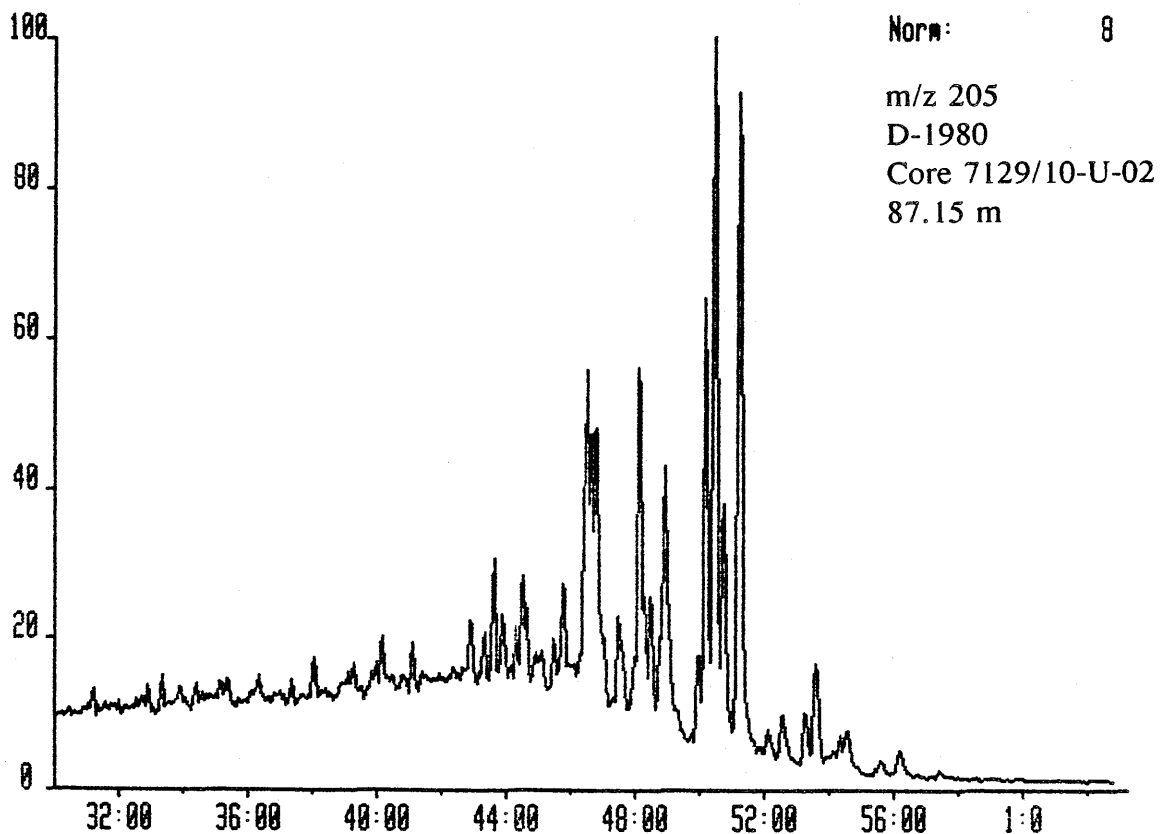
D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:

System:QUADSAT

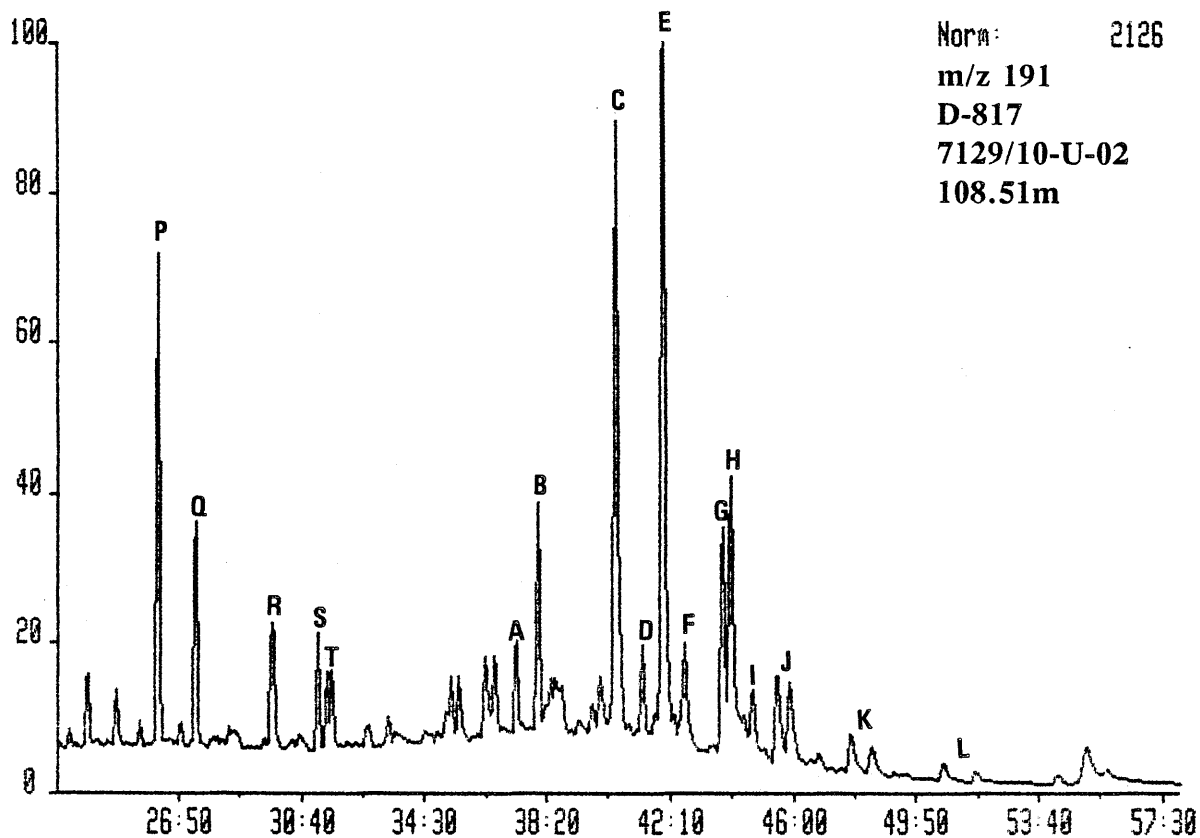


D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:

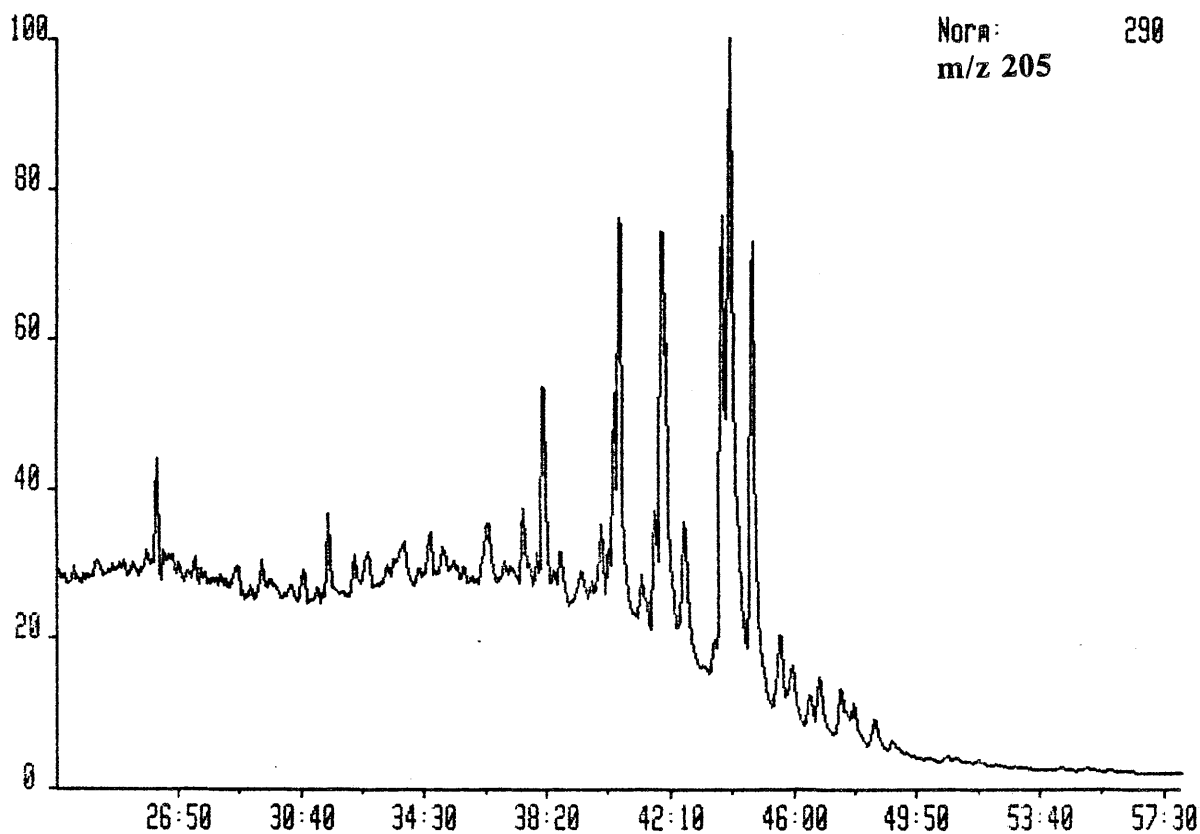
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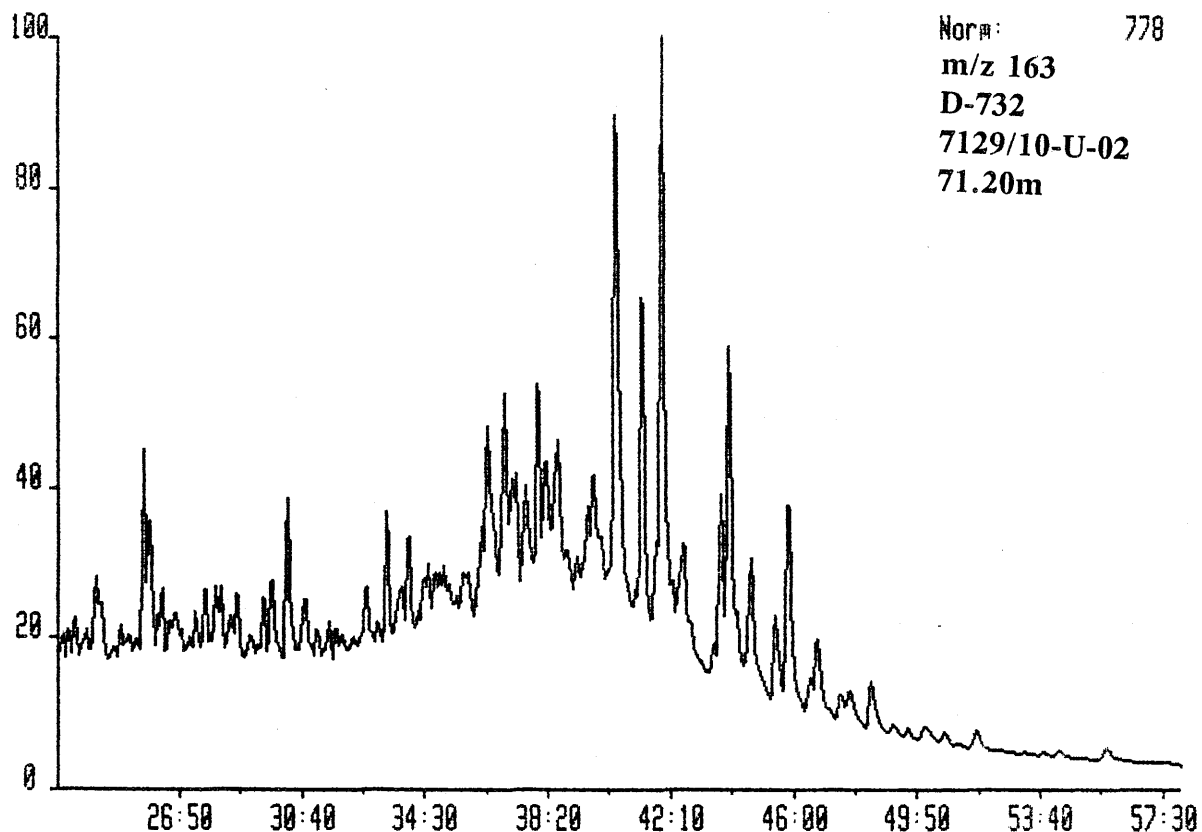
0817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



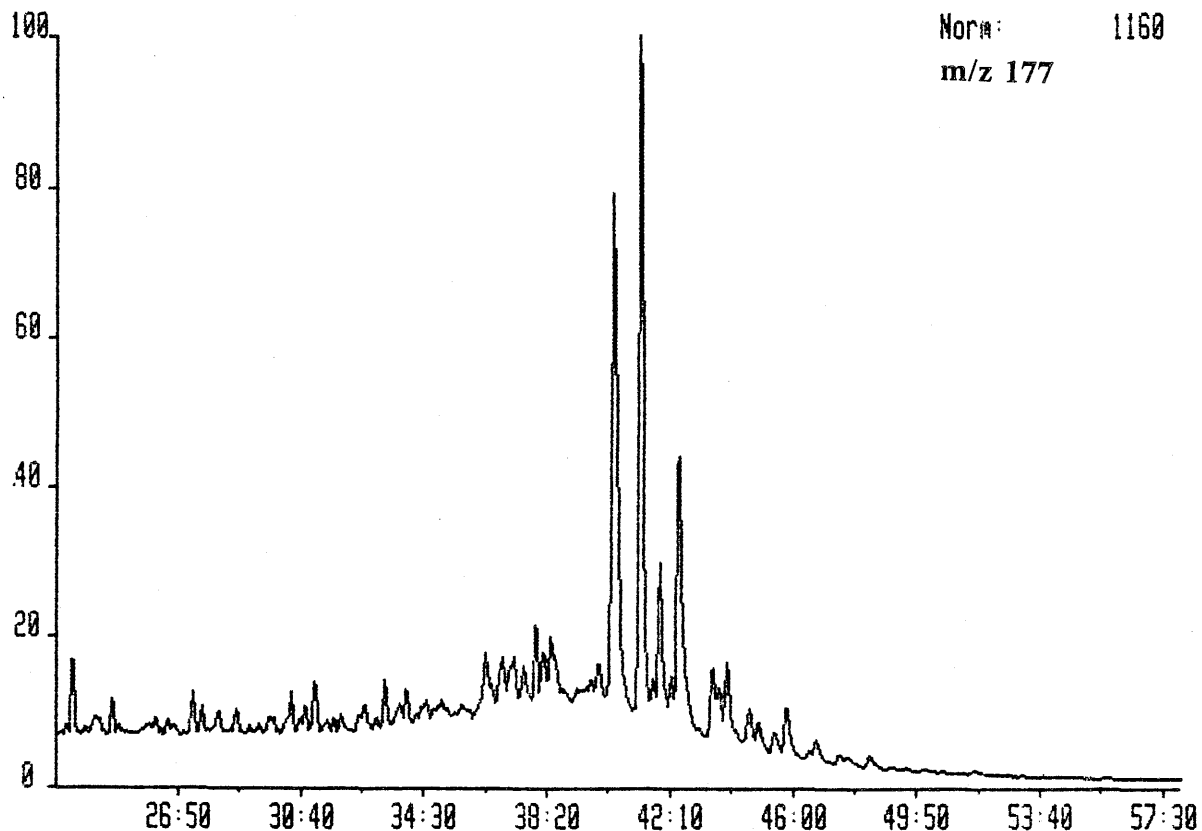
0817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23

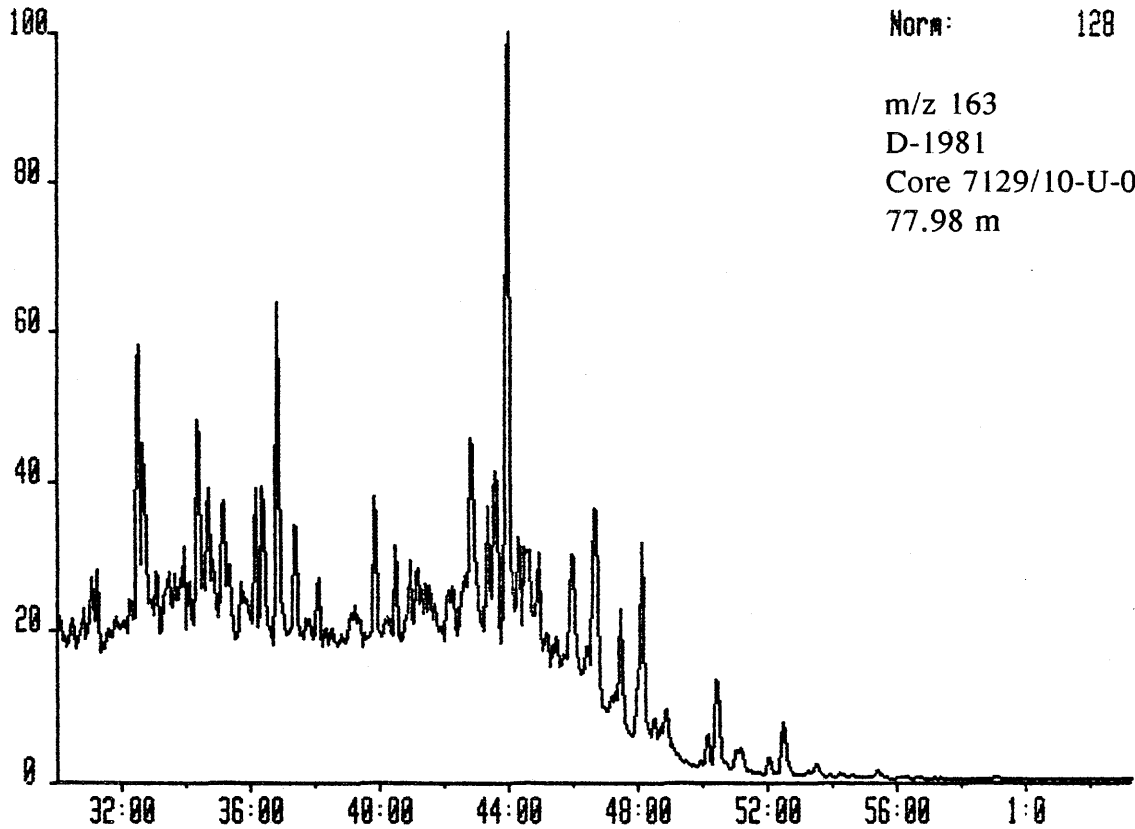


D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:

System:QUADSAT

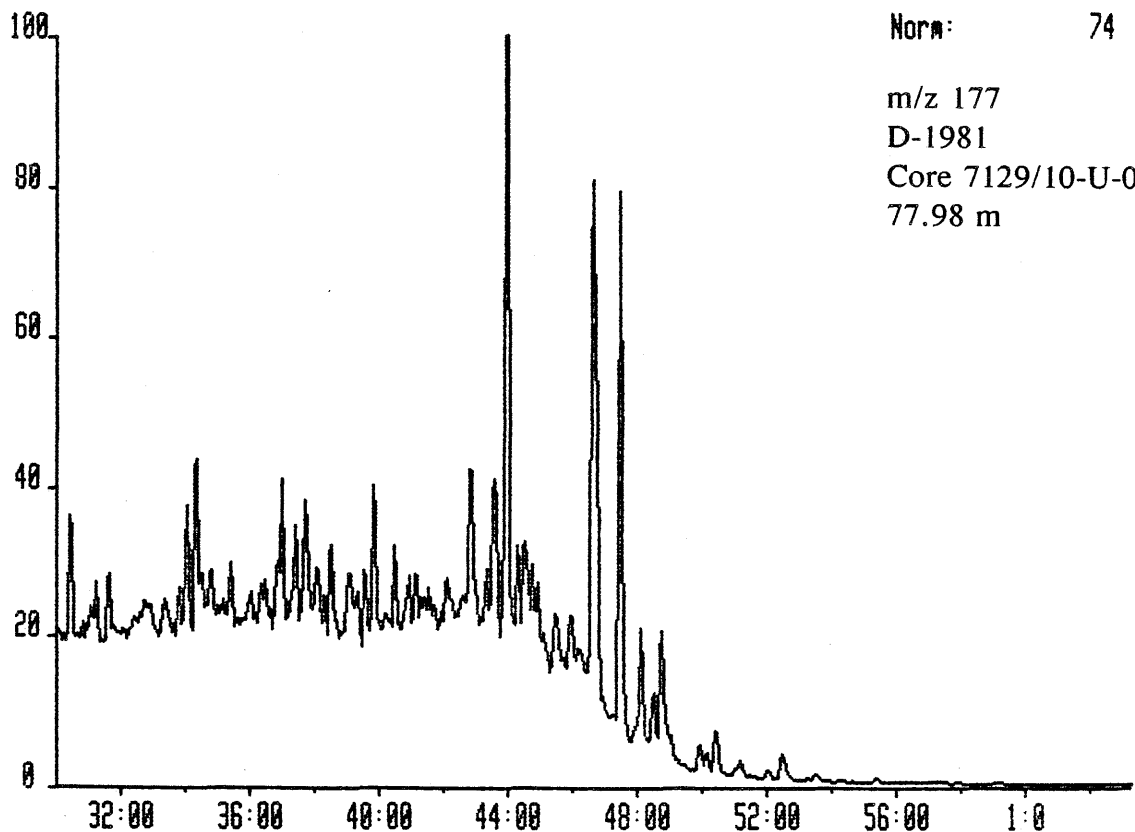


Norm: 128

m/z 163
D-1981
Core 7129/10-U-02
77.98 m

D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

System:QUADSAT

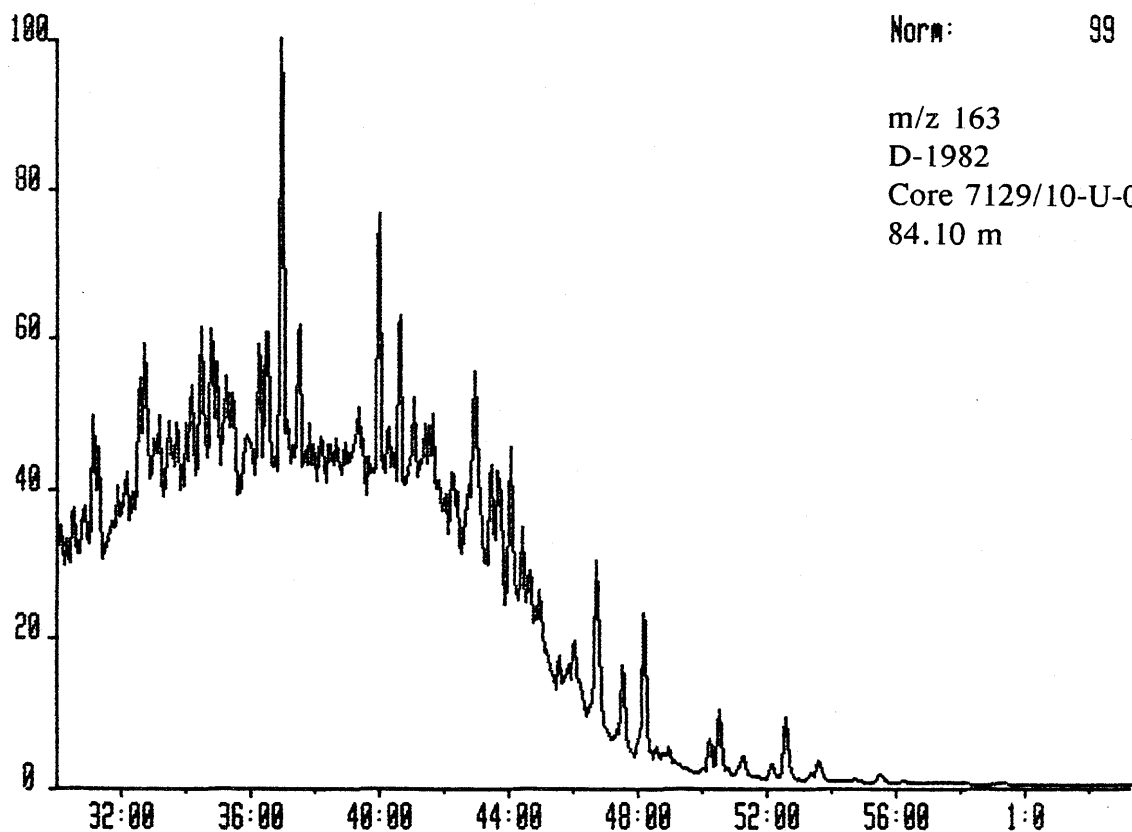


Norm: 74

m/z 177
D-1981
Core 7129/10-U-02
77.98 m

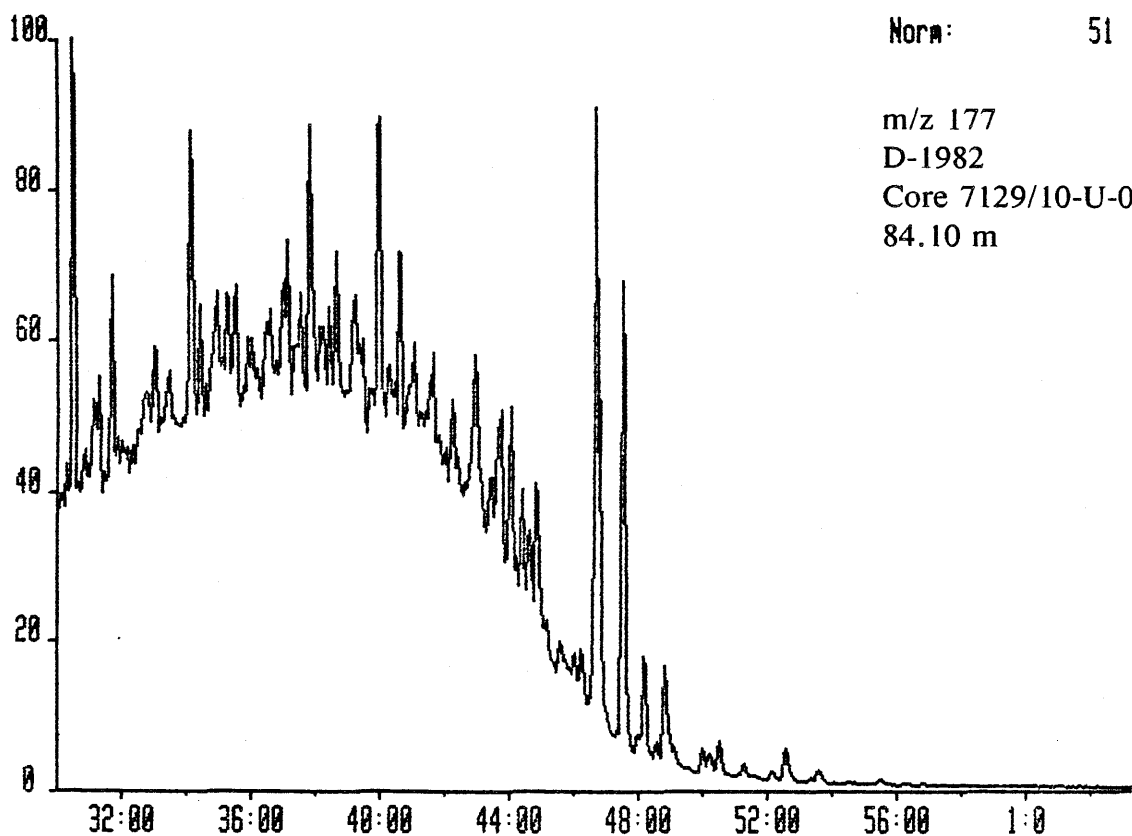
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:

System:QUADSAT



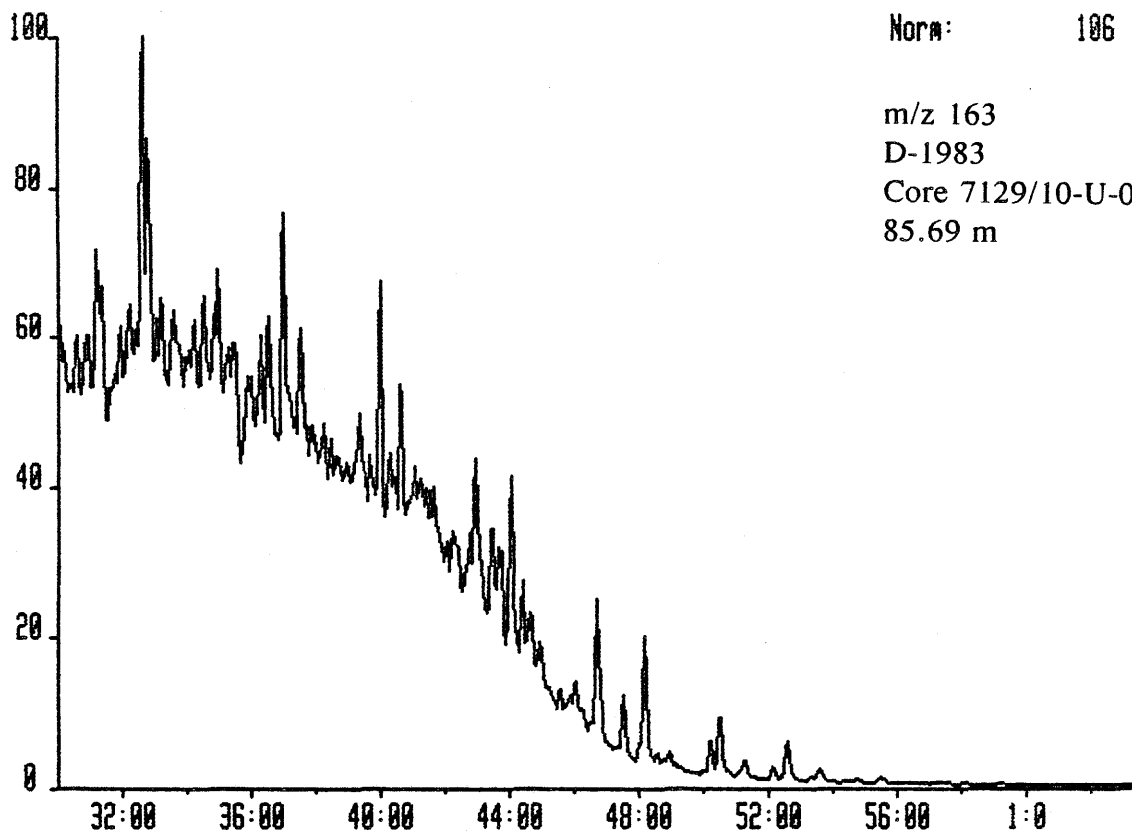
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

System:QUADSAT



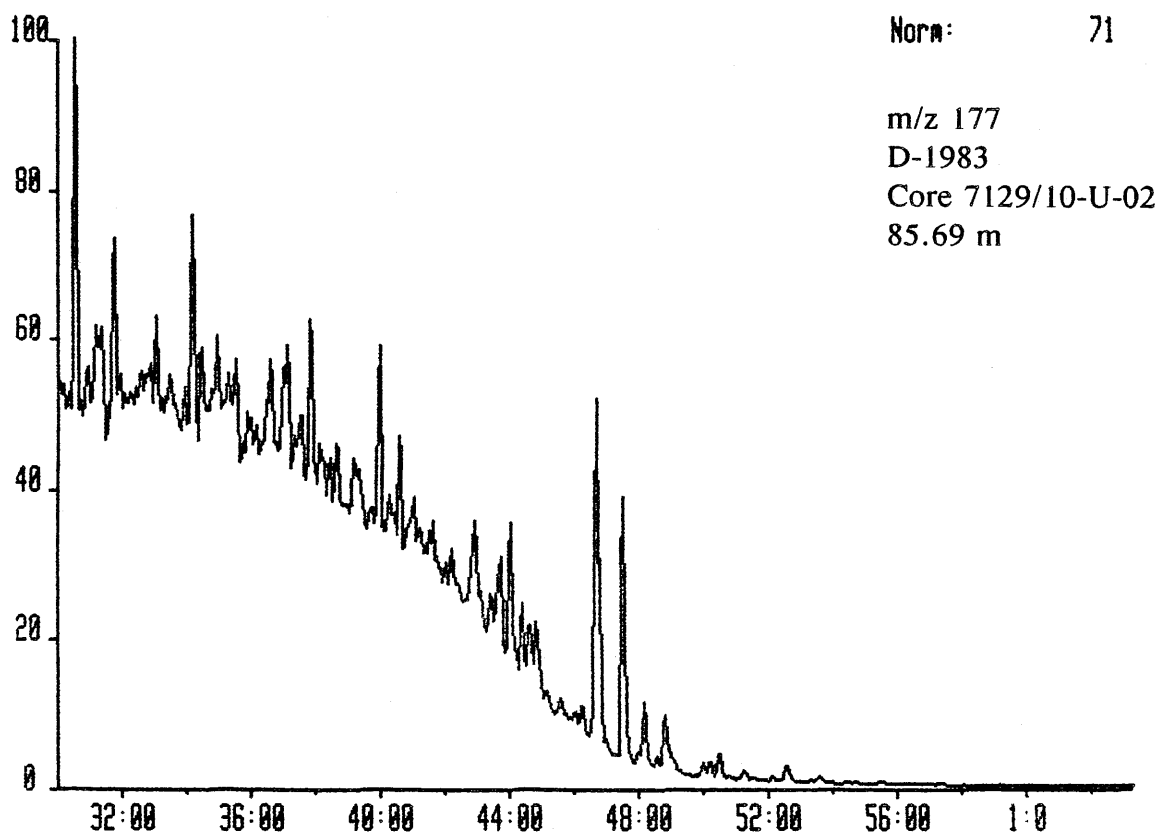
D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:

System:QUASAT



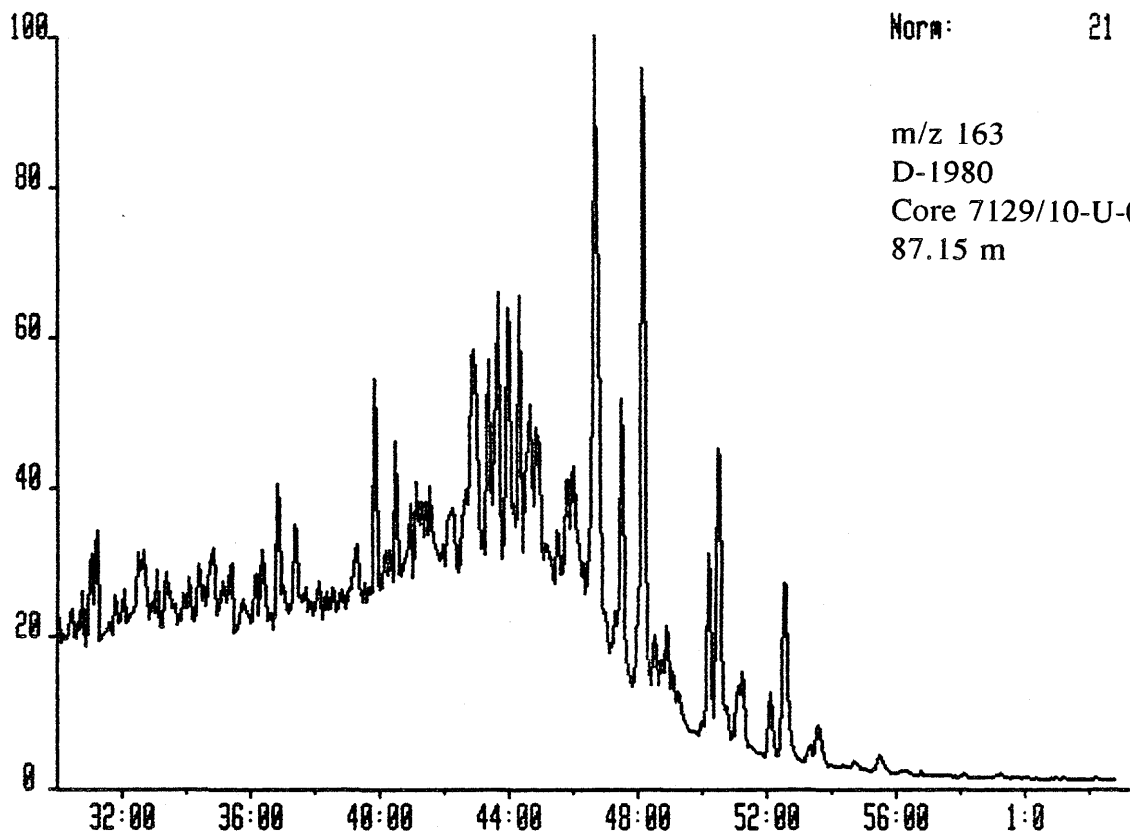
D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

System:QUASAT



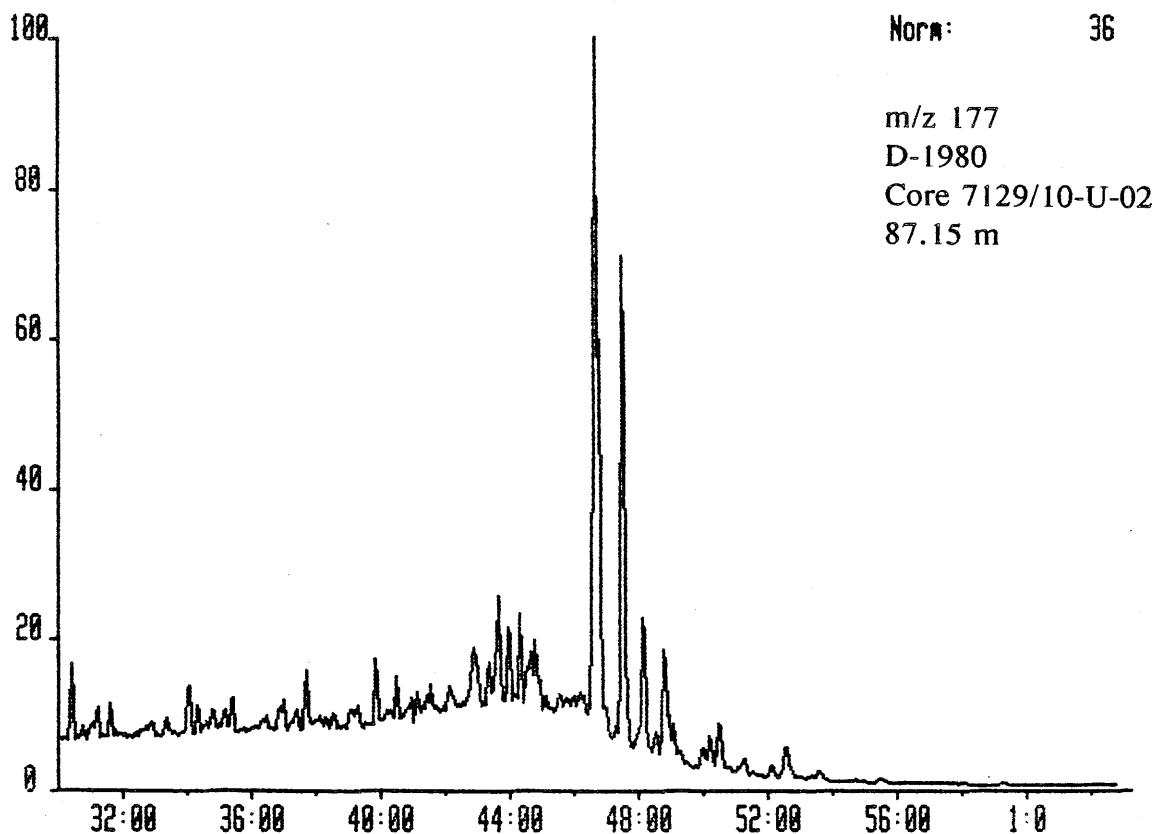
01980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:

System:QUADSAT

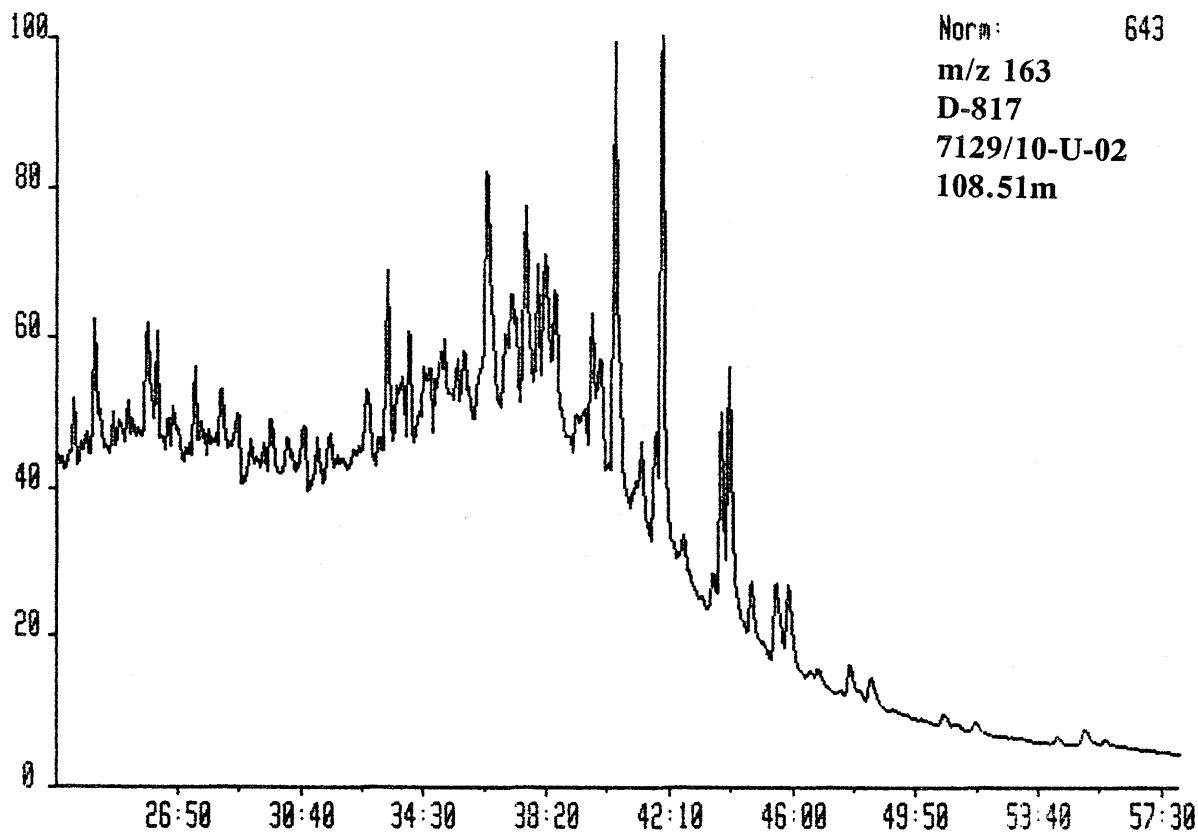


01980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:

System:QUADSAT



D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

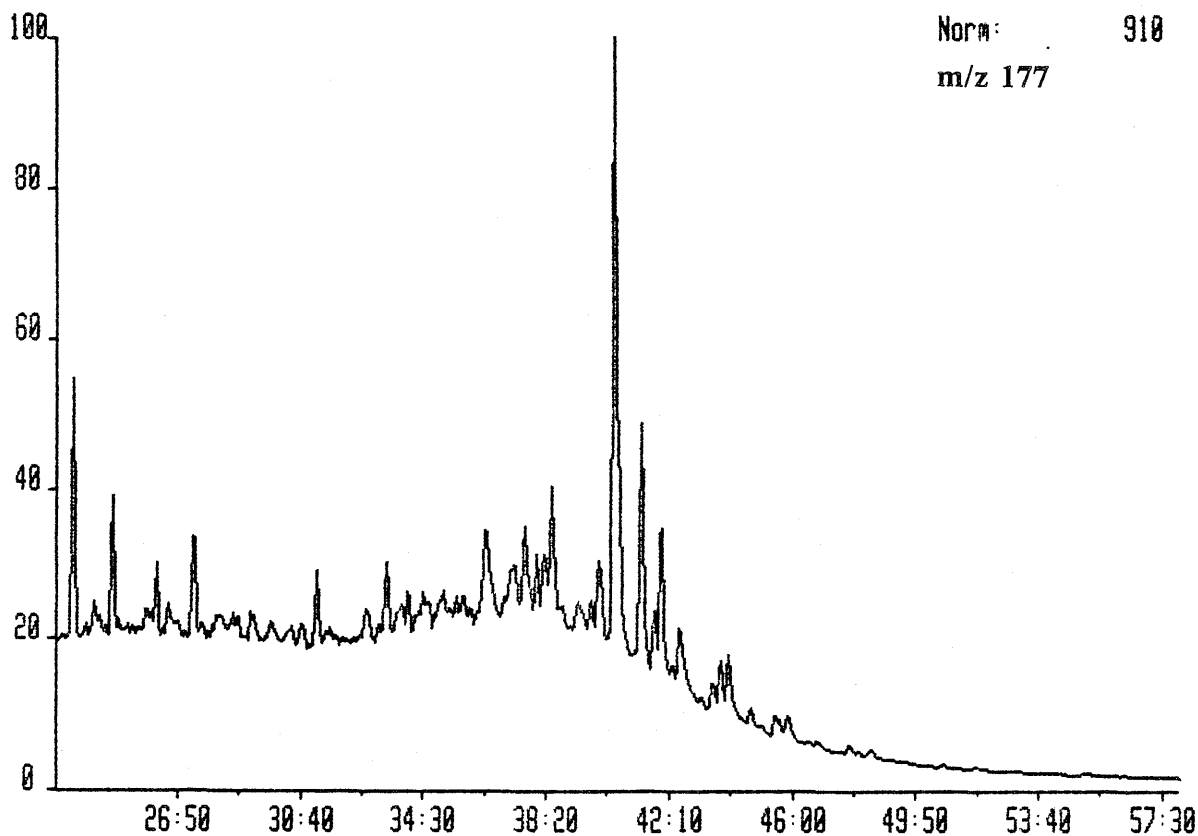
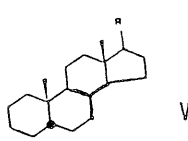
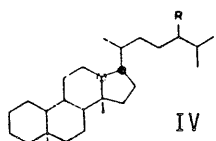
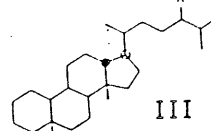
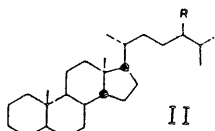
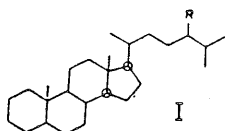


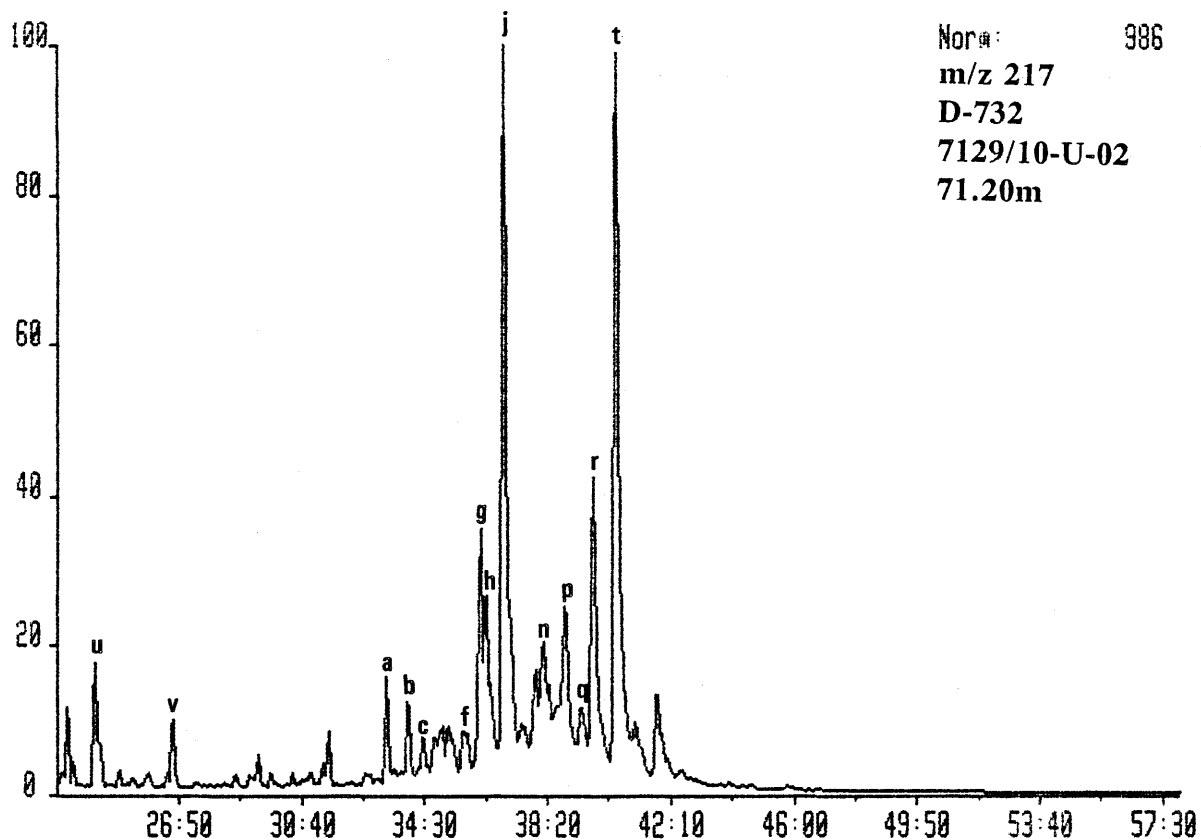
Figure A.II.2.4:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)

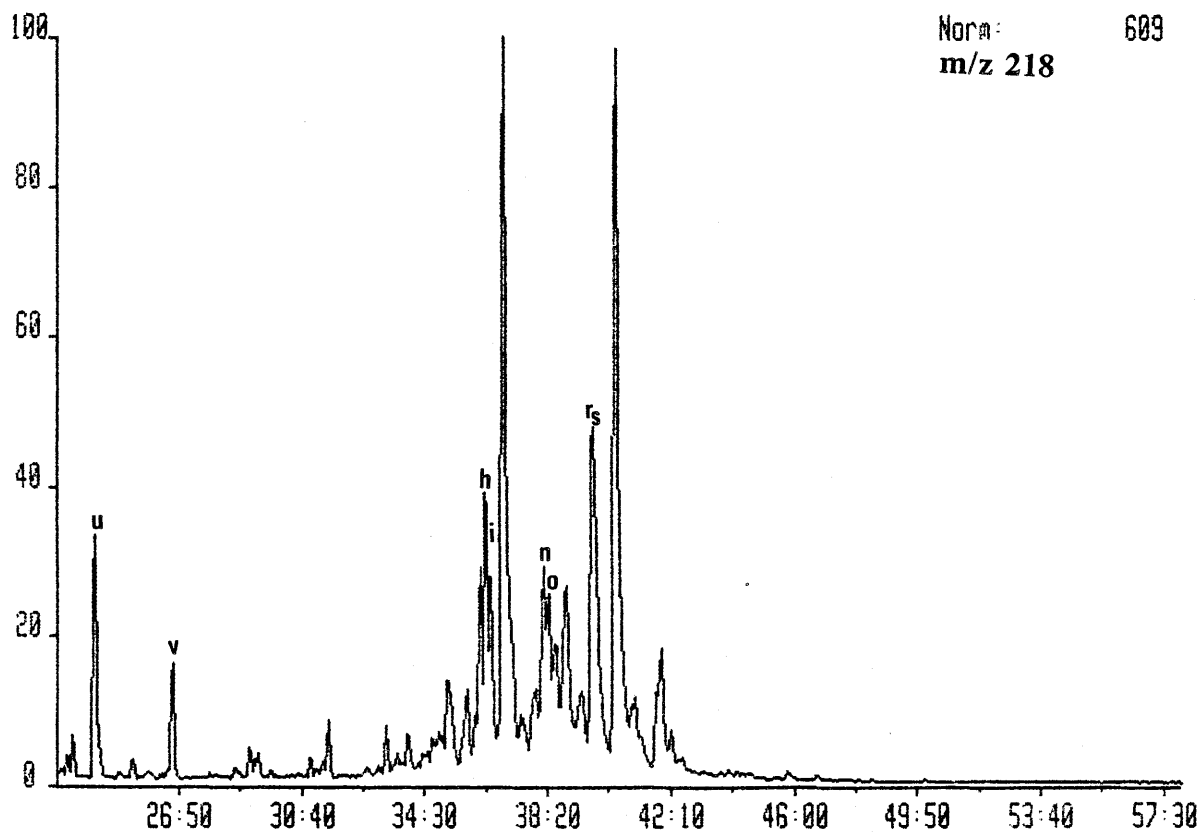


D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:21.3427.23



Norm: 986
 m/z 217
 D-732
 7129/10-U-02
 71.20m

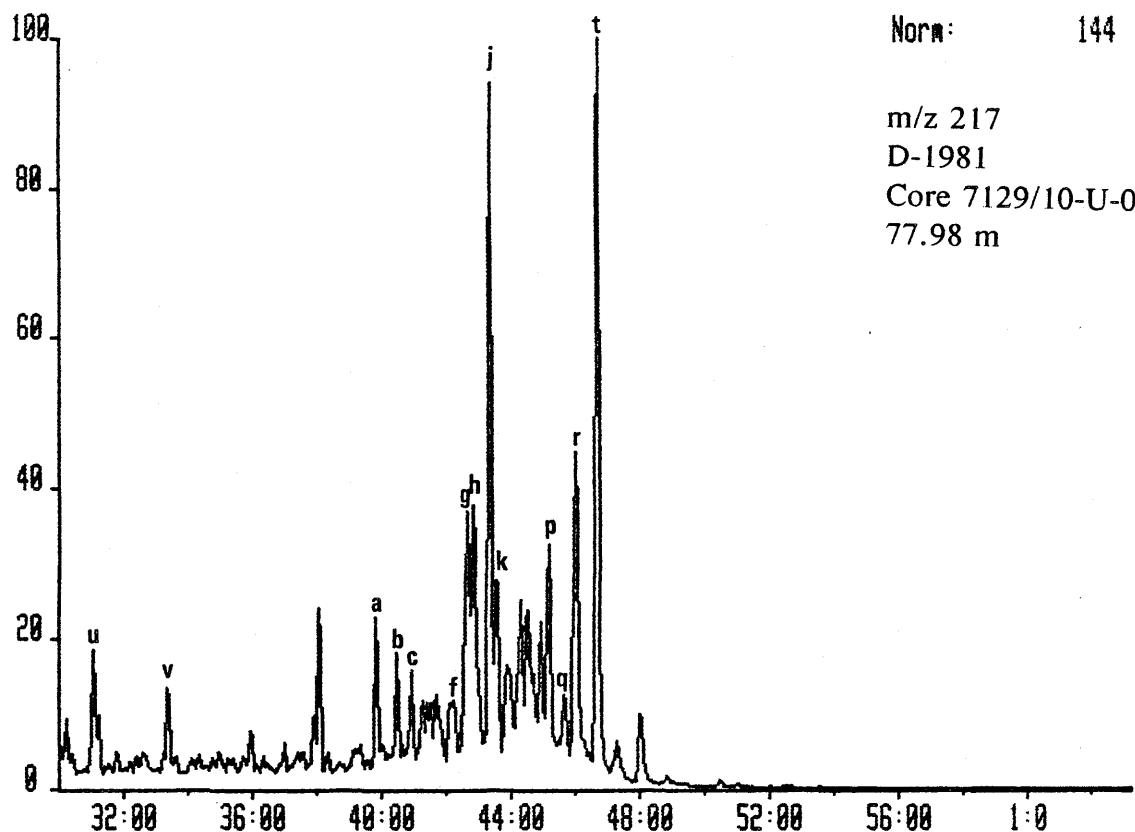
D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:21.3427.23



Norm: 609
 m/z 218

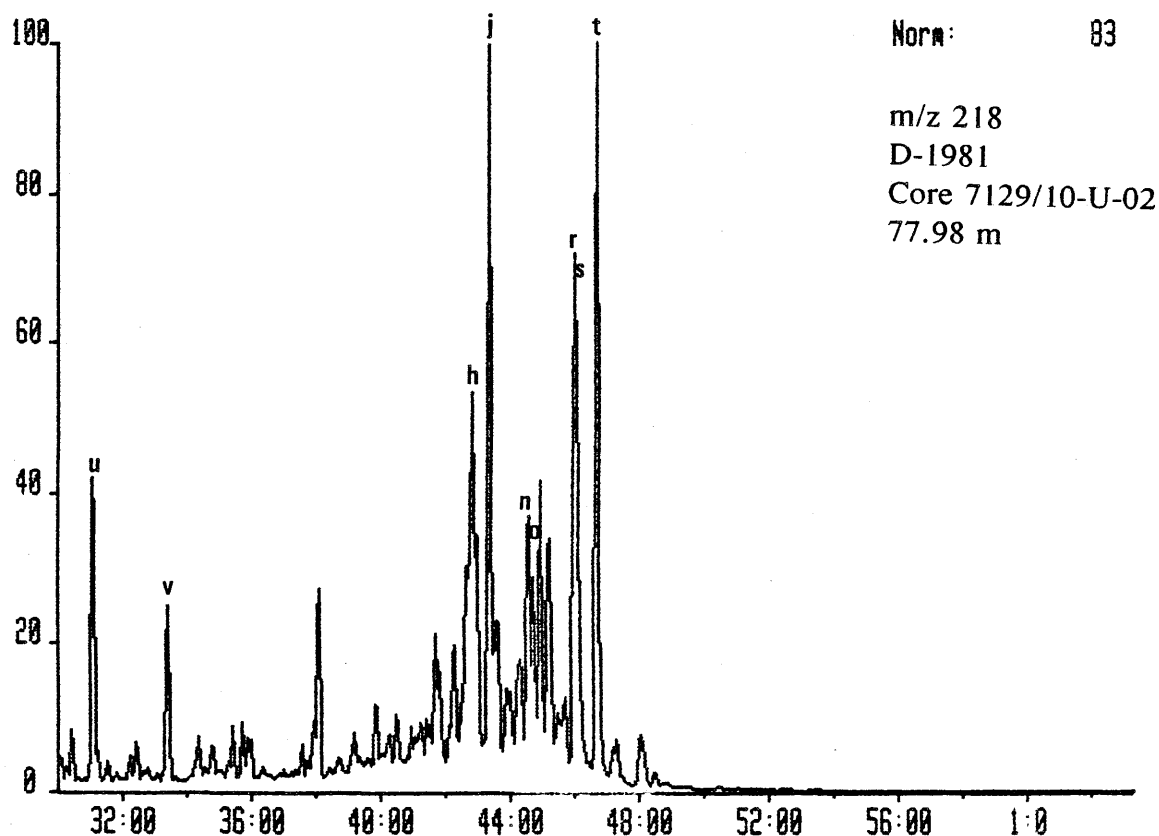
D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:

System:QUADSAT



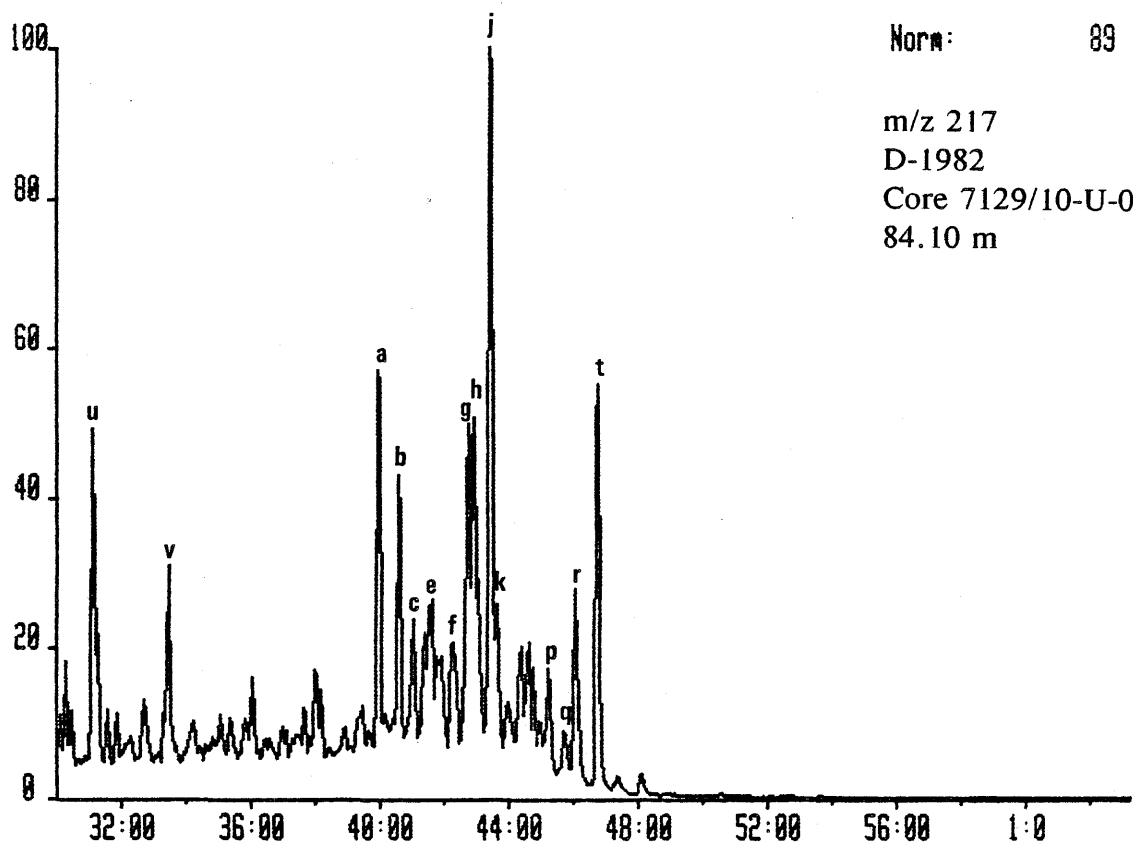
D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:

System:QUADSAT



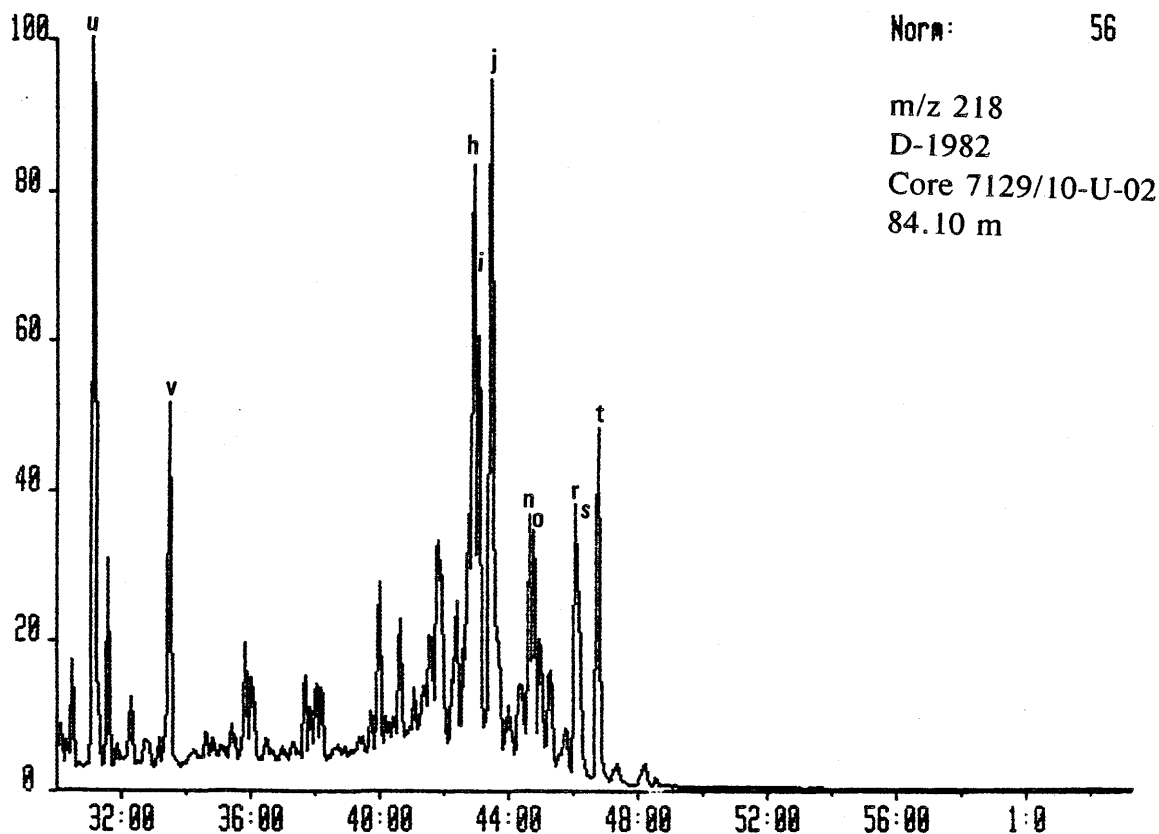
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:

System:QUADSAT



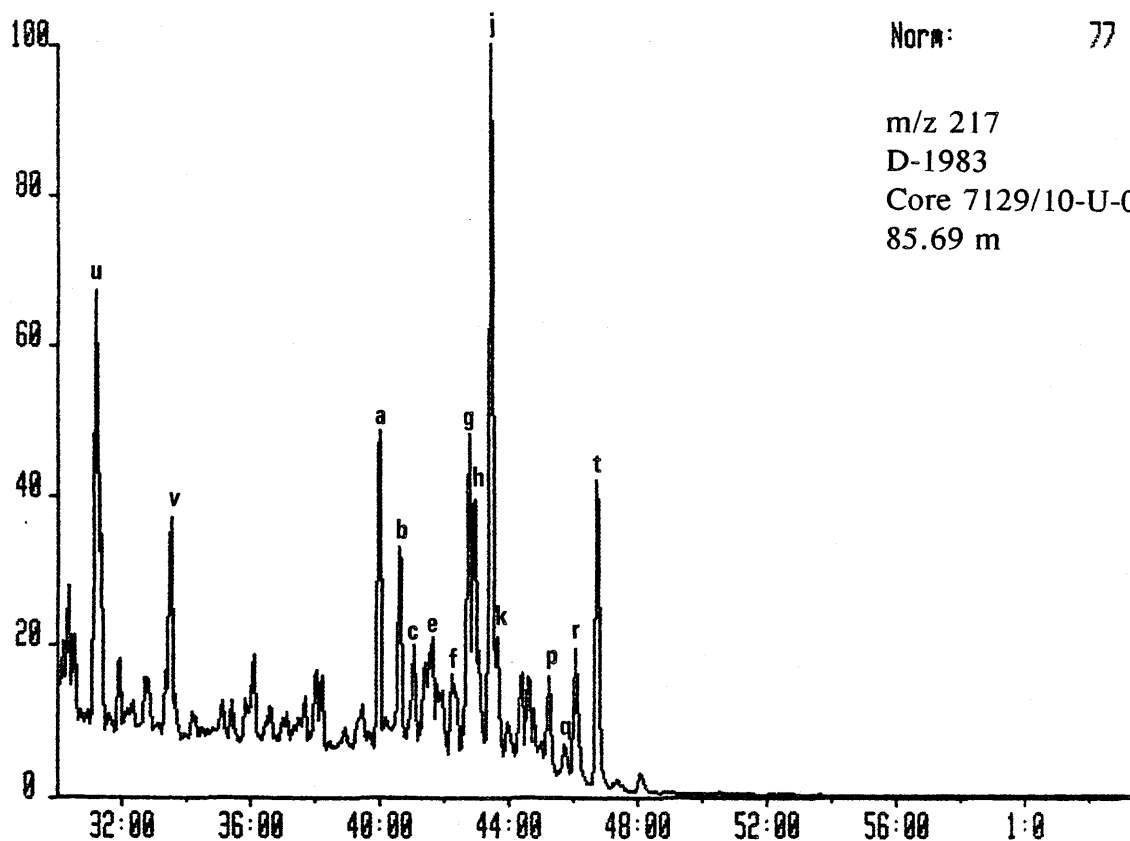
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:

System:QUADSAT



D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:

System:QUADSAT

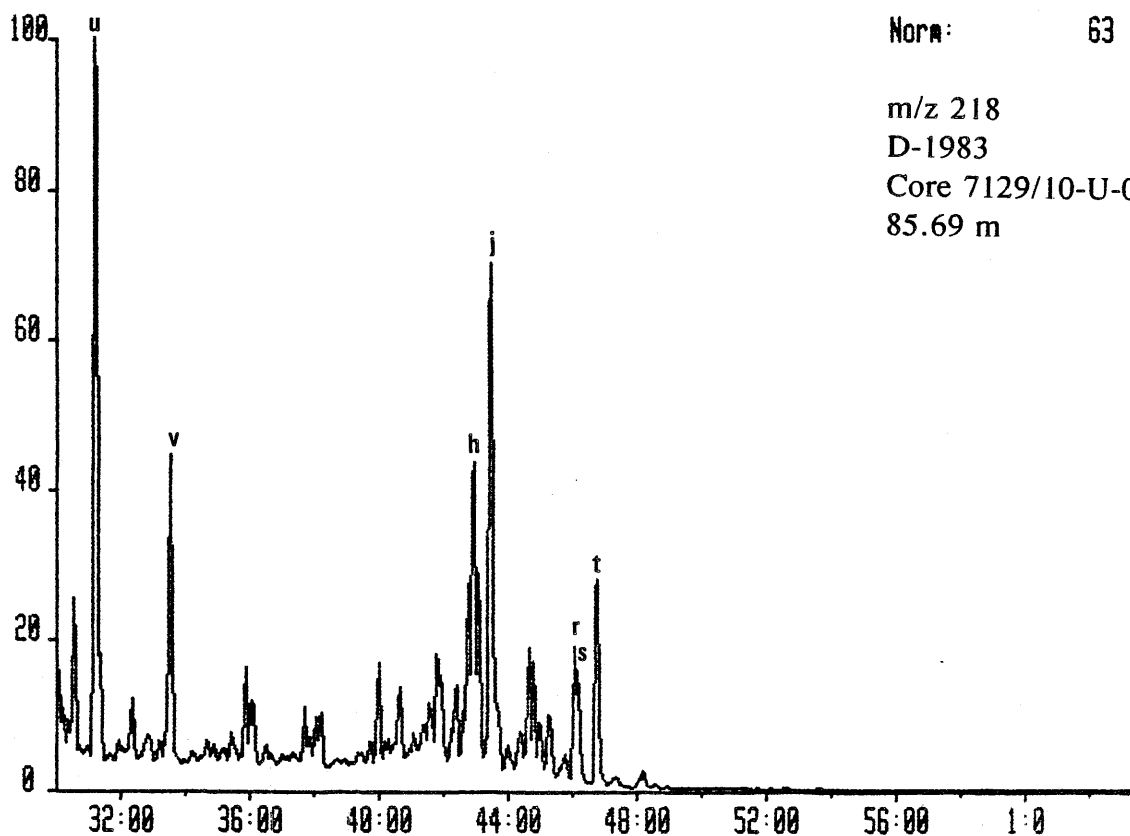


Norm: 77

m/z 217
D-1983
Core 7129/10-U-02
85.69 m

D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:

System:QUADSAT

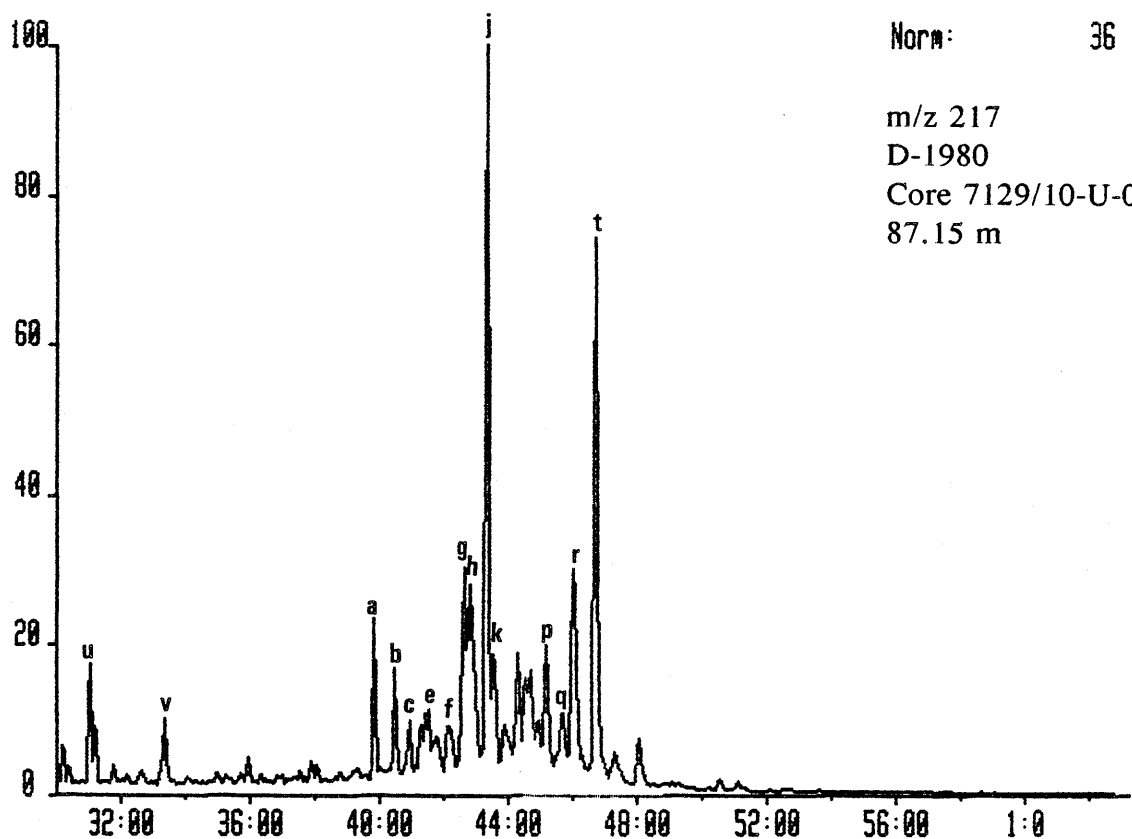


Norm: 63

m/z 218
D-1983
Core 7129/10-U-02
85.69 m

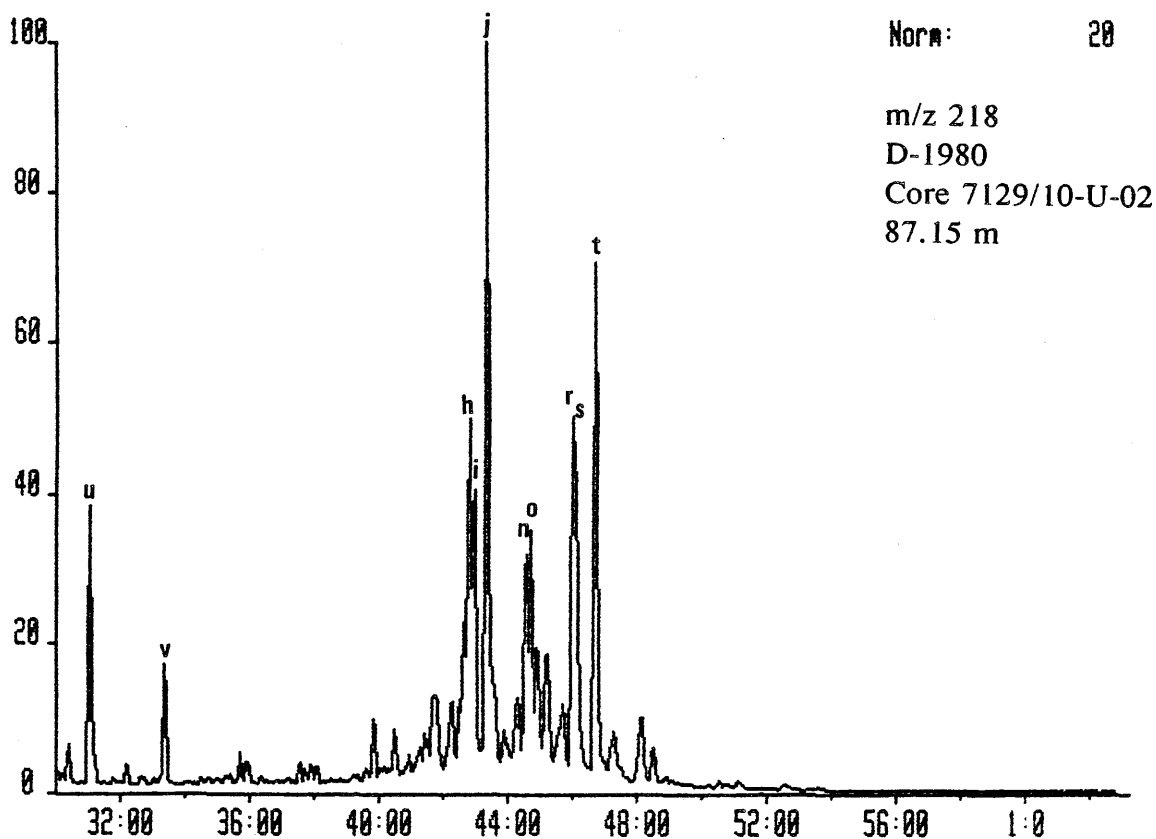
D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:

System:QUADSAT

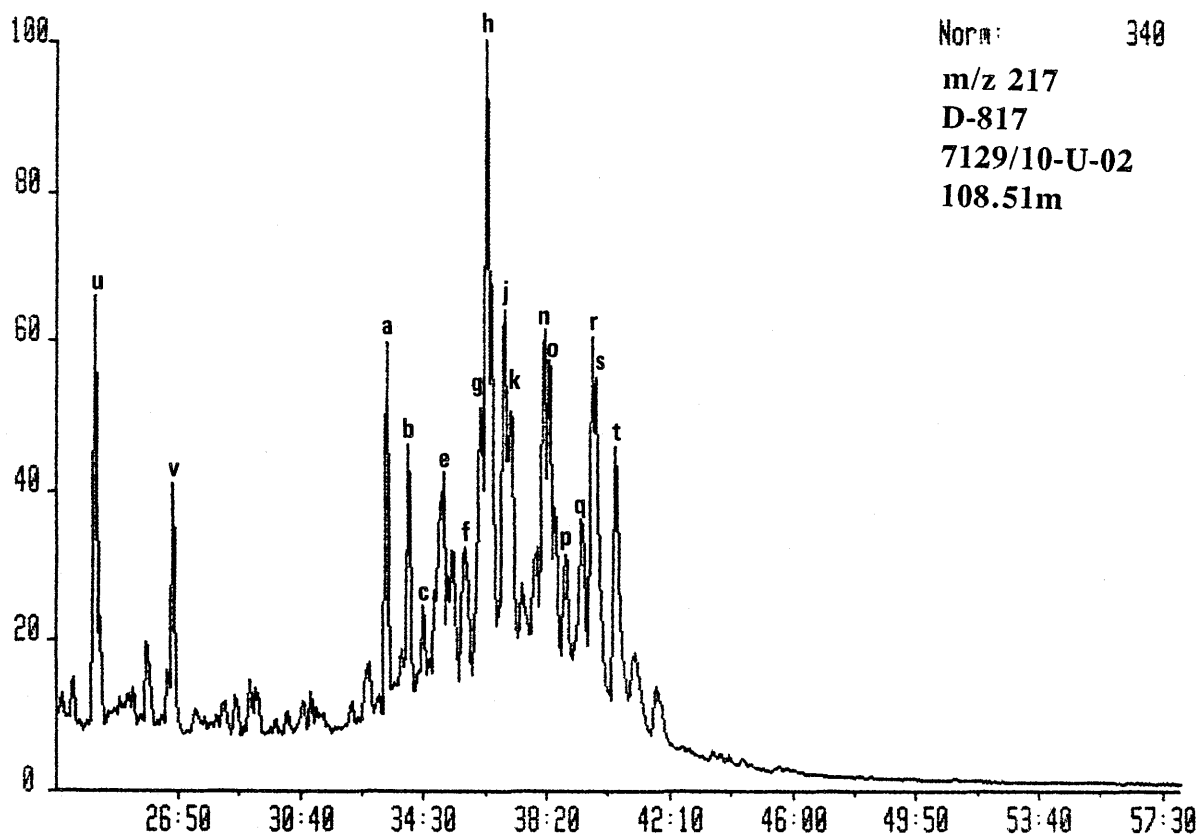


D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:

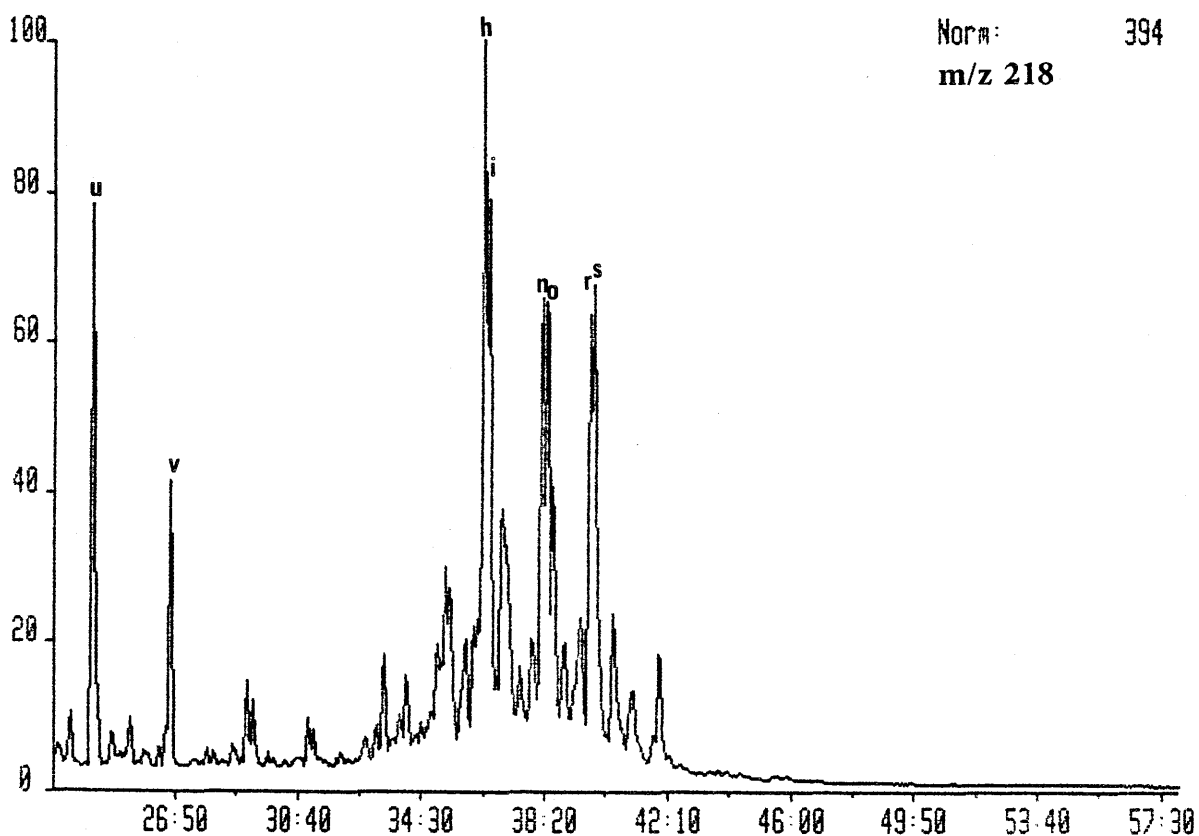
System:QUADSAT



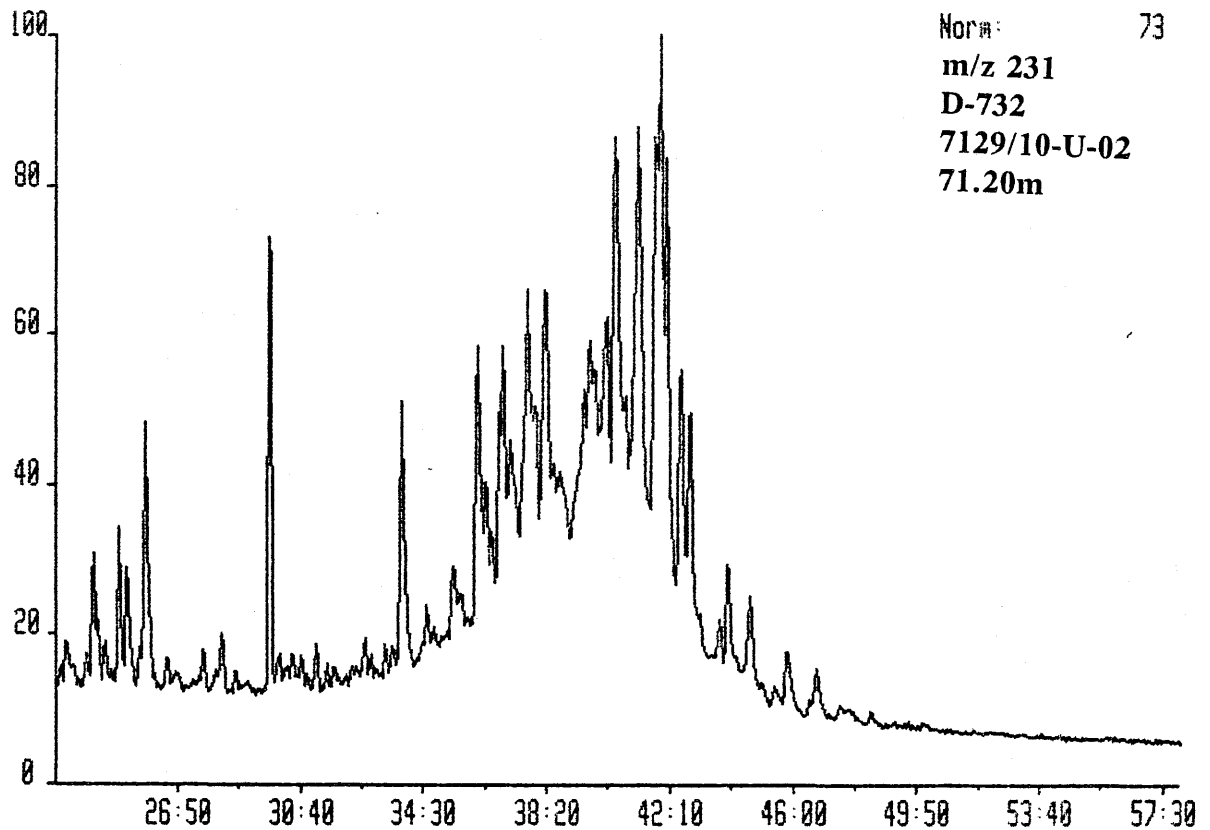
D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



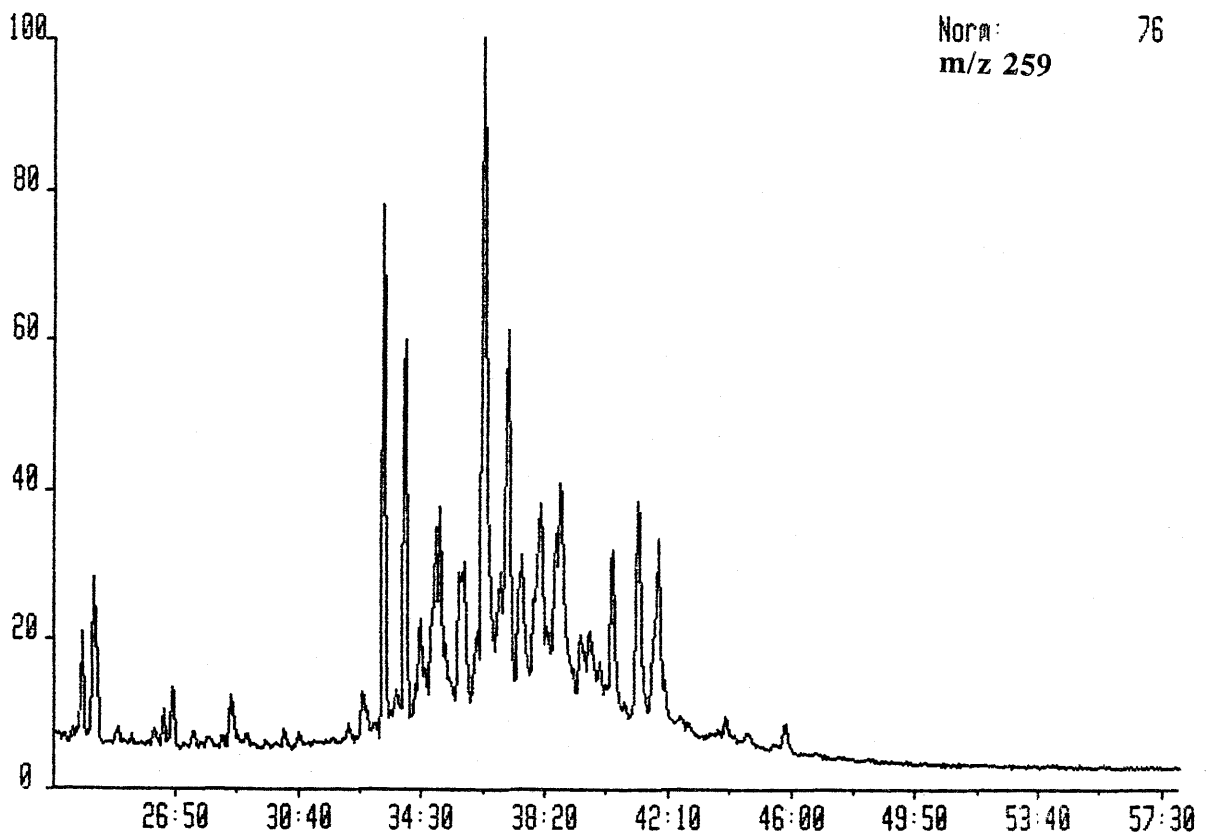
D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23

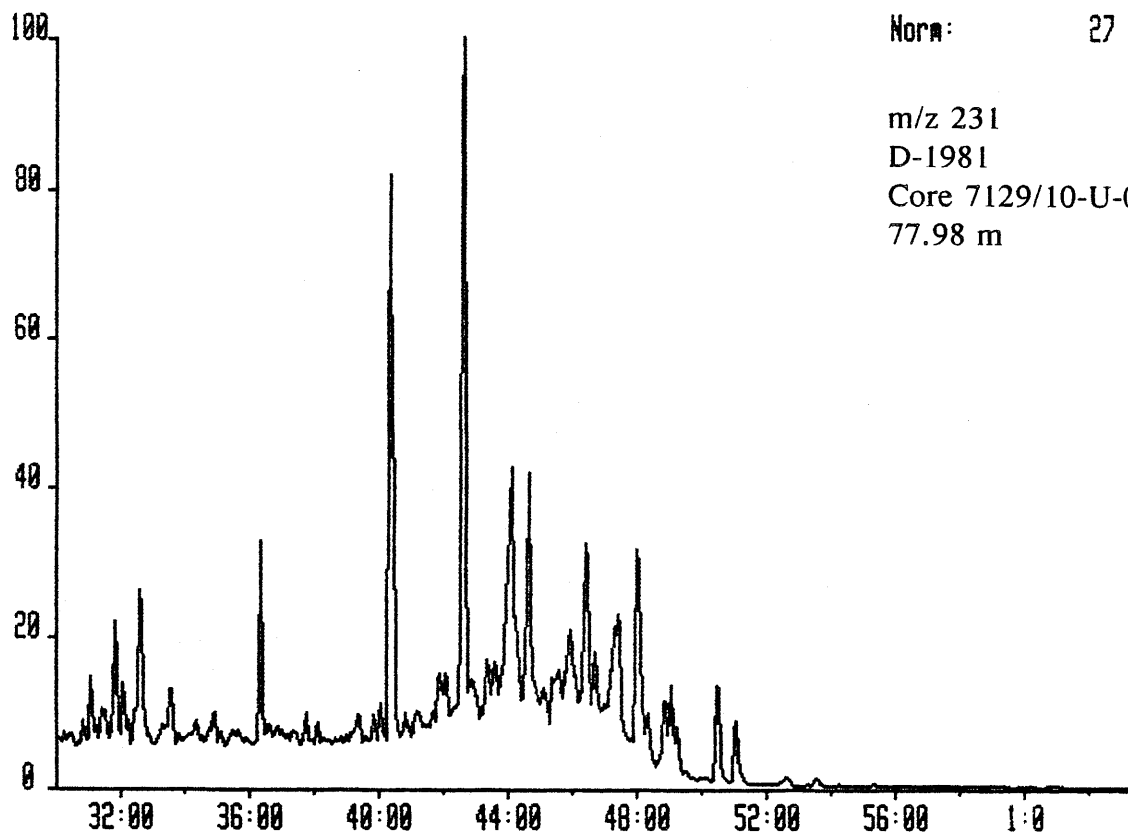


D732SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:

System:QUADSAT

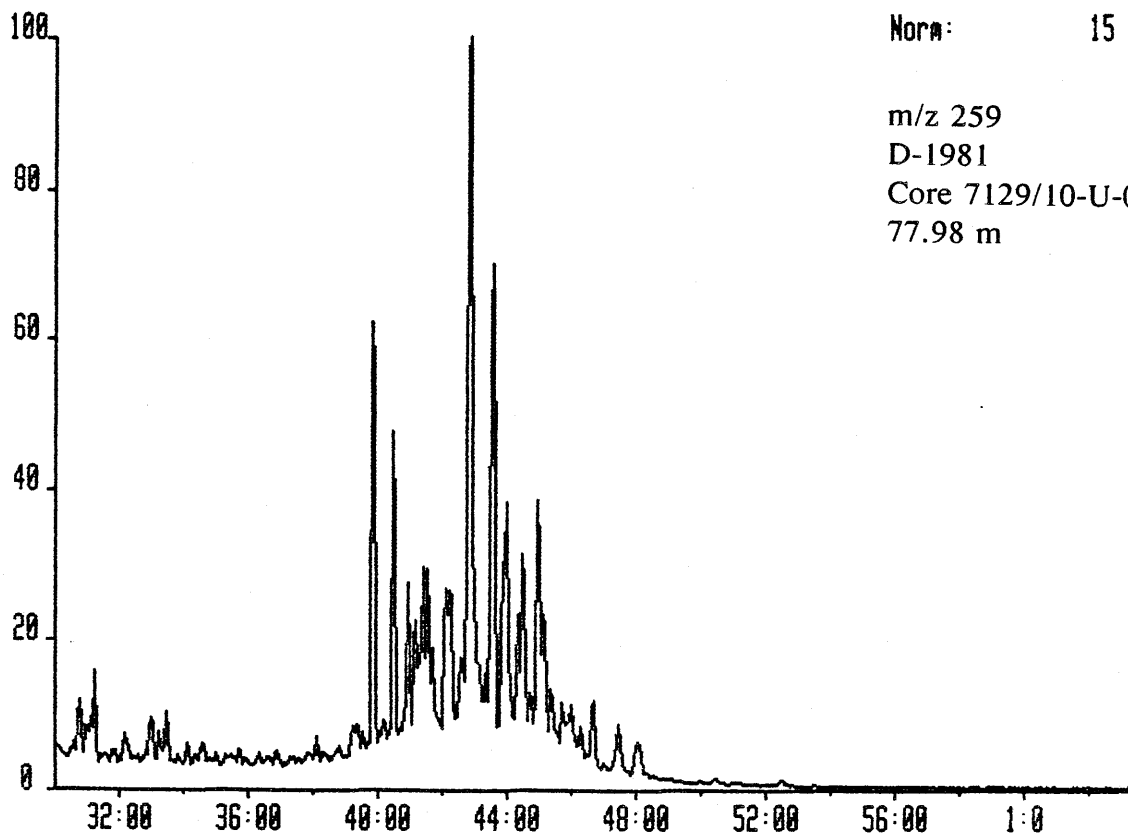


Norm: 27

m/z 231
D-1981
Core 7129/10-U-02
77.98 m

D1981SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:

System:QUADSAT

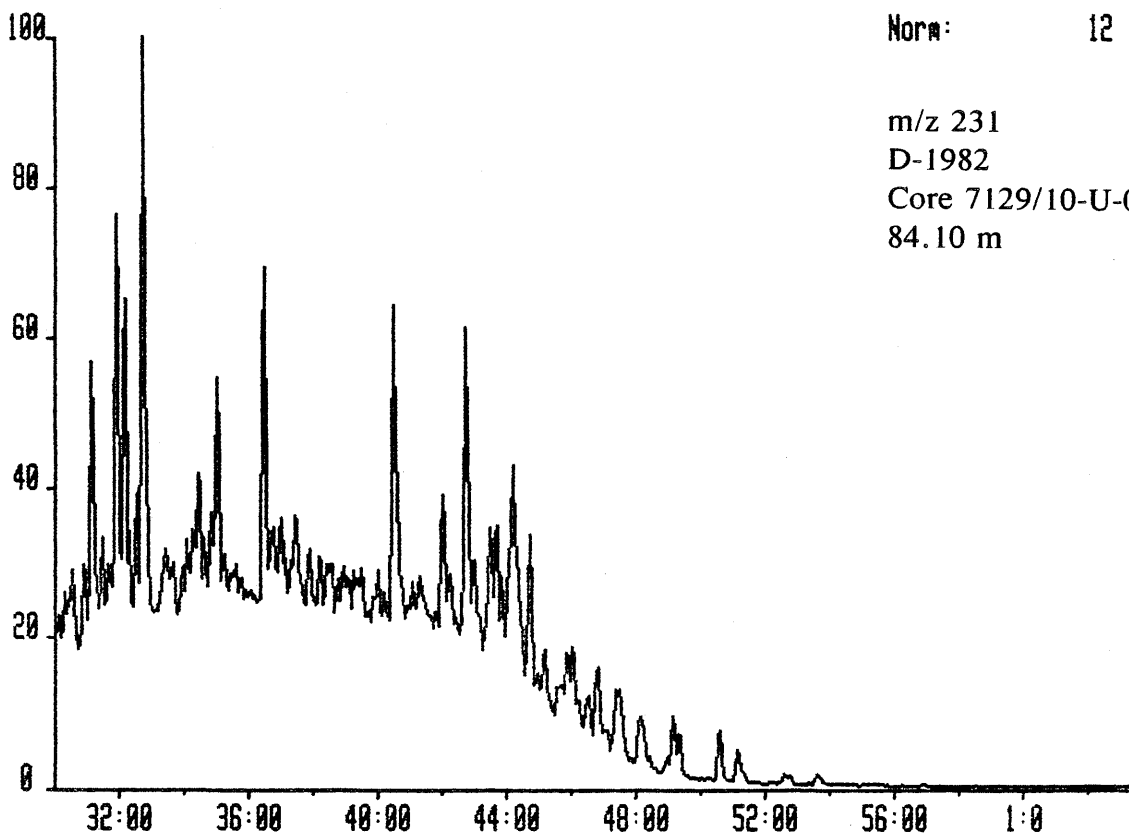


Norm: 15

m/z 259
D-1981
Core 7129/10-U-02
77.98 m

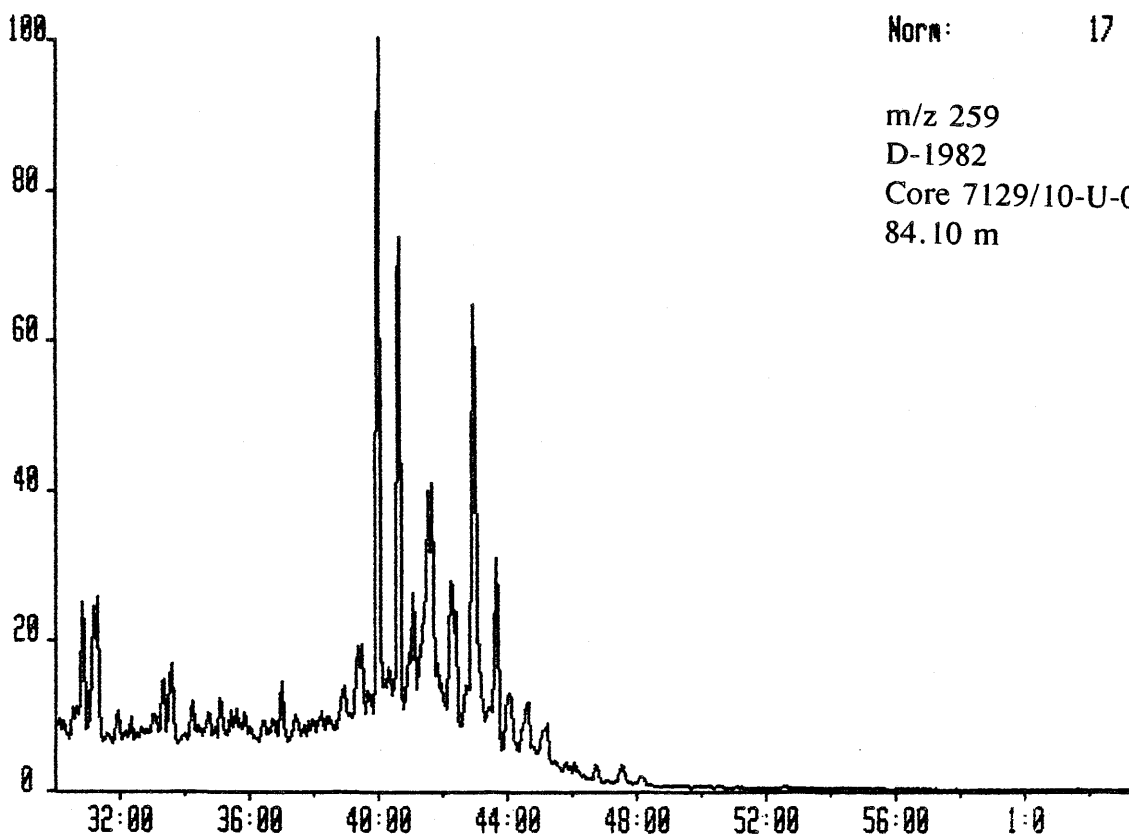
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:

System:QUADSAT



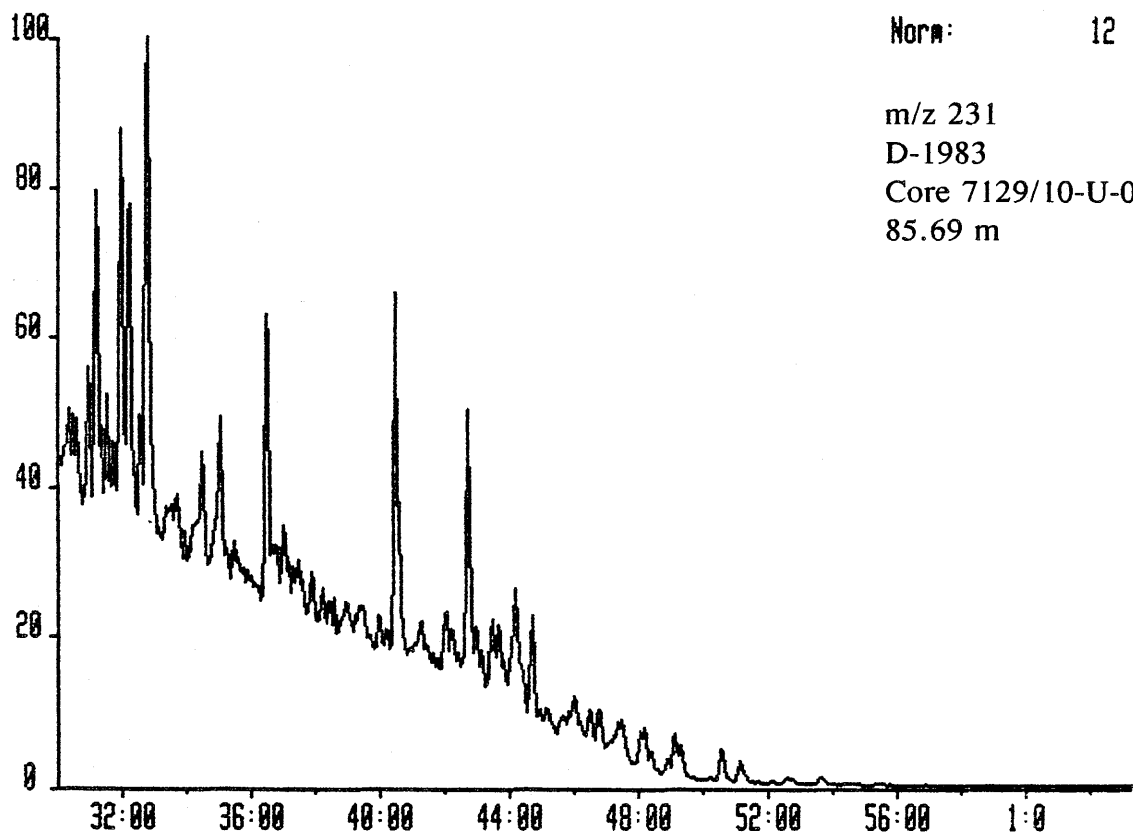
D1982SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:

System:QUADSAT



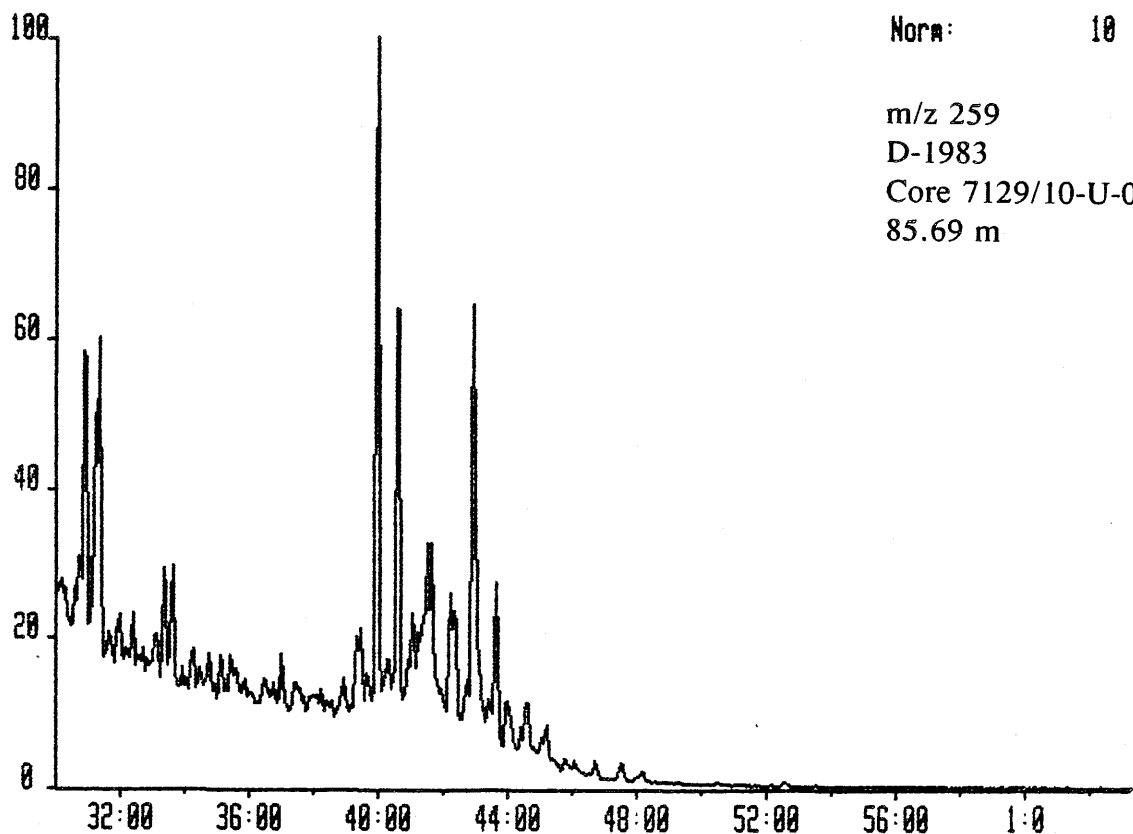
D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:

System:QUADSAT



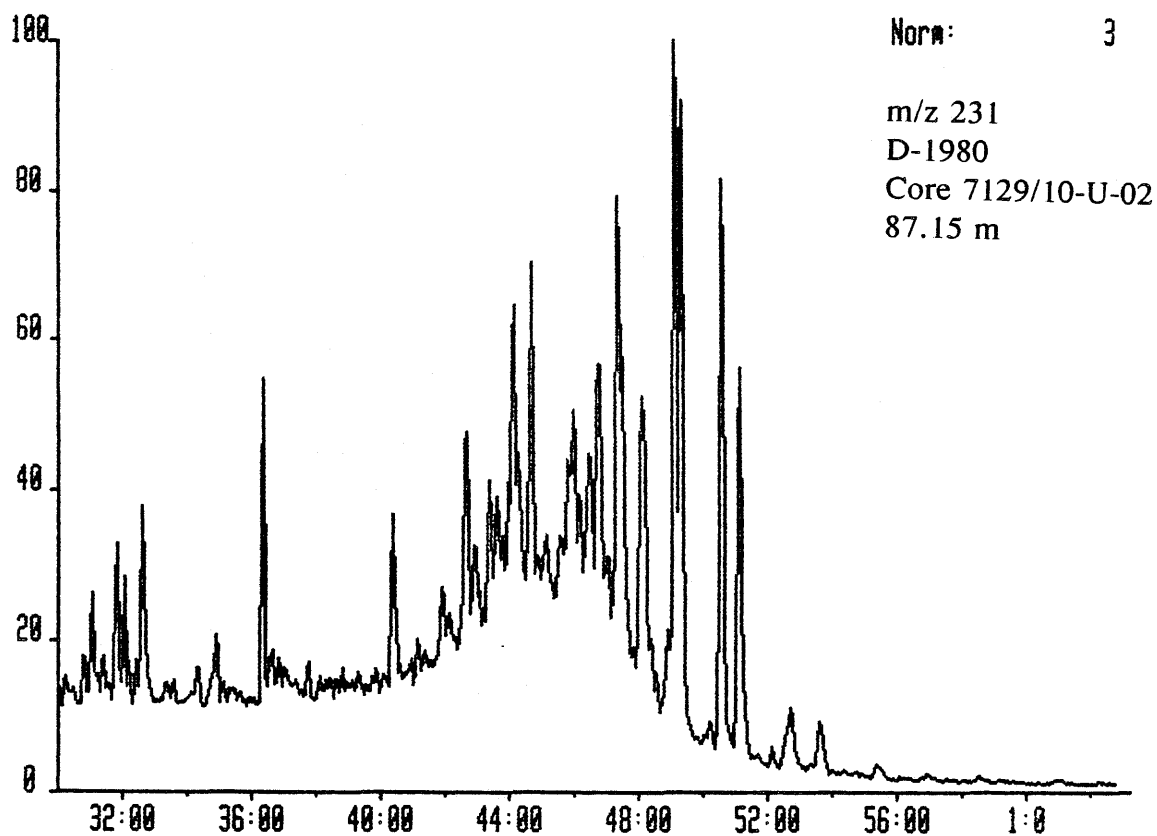
D1983SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:

System:QUADSAT



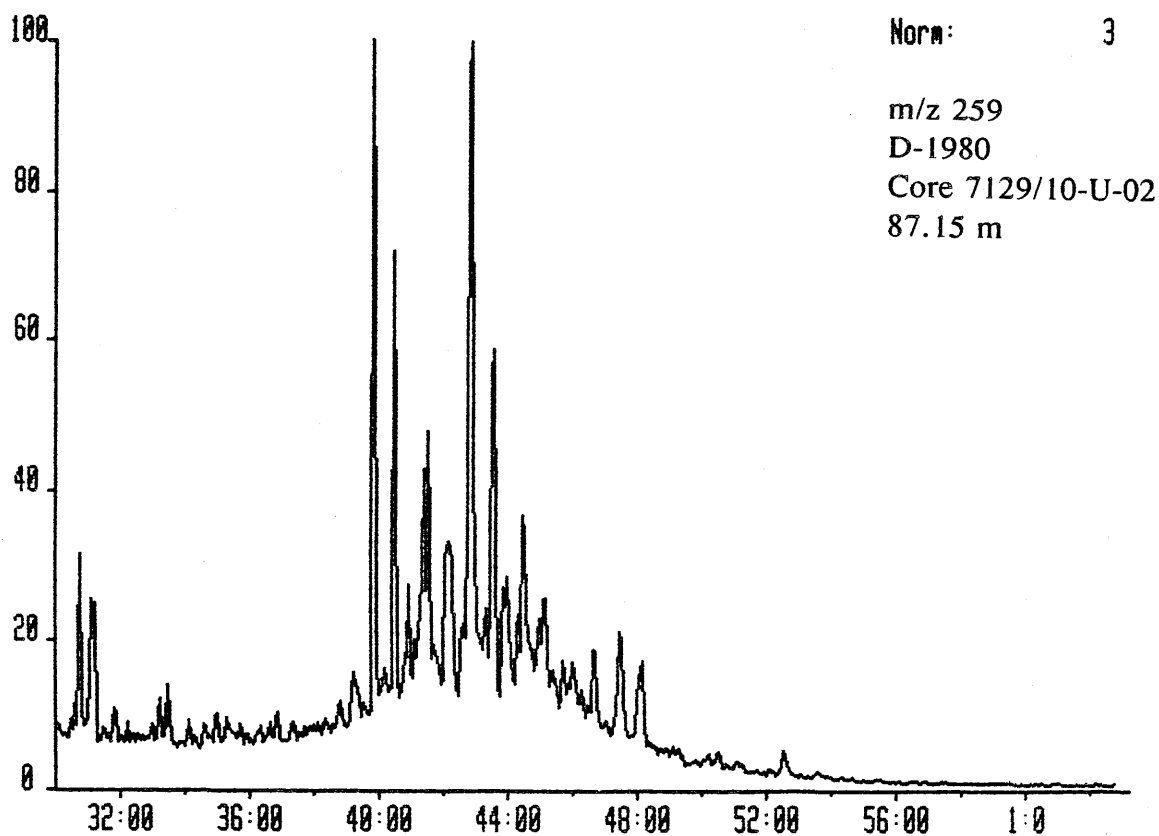
D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:

System:QUADSAT

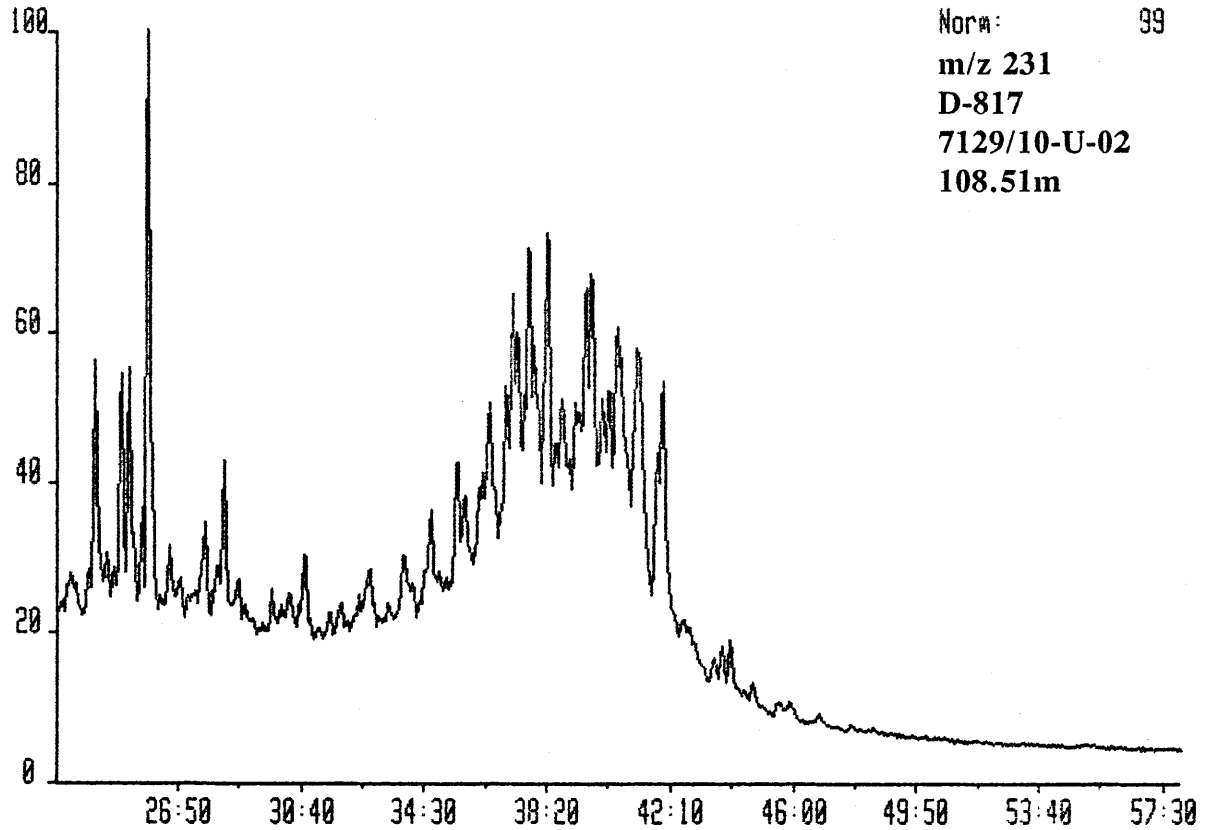


D1980SAT 3-NOV-87 Sir:Voltage 12-250 Acnt:IKU
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:

System:QUADSAT



D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D817SAT 18-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

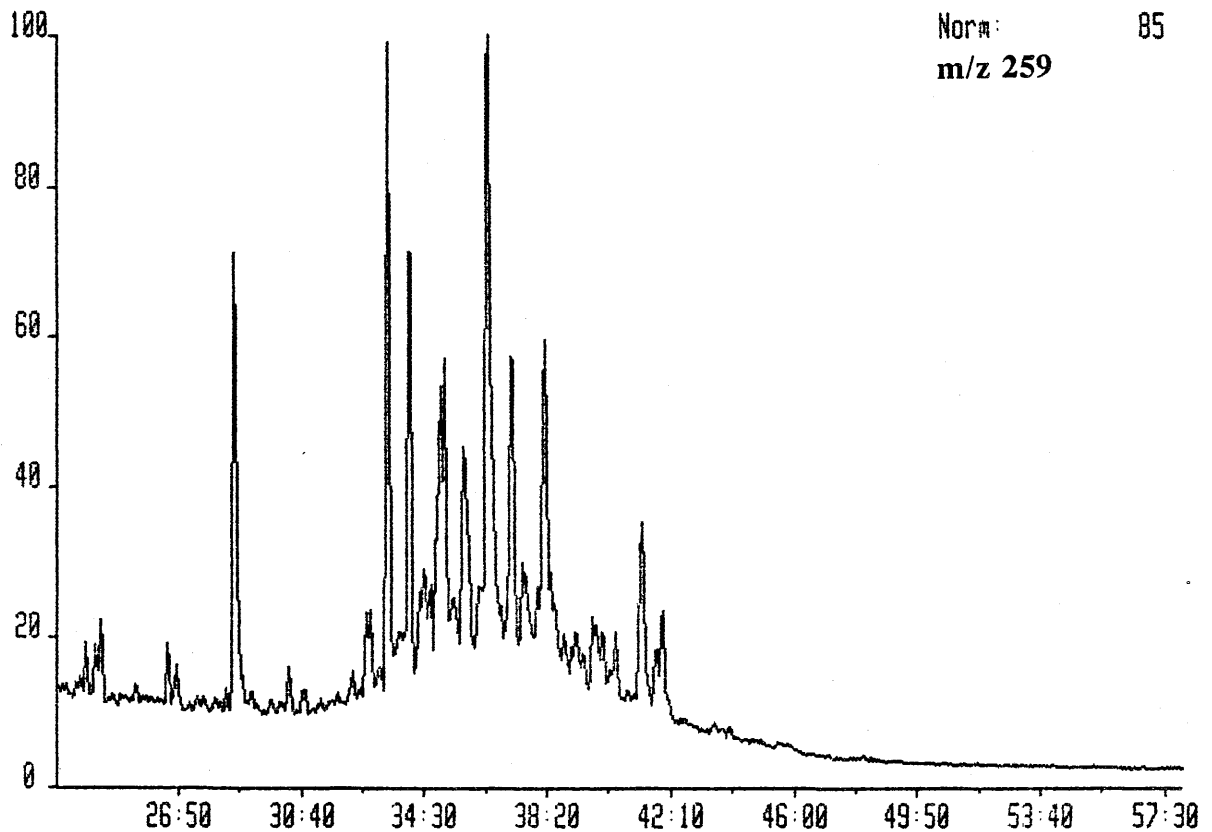


Figure A.II.2.5:

Mass fragmentograms of m/z 231, 239, 253 (aromatic steranes)

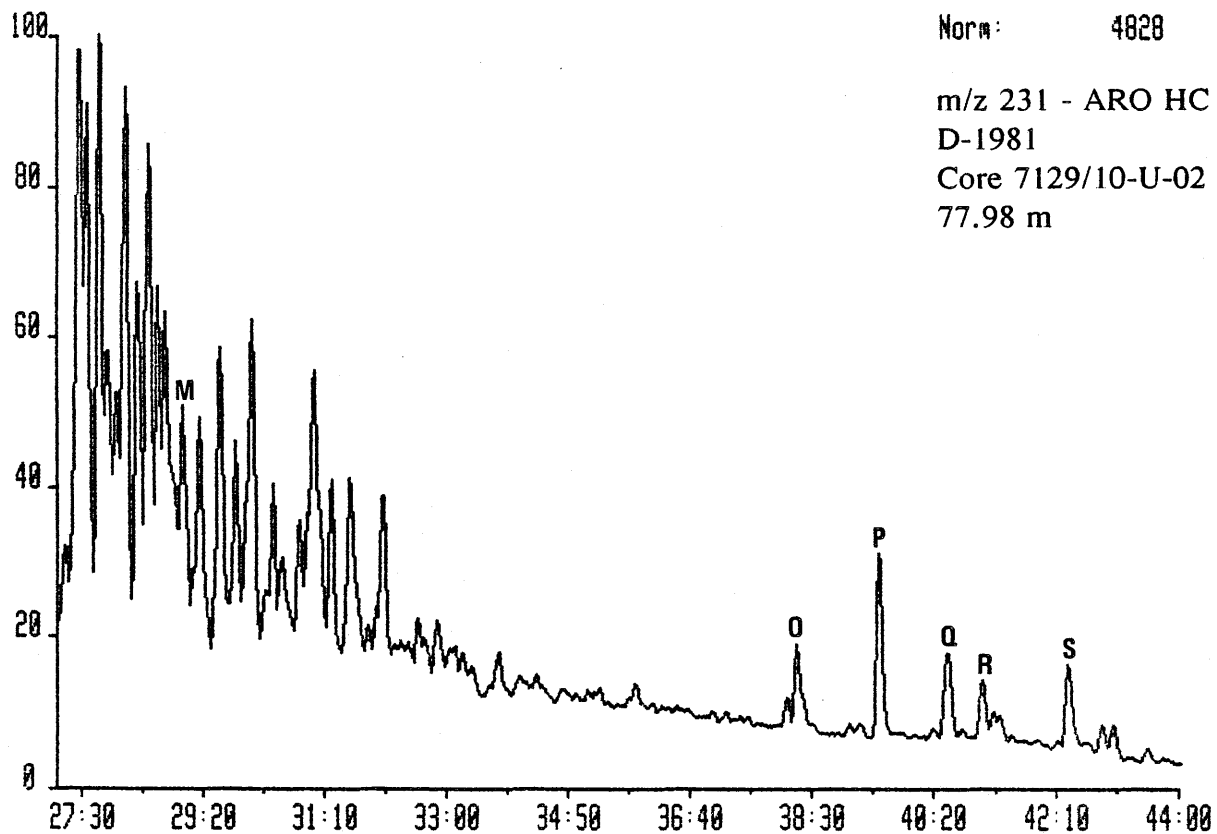
m/z 231

M	C ₂₀ triaromatic sterane
N	C ₂₁ triaromatic sterane
O	C ₂₆ triaromatic sterane
P	C ₂₆ + C ₂₇ triaromatic sterane
Q	C ₂₈ triaromatic sterane
R	C ₂₇ triaromatic sterane
S	C ₂₈ triaromatic sterane

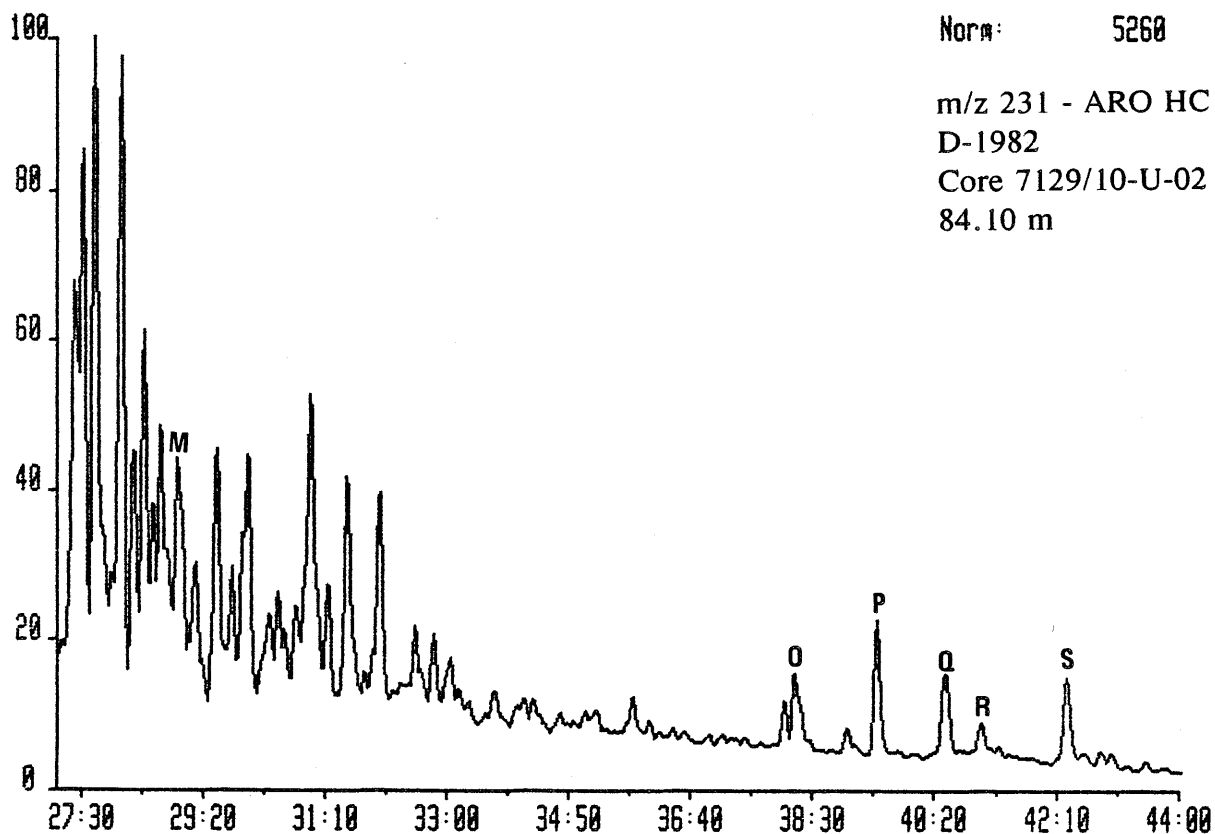
m/z 253

a	C ₂₁ monoaromatic sterane
b	C ₂₂ monoaromatic sterane
c	unidentified
d	C ₂₇ monoaromatic sterane
e	C ₂₇ monoaromatic sterane
f	C ₂₈ monoaromatic sterane
g	C ₂₇ monoaromatic sterane
h	C ₂₈ +C ₂₉ monoaromatic sterane
i	C ₂₉ monoaromatic sterane
j	C ₂₉ monoaromatic sterane
k	unidentified
l	unidentified

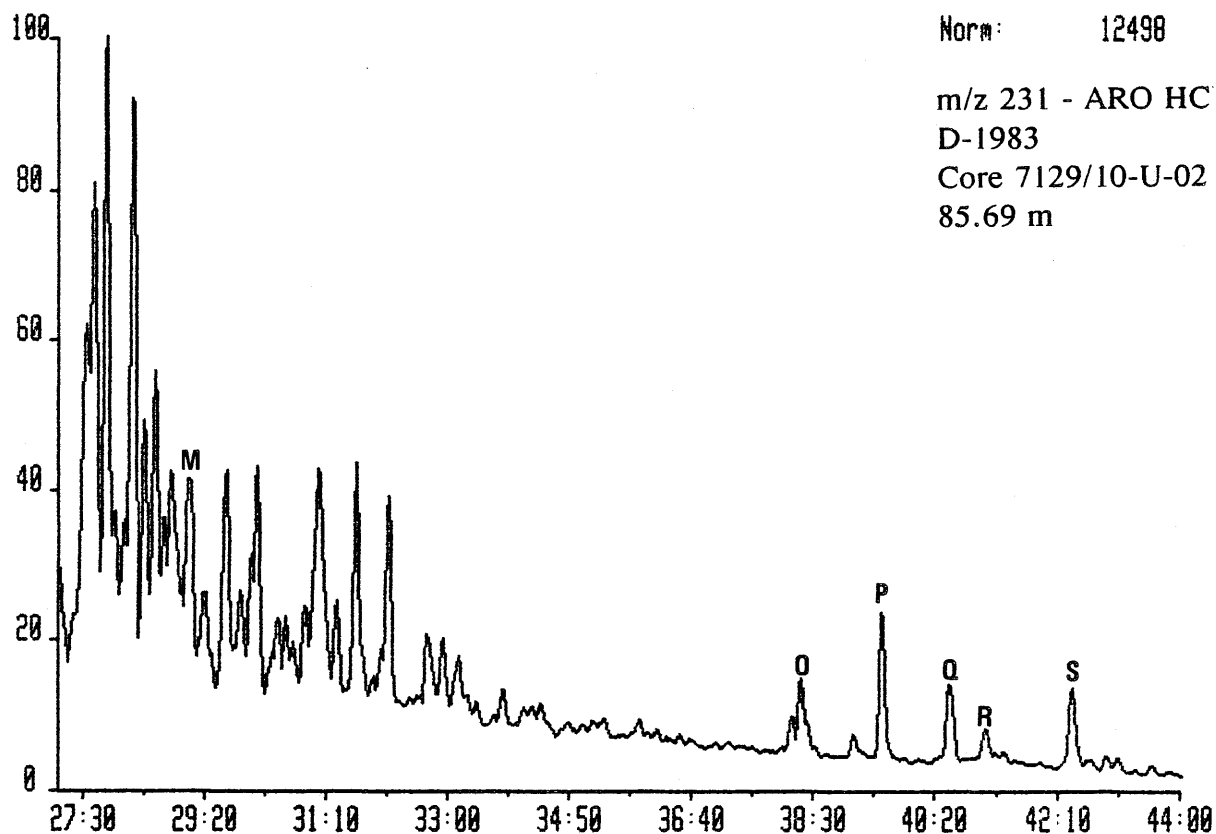
D1981ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
 Sample 1 Injection 1 Group 1 Mass 231.1000
 Text:21.3427.23 D-1981



D1982ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMIO
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23 D-1982



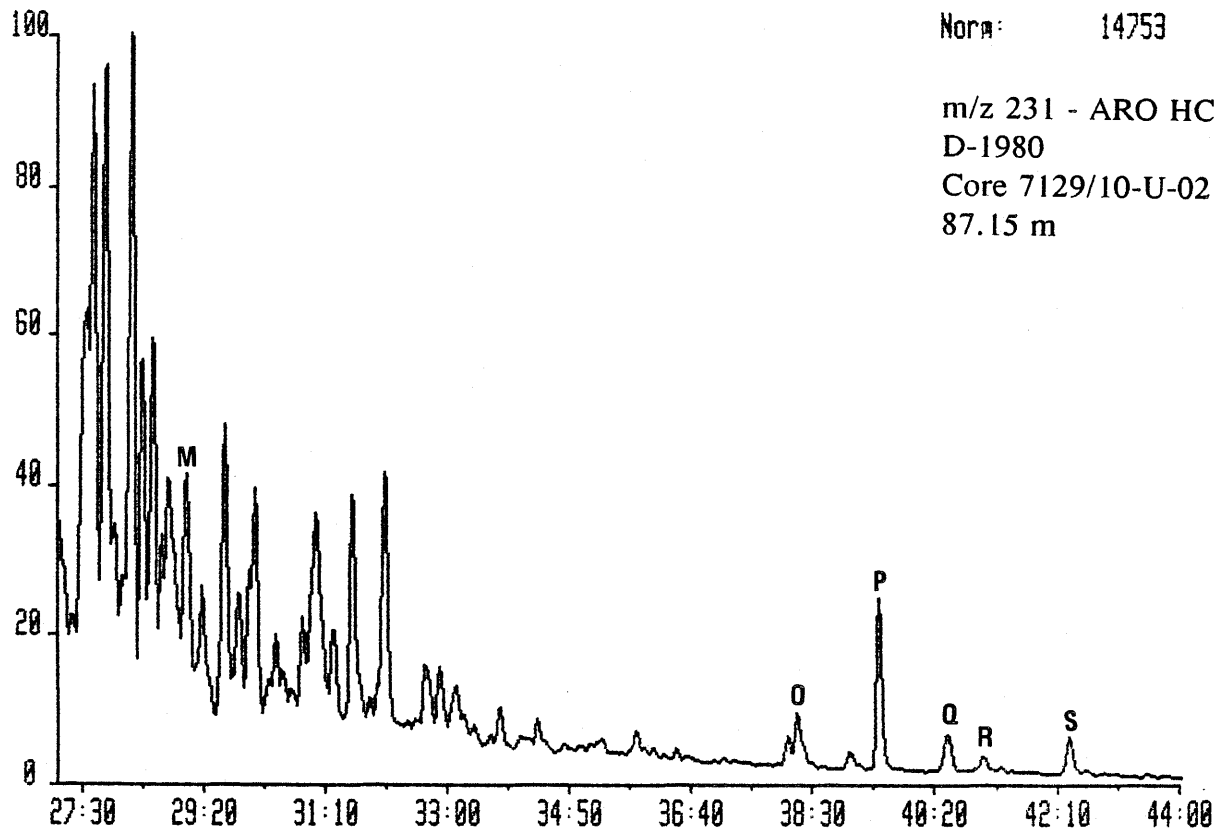
D1983ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23 D-1983



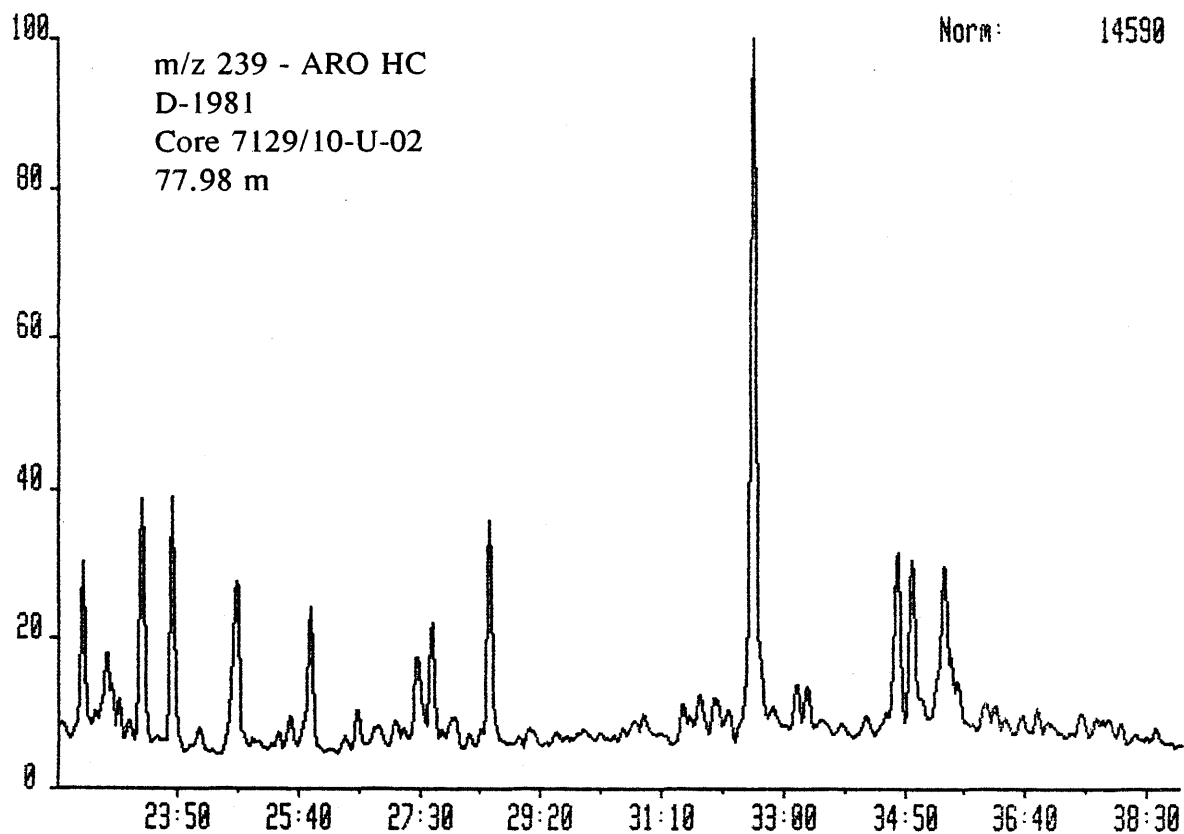
D1980ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23 0-1980

Norm: 14753

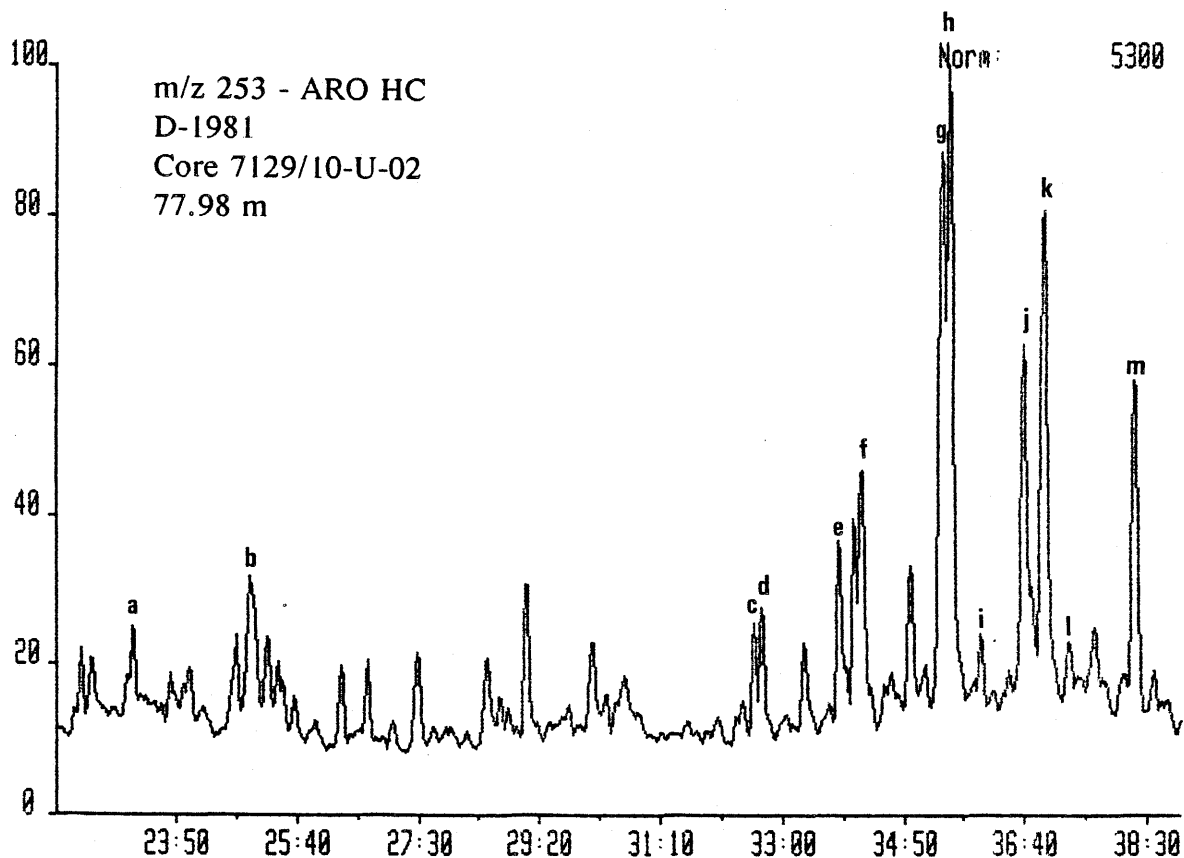
m/z 231 - ARO HC
D-1980
Core 7129/10-U-02
87.15 m



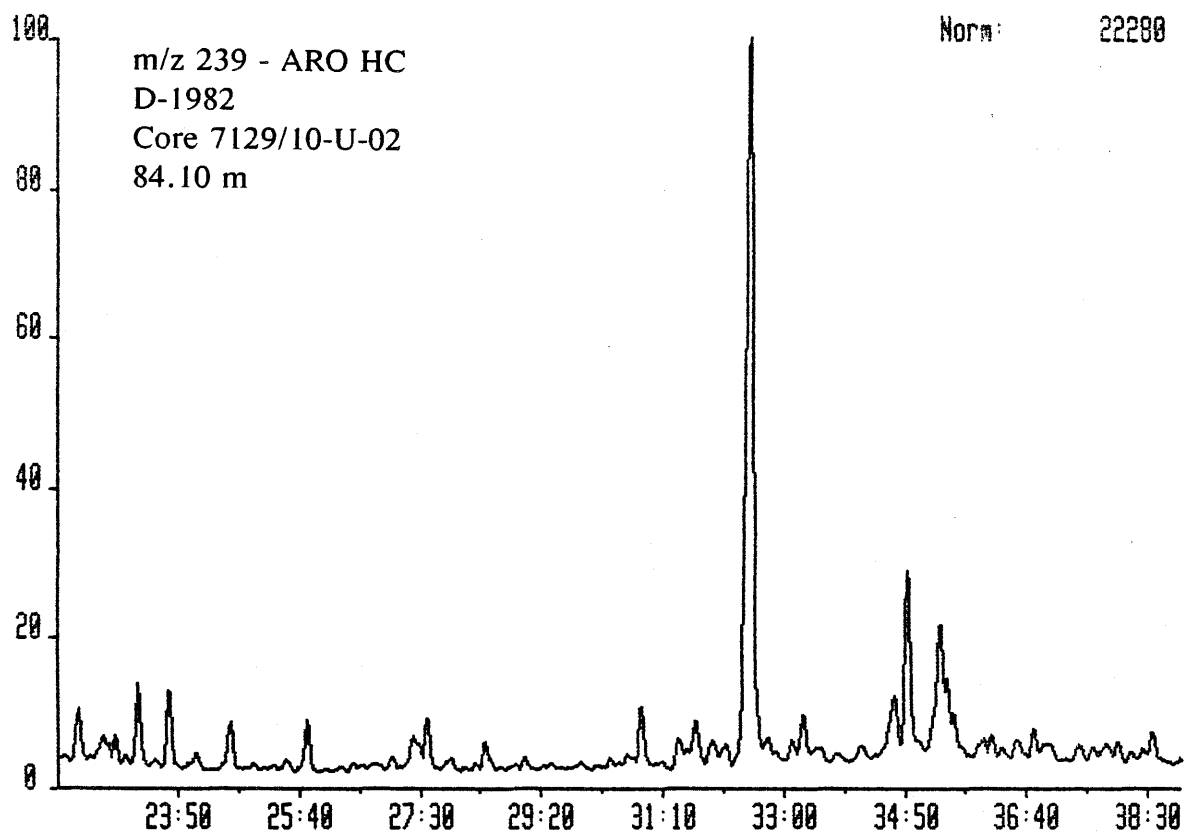
D1981ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 239.1000
Text:21.3427.23 D-1981



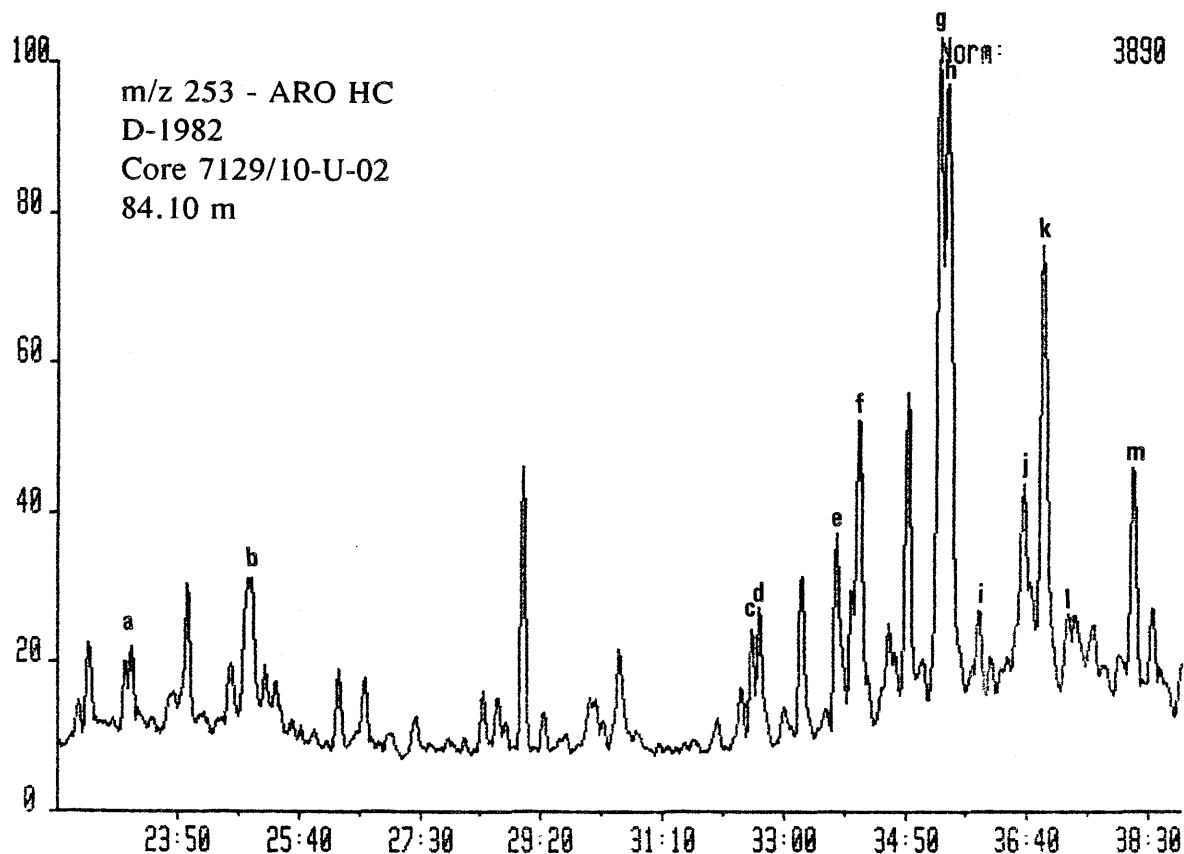
D1981ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 253.1000
Text:21.3427.23 D-1981



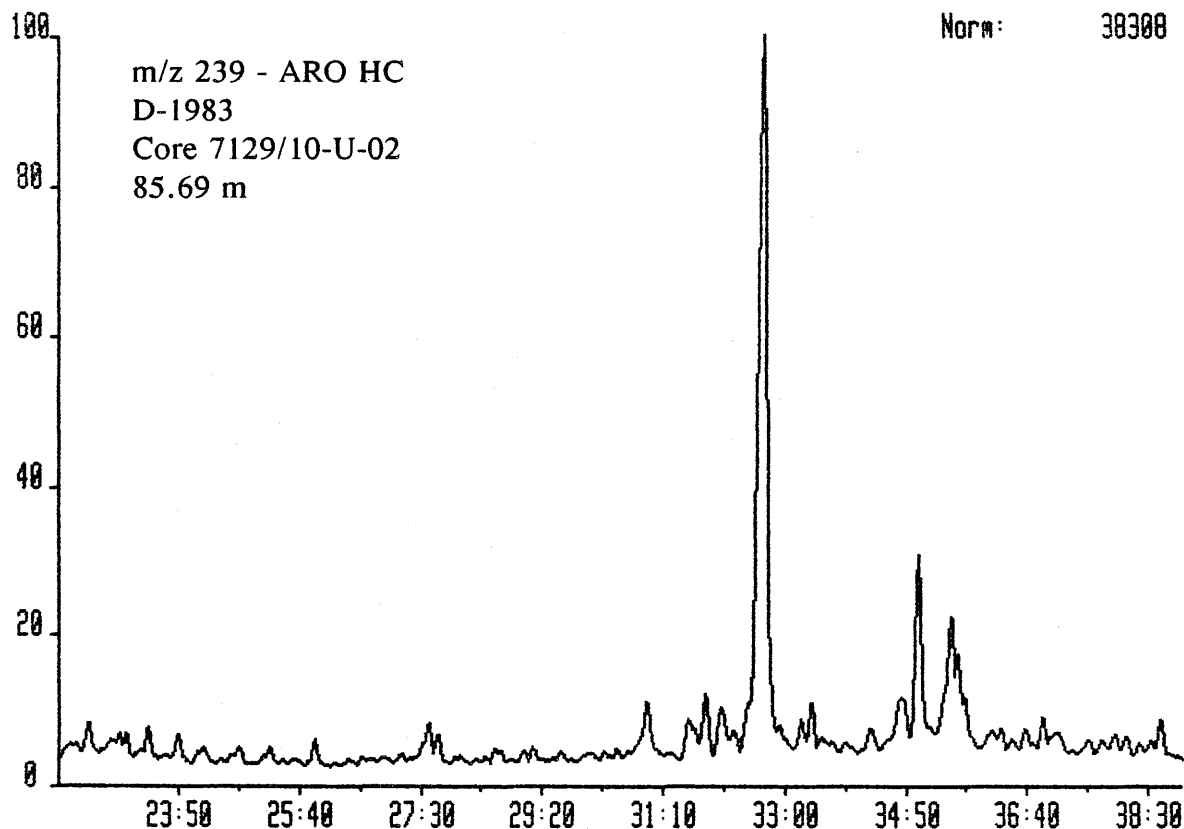
D1982ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 239.1000
Text:21.3427.23 D-1982



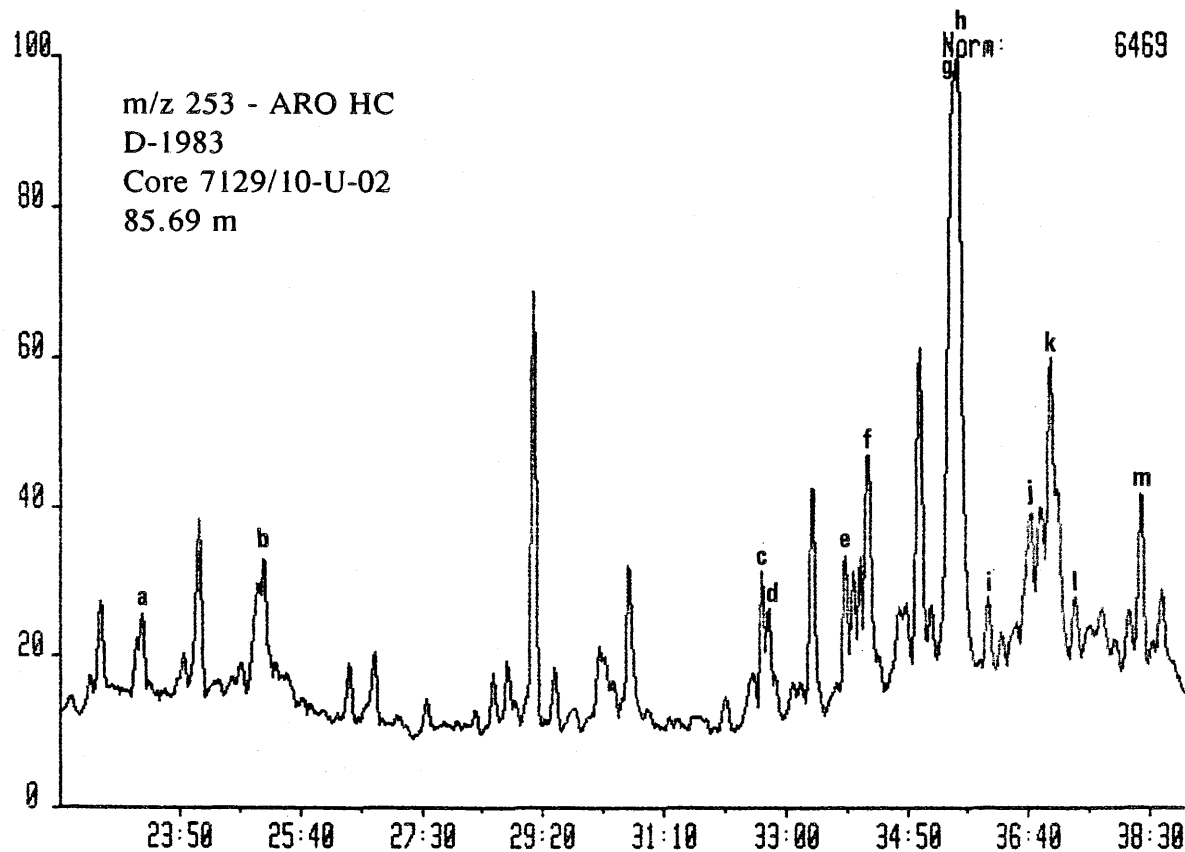
D1982ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 253.1000
Text:21.3427.23 D-1982



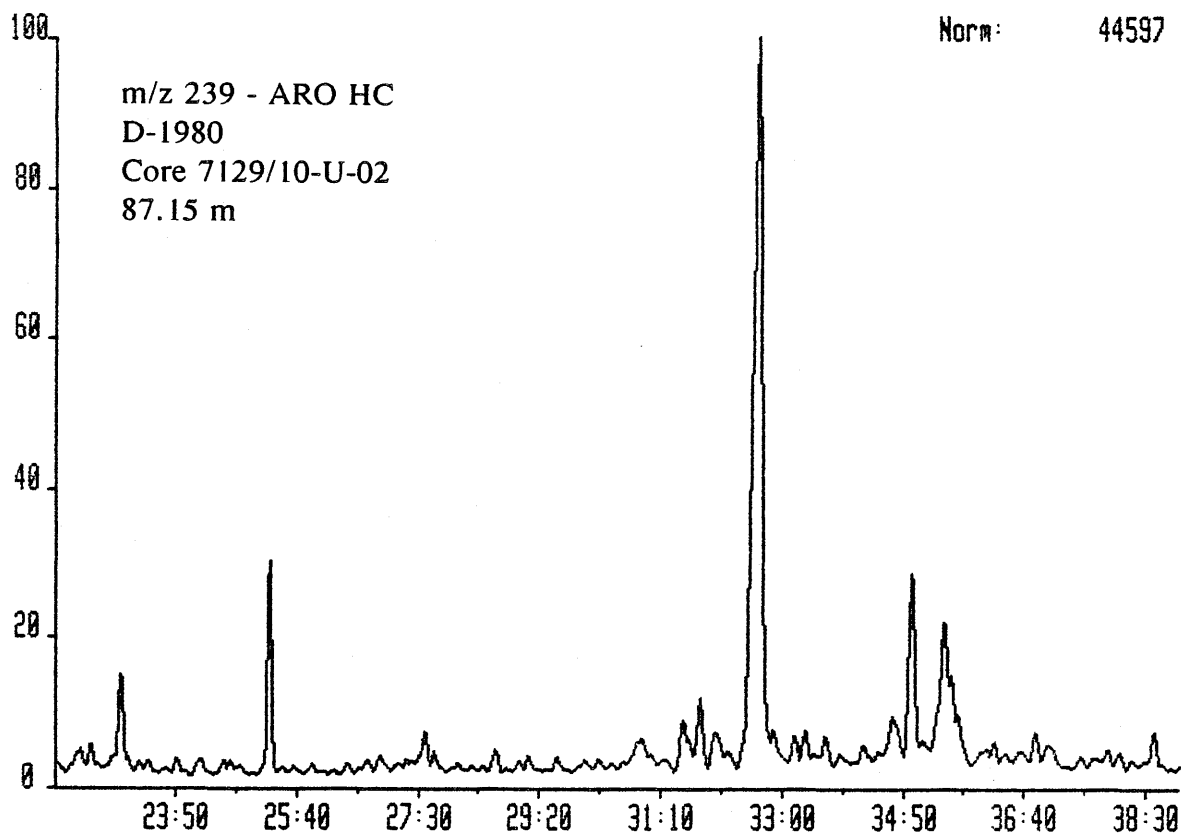
D1983ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 239.1000
Text:21.3427.23 D-1983



D1983ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMID
Sample 1 Injection 1 Group 1 Mass 253.1000
Text:21.3427.23 D-1983



D1980ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMIO
 Sample 1 Injection 1 Group 1 Mass 239.1000
 Text:21.3427.23 0-1980



D1980ARO 8-FEB-88 Sir:Voltage 7070H Sys: AROMIO
 Sample 1 Injection 1 Group 1 Mass 253.1000
 Text:21.3427.23 0-1980

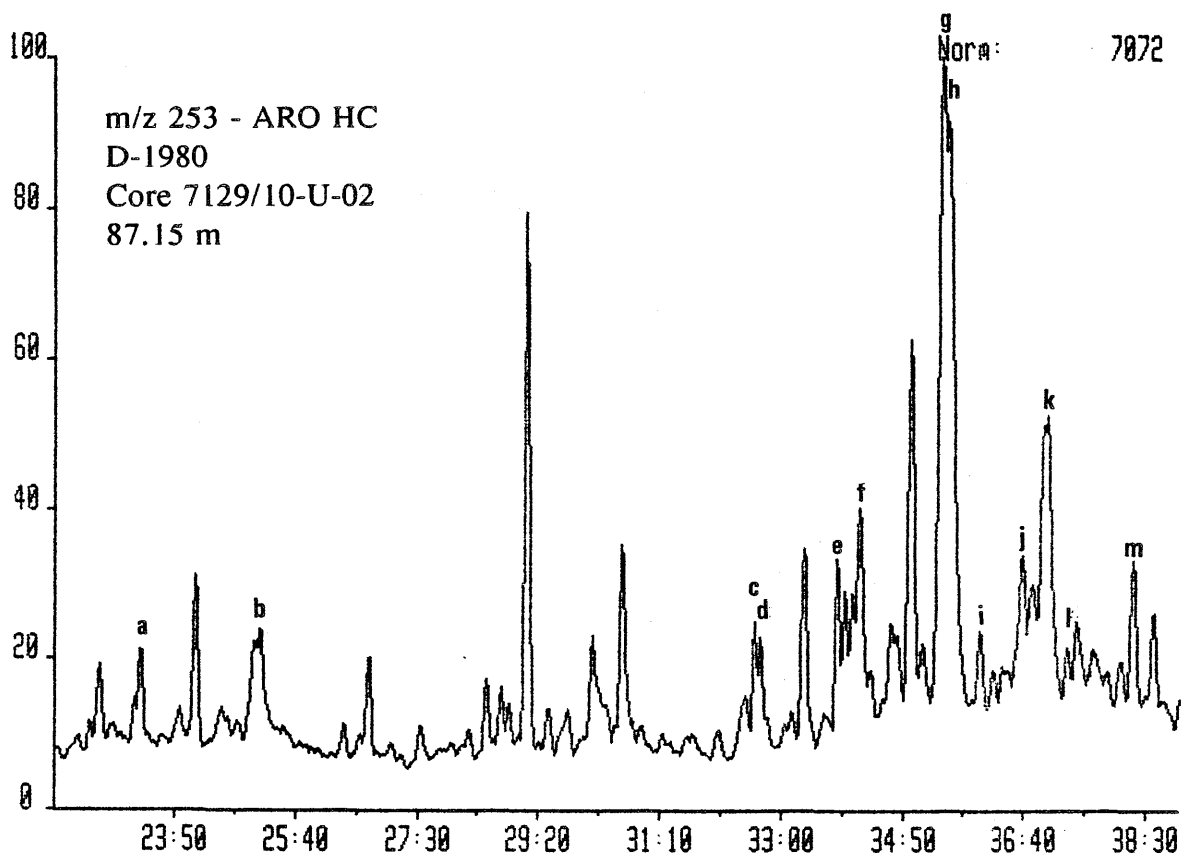


Figure A.II.2.6: Vitrinite reflectance histograms.

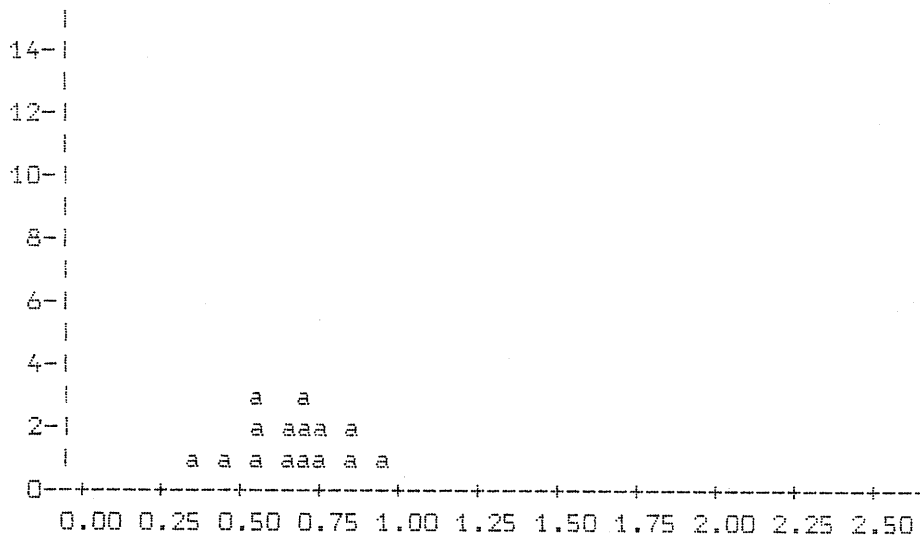
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

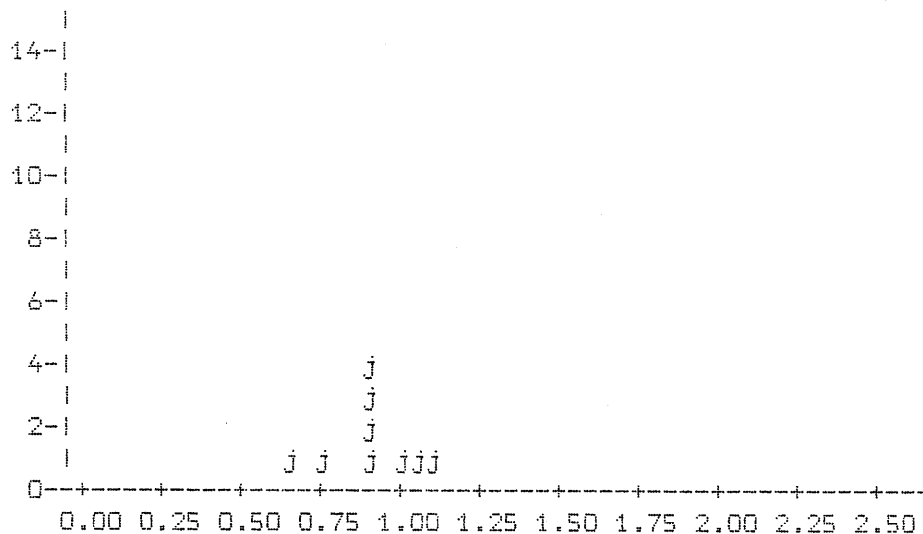
IKU# D-732 71.2M 7129/10-2


 PP LOW HIGH LIT #VAL MEAN STDV
 N 0.38 0.96 ALL 15 0.69 0.15
 OVERALL 15 0.69 0.15

ORDERED VALUES FOLLOW:

 0.38a 0.48a 0.58a 0.59a 0.59a 0.67a 0.67a 0.73a 0.73a 0.74a 0.77a
 0.77a 0.86a 0.89a 0.95a

IKU# D-1990 84.1M 7129/10-2



PP LOW HIGH LIT #VAL MEAN STDV
 N 0.68 1.15 ALL 9 0.93 0.14
 OVERALL 9 0.93 0.14

ORDERED VALUES FOLLOW:

0.68j 0.75j 0.91j 0.92j 0.92j 0.94j 1.00j 1.08j 1.14j

IKU# D-762 87.7M 7129/10-2

14-1

12-1

10-1

8-1

6-1

4-1

2-1

0-1

A a
 AKA akaaa
 AAA aaaaa a

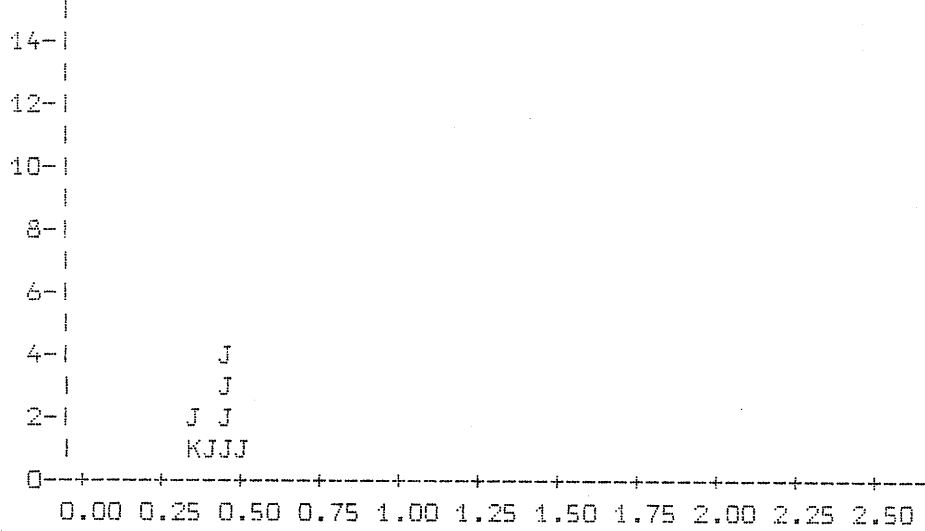
0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.40 0.52 ALL 7 0.46 0.04
 N 0.60 0.84 ALL 11 0.72 0.08
 N 0.99 1.00 ALL 1 0.99 0.00
 OVERALL 19 0.64 0.16

ORDERED VALUES FOLLOW:

0.40A 0.43A 0.44A 0.45K 0.47A 0.51A 0.51A 0.60a 0.62a 0.65k 0.67a
 0.72a 0.72a 0.74a 0.77a 0.79a 0.80a 0.83a 0.99a

IKU# D-800 102.7M 7129/10-2



PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.37 0.55 ALL 8 0.44 0.05
 OVERALL 8 0.44 0.05

ORDERED VALUES FOLLOW:

0.37J 0.39K 0.40J 0.45J 0.46J 0.46J 0.47J 0.54J

APPENDIX II.3: TABLE OF CONTENTS

Core 7129/10-U-01

TABLES

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Table A.II.3.10a:	Molecular ratios from sterane and terpane mass fragmentograms. Maturity characteristic ratios.
Table A.II.3.10b:	Molecular ratios from sterane and terpane mass fragmentograms. Maturity and source characteristic ratios.

FIGURES

Figure A.II.3.1:	Saturated hydrocarbon gas chromatograms.
Figure A.II.3.2:	Aromatic hydrocarbon gas chromatograms.
Figure A.II.3.3:	Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).
Figure A.II.3.4:	Mass fragmentograms of m/z 217, 218, 231, 259 (steranes).
Figure A.II.3.5:	Vitrinite reflectance histograms.

Table A.II.3.1a

Core 7129/10-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I	D 0248	57.62	835	2	2				839	4	0.47	*****	I
I	D 0249	60.60	8						8		0.00	*****	I
I	D 0250	63.44	6						6		0.00	*****	I
I	D 0251	64.71									*****	*****	I
I	D 0252	69.44	46						46		0.00	*****	I
I	D 0253	72.45	359						359		0.00	*****	I
I	D 0254	75.46	5439						5439		0.00	*****	I
I	D 0255	78.49	9501	3					9504	3	0.03	*****	I
I	D 0256	81.55	14569	14	38				14621	52	0.35	*****	I
I	D 0257	82.90	6682	30	176	132	120	334	7141	458	6.42	1.11	I
I	D 0258	87.47	164	2					165	2	0.92	*****	I
I	D 0259	89.71	394	4	2	2			402	7	1.83	*****	I
I	D 0260	93.24	278	2	1				282	4	1.40	*****	I

CORE 7129/10-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	
	no.	m							C1-C4	C2-C4	NESS	-----	
											(%)	nC4	
I	D 0248	57.62	532	9	5				546	14	2.56	*****	I
I	D 0249	60.60	331	28	33	11		14	403	72	17.82	*****	I
I	D 0250	63.44	178	25	28				231	52	22.72	*****	I
I	D 0251	64.71	71	6	6	9	7		98	27	27.55	1.24	I
I	D 0252	69.44	148	11	10				169	21	12.42	*****	I
I	D 0253	72.45	722	24	21	4			770	49	6.33	*****	I
I	D 0254	75.46	398	15	17	19	18	228	467	68	14.68	1.04	I
I	D 0255	78.49	767	15	13	5			800	33	4.10	*****	I
I	D 0256	81.55	6227	42	221	166	156	415	6813	586	8.61	1.06	I
I	D 0257	82.90	920	26	141	147	177	1198	1411	491	34.81	0.83	I
I	D 0258	87.47	386	10	12				408	22	5.34	*****	I
I	D 0259	89.71	3579	29	11	8			3627	48	1.31	*****	I
I	D 0260	93.24	2147	22	21	1			2191	44	2.02	*****	I

Table A.II.3.1c

Core 7129/10-U-01

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

[illegible]

Table A.II.3.2

Core 7129/10-U-01

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m/ft	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)	I
I	D	248	:	****	****	****	0.09	*****	****	*****	*****	***	I
I	D	213	:	****	****	****	0.34	*****	****	*****	*****	***	I
I	D	249	:	****	****	****	0.18	*****	****	*****	*****	***	I
I	D	215	:	****	****	****	0.28	*****	****	*****	*****	***	I
I	D	250	:	****	****	****	0.19	*****	****	*****	*****	***	I
I	D	219	:	0.04	0.03	0.90	0.51	6	176	0.07	0.57	447	I
I	D	251	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D	252	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D	253	:	****	****	****	0.12	*****	****	*****	*****	***	I
I	D	254	:	****	****	****	0.25	*****	****	*****	*****	***	I
I	D	231	:	0.01	0.00	0.15	0.80	0	19	0.01	1.00	374	I
I	D	255	:	****	****	****	0.37	*****	****	*****	*****	***	I
I	D	233	:	0.08	0.17	0.81	0.89	19	91	0.25	0.32	413	I
I	D	256	:	****	****	****	0.31	*****	****	*****	*****	***	I
I	D	236	:	0.52	2.20	2.77	1.74	126	159	2.72	0.19	431	I
I	D	257	:	****	****	****	0.70	*****	****	*****	*****	***	I
I	D	239	:	0.70	0.21	2.17	0.21	100	1033	0.91	0.77	379	I
I	D	258	:	****	****	****	0.07	*****	****	*****	*****	***	I
I	D	259	:	****	****	****	0.09	*****	****	*****	*****	***	I
I	D	260	:	****	****	****	0.12	*****	****	*****	*****	***	I

DATE : 2 - 2 - 88.

Table A.II.3.3

Core number: 7129/10-U-01
Reference number: 21.3427.23
(1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-233	-----	78.91	0.44 (16) 0.69 (6)	F R	0.06 0.08	2-4
D-236	-----	82.05	0.43 (9) 0.28 (1) 0.86 (5)	F S R	0.06 0.00 0.16	1-3

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked.

Table A.II.3.4

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7129/10-U-01

I			:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:		:		I
I		(m)	:	(mg)	:	(mg)	I
I			:		:		I
I	D 239	85.22	:	1.2	:	0.6	I
I	D 254	75.46	:	7.0	:	2.4	I
I	D 256	81.55	:	1.0	:	2.2	I
I	D 257	82.90	:	1.5	:	0.7	I
I			:		:		I

Project no.: 21.3427.23
 Well ident.: 7129/10-U-01
 DATE : 8 - 2 - 88.

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Table A.II.3.5

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

I	I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	: Rock	EOM	Sat.	Aro.	HC	Non HC	TOC	I
I			: Extr.							I
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	I
I			:							I
I	D 0254	75.46	: 12.8	13.8	0.6	0.8	1.4	12.4	0.25	I
I			:							I
I	D 0256	81.55	: 14.3	4.6	0.5	0.8	1.3	3.3	0.31	I
I			:							I
I	D 0257	82.90	: 12.4	5.4	0.4	1.6	1.9	3.5	0.70	I
I			:							I
I	D 0239	85.22	: 5.2	1.9	0.6	0.8	1.4	0.5	0.21	I
I			:							I

Table A.II.3.6

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

IKU-No	DEPTH (m)	:	EOM	Sat.	Aro.	HC	Non HC
D 0254	75.46	:	1079	47	66	113	966
D 0256	81.55	:	321	34	59	92	229
D 0257	82.90	:	435	29	126	155	280
D 0239	85.22	:	368	116	162	279	89

Project no.: 21.3427.23
Well ident.: 7129/10-U-01
DATE : 8 - 2 - 88.

Table A.II.3.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 0254	75.46	431.6	18.8	26.3	45.0	386.6
D 0256	81.55	103.6	10.8	18.9	29.7	73.9
D 0257	82.90	62.2	4.1	18.0	22.1	40.1
D 0239	85.22	175.0	55.3	77.4	132.6	42.4

Project no.: 21.3427.23
 Well ident.: 7129/10-U-01
 DATE : 8 - 2 - 88.

Table A.II.3.8

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 0254	75.46	:	4.3	6.1	10.4	71.4	89.6	11.7	I
I			:							I
I	D 0256	81.55	:	10.4	18.3	28.7	57.1	71.3	40.2	I
I			:							I
I	D 0257	82.90	:	6.7	28.9	35.6	23.1	64.4	55.2	I
I			:							I
I	D 0239	85.22	:	31.6	44.2	75.8	71.4	24.2	313.0	I
I			:							I

Table A.II.3.9

Core 7129/10-U-01

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I	IKU No.	:	-----	A= -----	B= -----	---	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I		:								I
I	D 0254	:	3.7	1.0	0.4	2.6	2.2	1.2	1.1	I
I	D 0256	:	0.8	1.0	0.9	1.1	0.3	1.2	1.2	I
I	D 0527	:	1.2	1.6	0.8	1.9	0.4	1.0	1.0	I
I	D 0239	:	1.3	1.4	0.6	2.2	0.4	1.2	1.1	I
I		:								I

DATE : 29 - 2 - 88.

Table A.II.3.10a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7129/10-U-1

IKU code	Depth	$\alpha\beta/\alpha\beta+\beta\alpha^{1)}$	%22S ²⁾	% $\beta\beta^{3)}$	%20S ⁴⁾
D-254	75.46	0.93	56.7	73.8	41.0
D-256	81.55	0.87	53.4	64.4	21.6
D-257	82.90	0.79	24.8	59.4	4.4
D-239	85.22	0.89	58.3	72.8	36.7

1) E/E+F in m/z 191

2) Average % distribution between first and second eluting isomers of extended hopanes (G-M in m/z 191)

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217

4) $q/q+t$ in m/z 217

Table A.II.3.10b:

Molecular ratios from terpane and sterane mass chromatograms.
Maturity and source characteristic ratios.

Core 7129/10-U-01

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-254	75.46	0.12	1.00	-	0.16	0.68
D-256	81.55	0.17	1.46	-	-	0.54
D-257	82.90	0.08	4.18	-	-	0.09
D-239	85.22	0.19	2.07	-	-	0.59

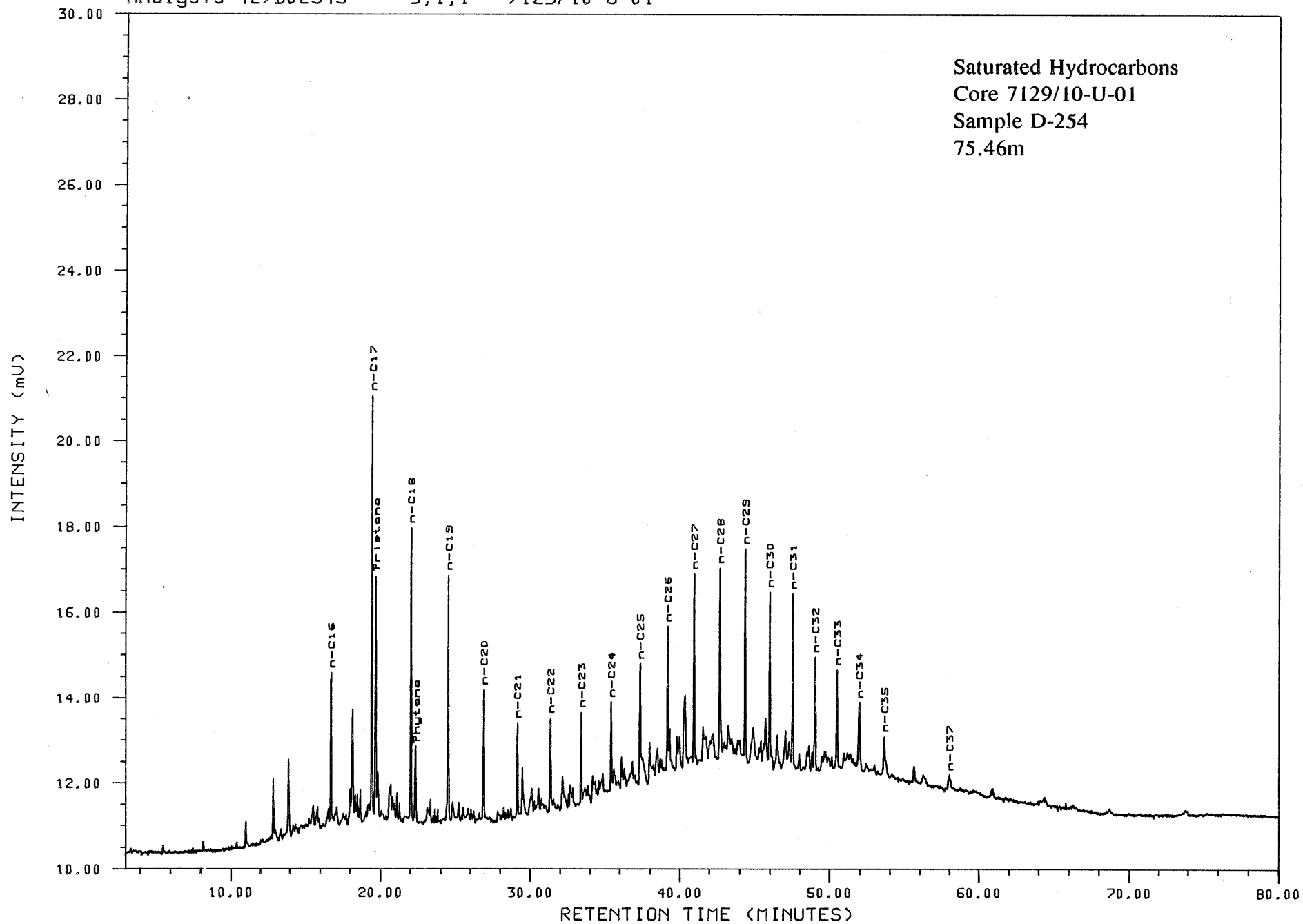
- 1) Relative abundance of tricyclic terpanes (Q/E in m/z 191)
- 2) B/A in m/z 191
- 3) Relative abundance of unknown (X/E in m/z 191)
- 4) Relative abundance of bisnorhopane (Z/E in m/z 191)
- 5) Relative abundance of C₂₇ rearranged steranes (a/a+j in m/z 217)

Figure A.II.3.1:

Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

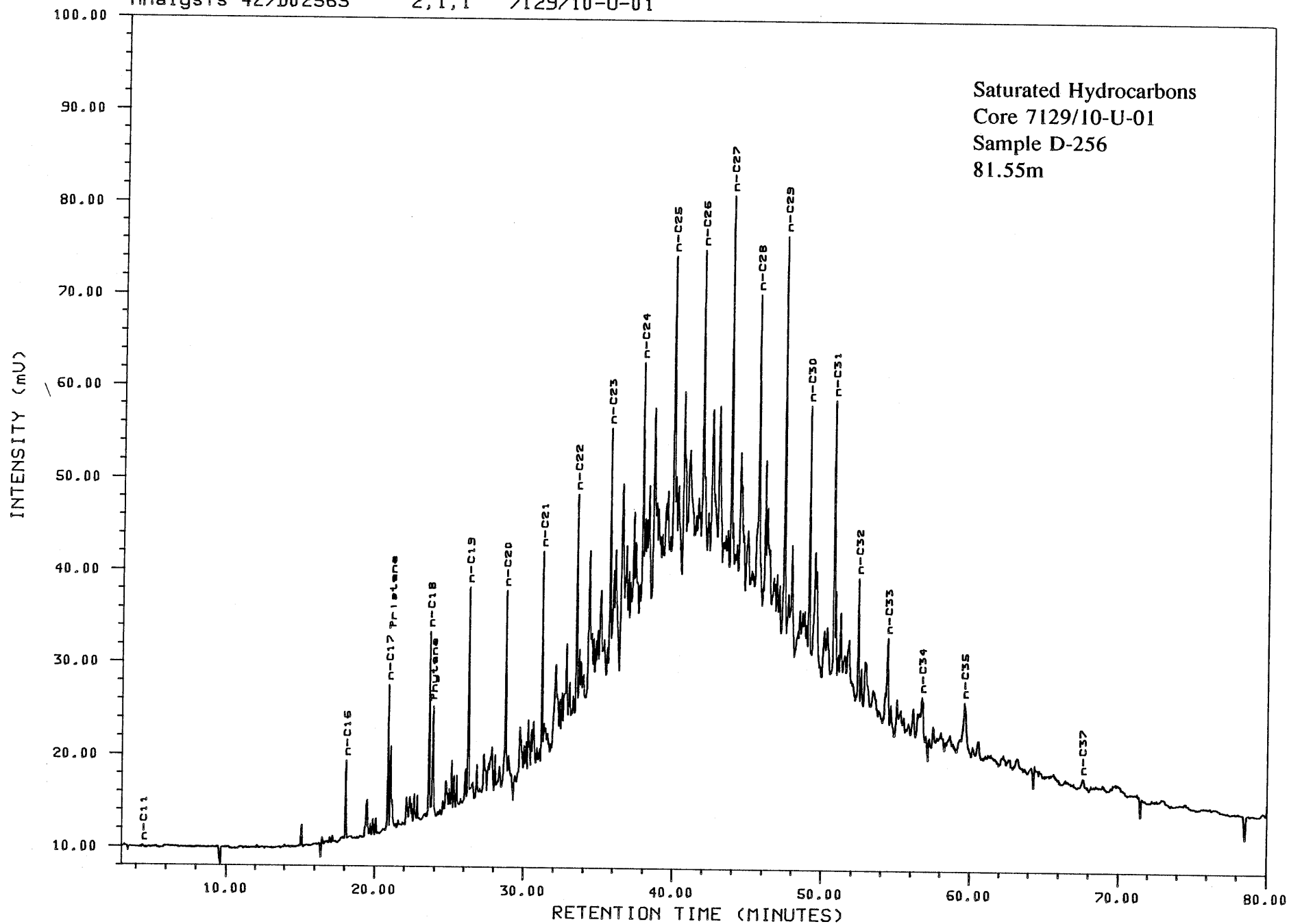
Analysis 427D0254S 3,1,1 7129/10-U-01



Analysis 427D0256S

2,1,1

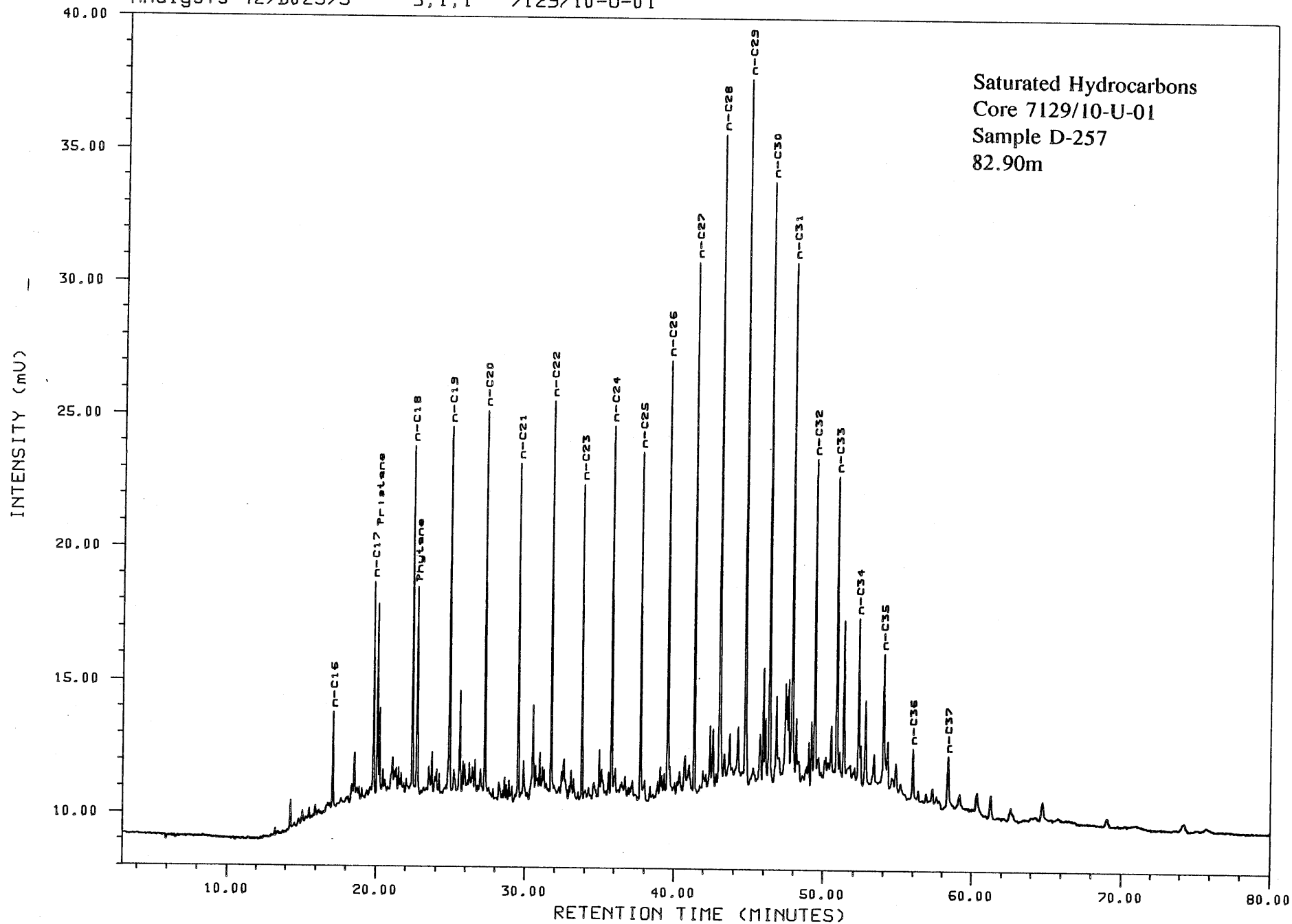
7129/10-U-01



Analysis 427D0257S

3,1,1

7129/10-U-01



Analysis 427D0239S

3,1,1

7129/10-U-01

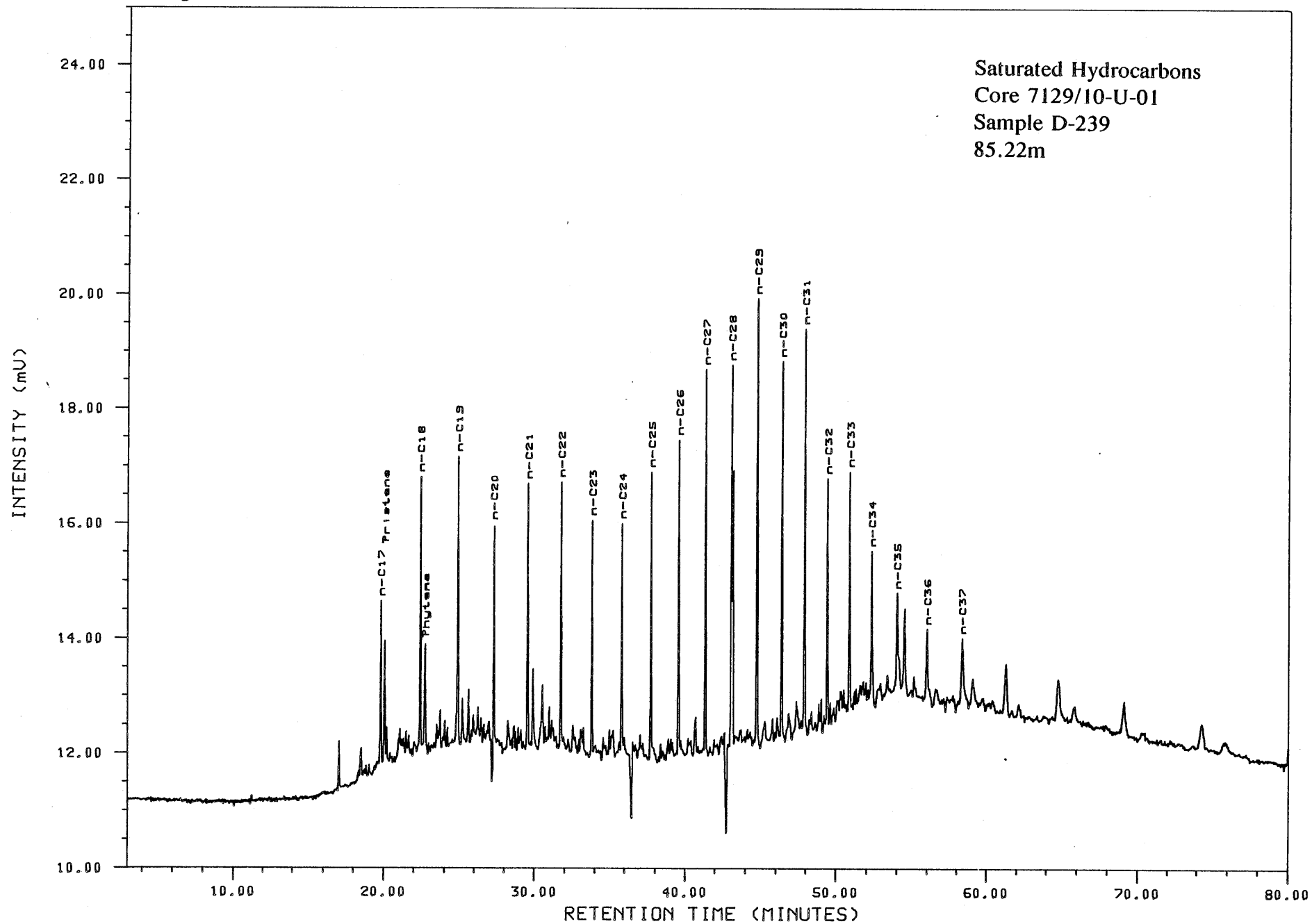
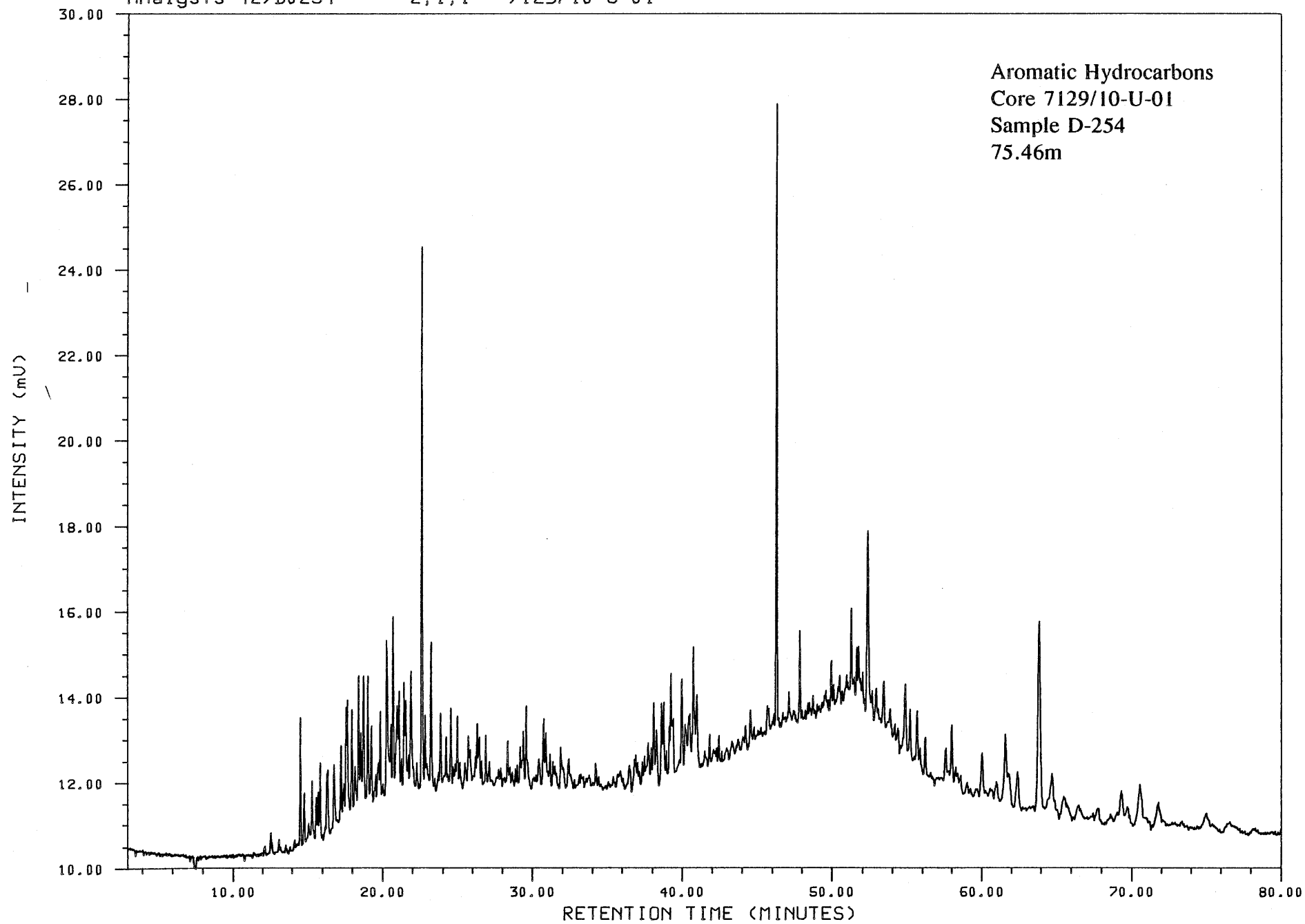


Figure A.II.3.2:

Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

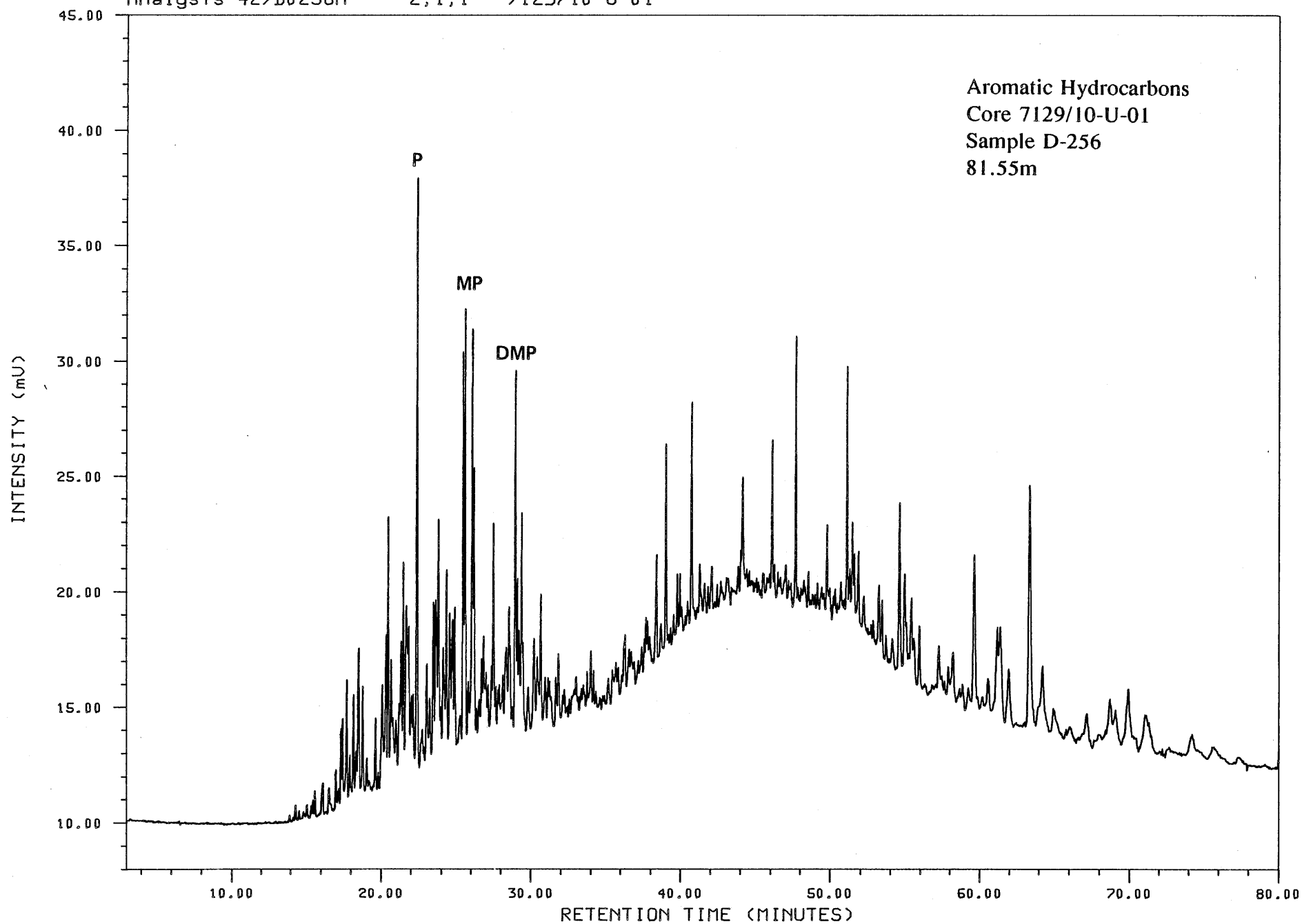
Analysis 427D0254 2,1,1 7129/10-U-01



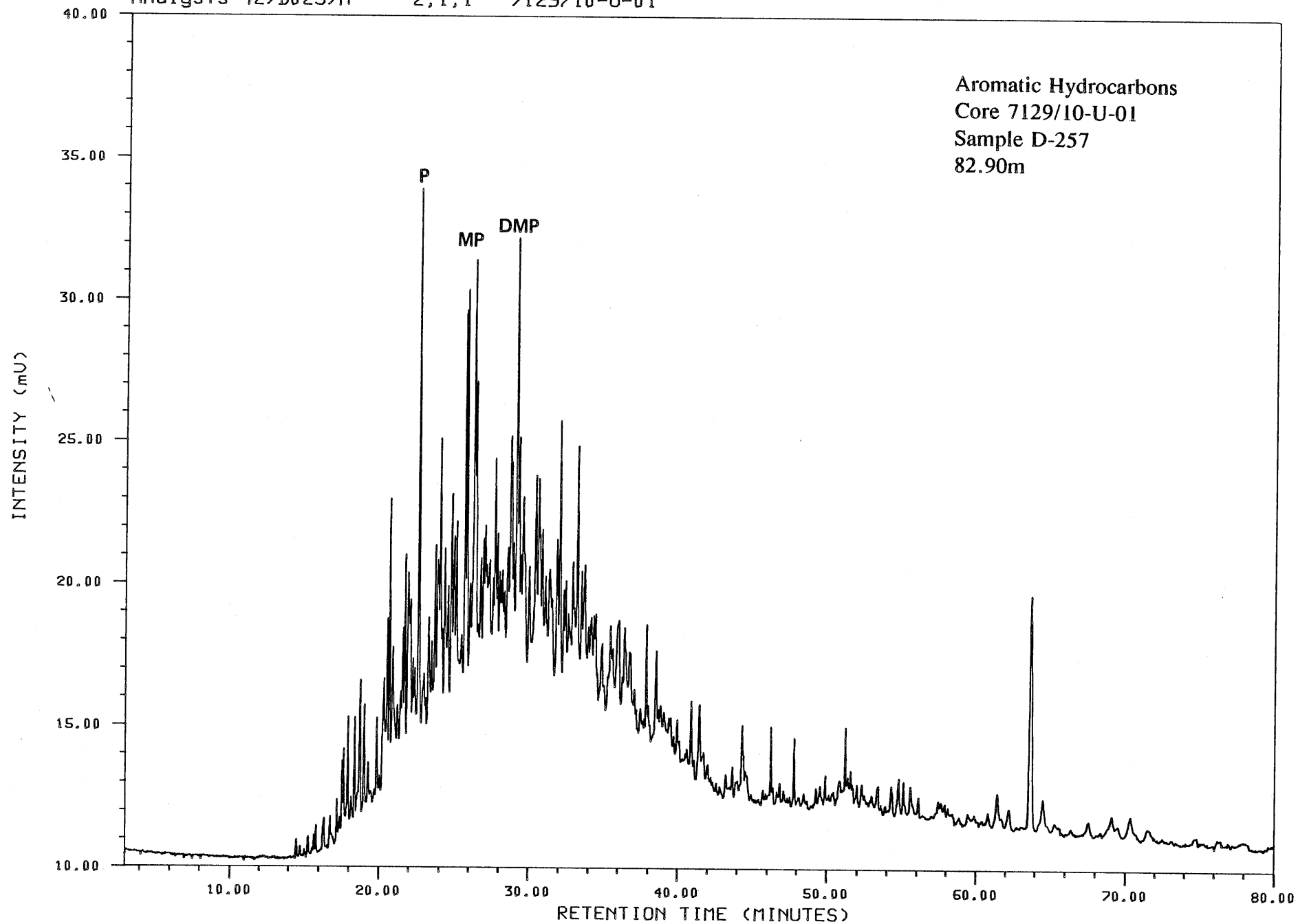
Analysis 427D0256A

2,1,1

7129/10-U-01



Analysis 427D0257A 2,1,1 7129/10-U-01



Analysis 427D0239A

2,1,1

7129/10-U-01

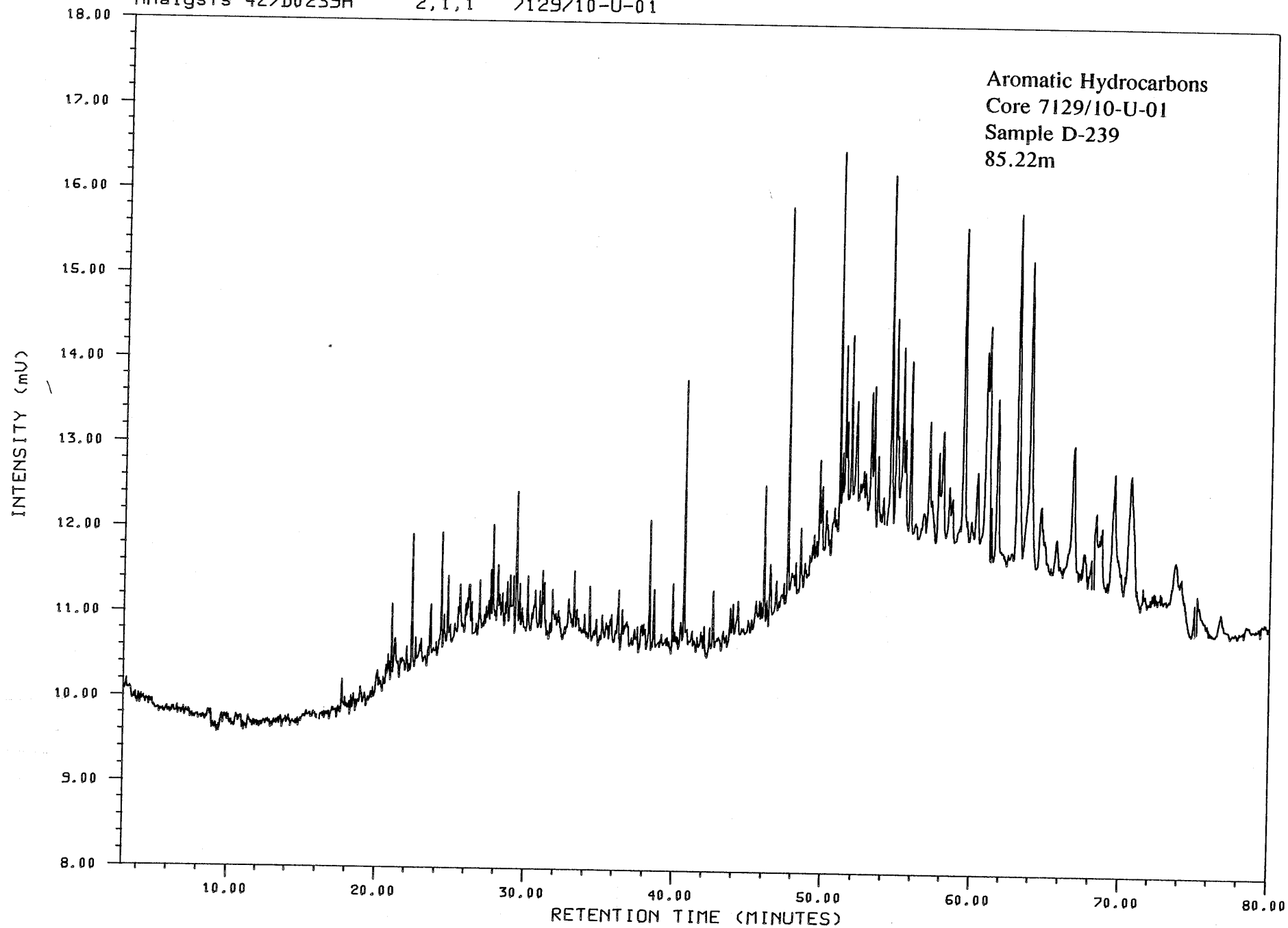
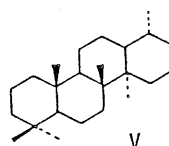
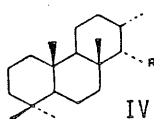
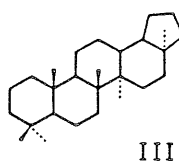
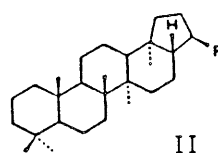
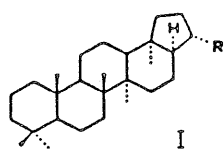


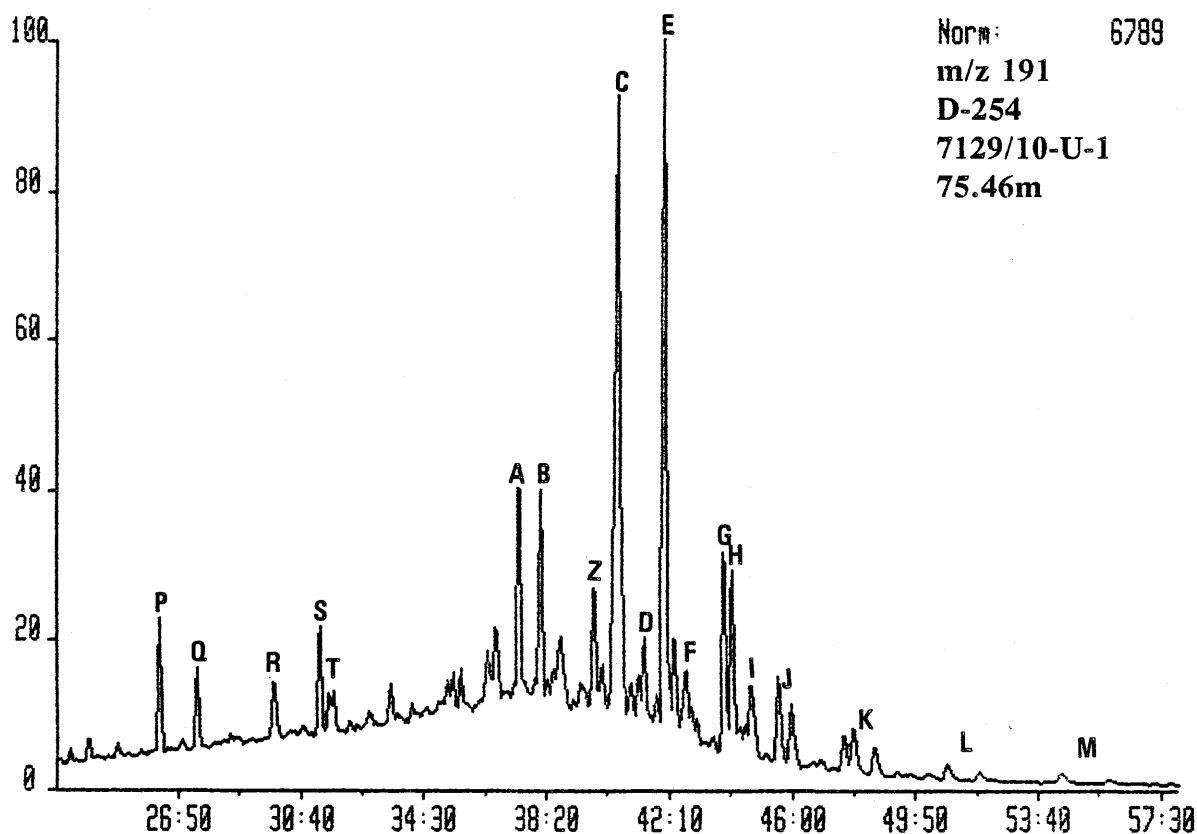
Figure A.II.3.3:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

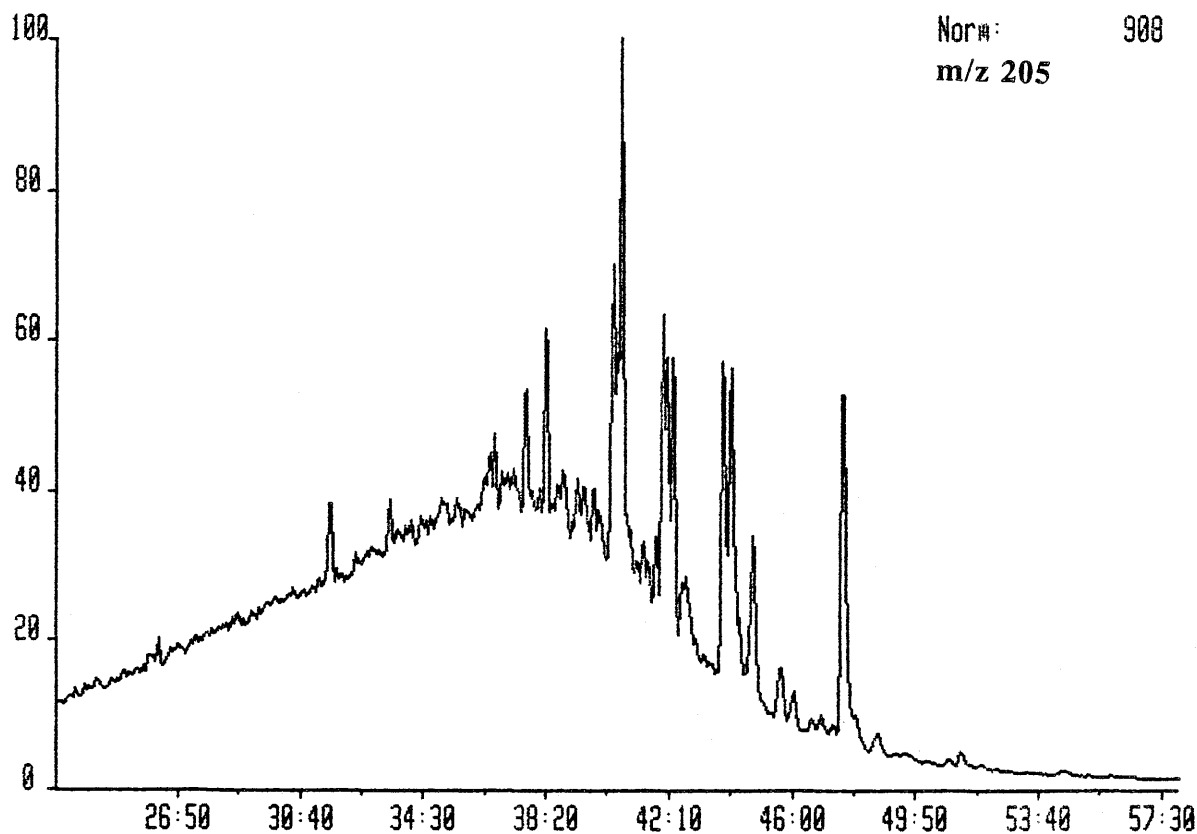
P	tricyclic terpane	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trisorneohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trisnorhopane	$C_{27}H_{46}$	(I, R=H)
Z	bisnorhopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



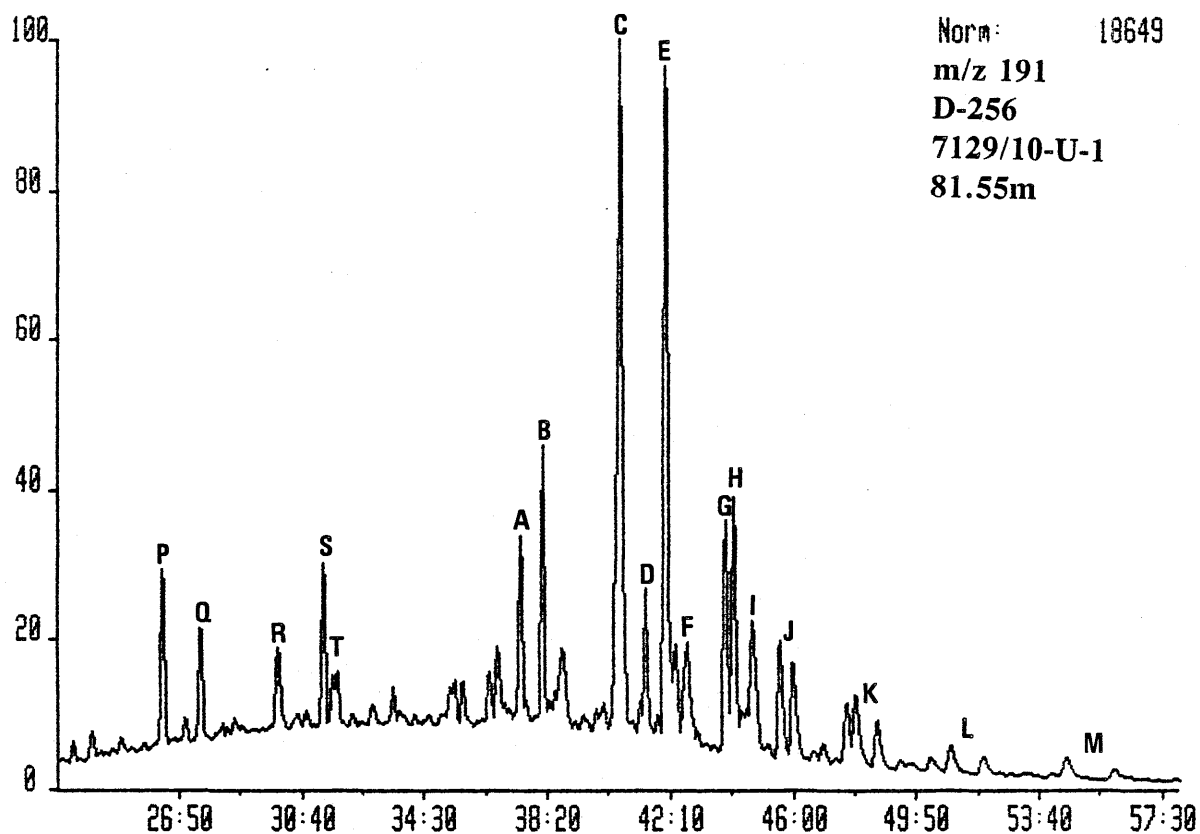
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23

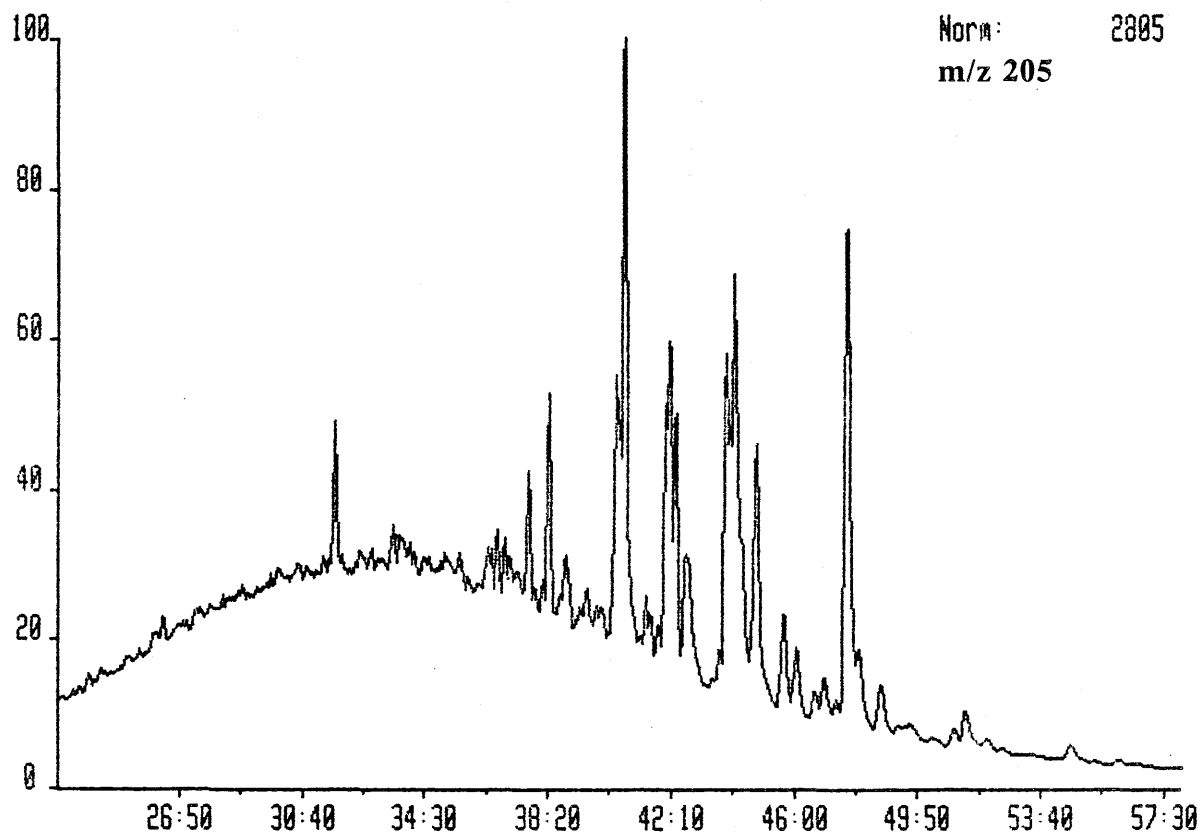


0256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



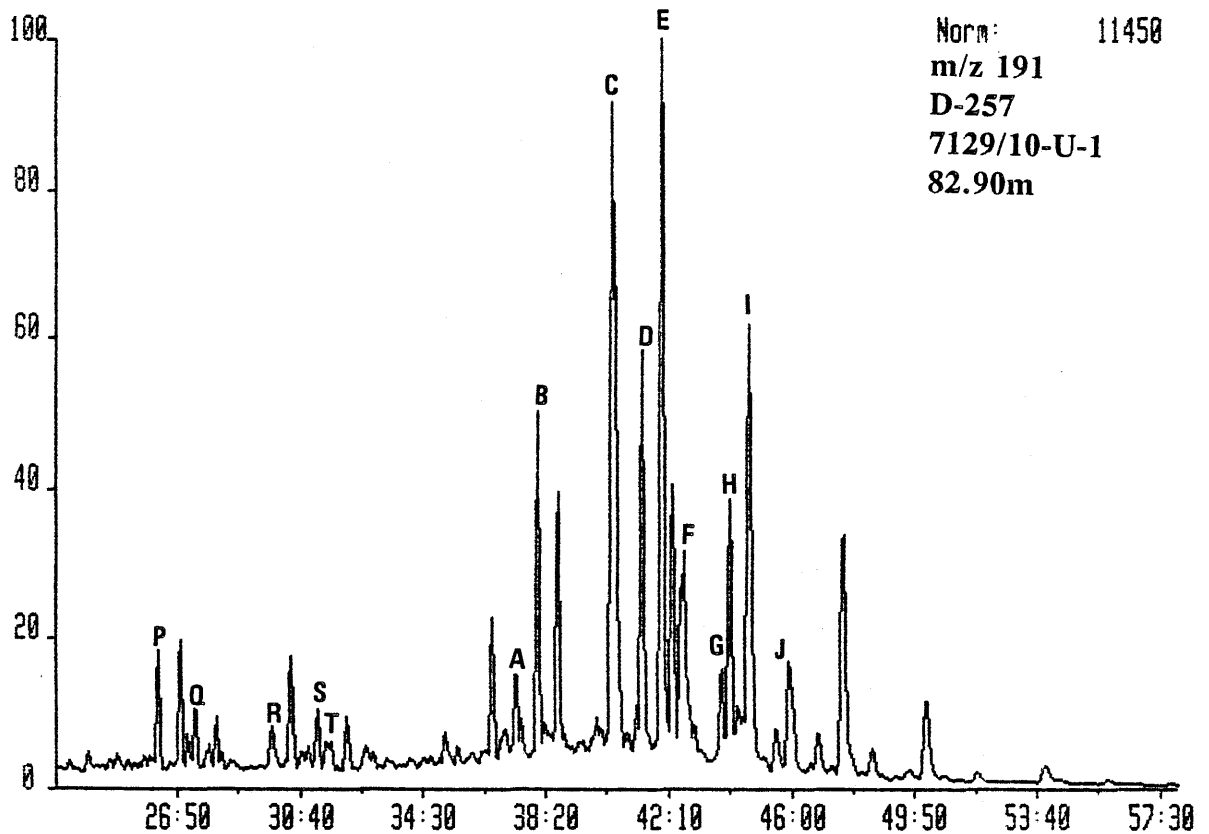
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m/z 191
D-256
7129/10-U-1
81.55m

0256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



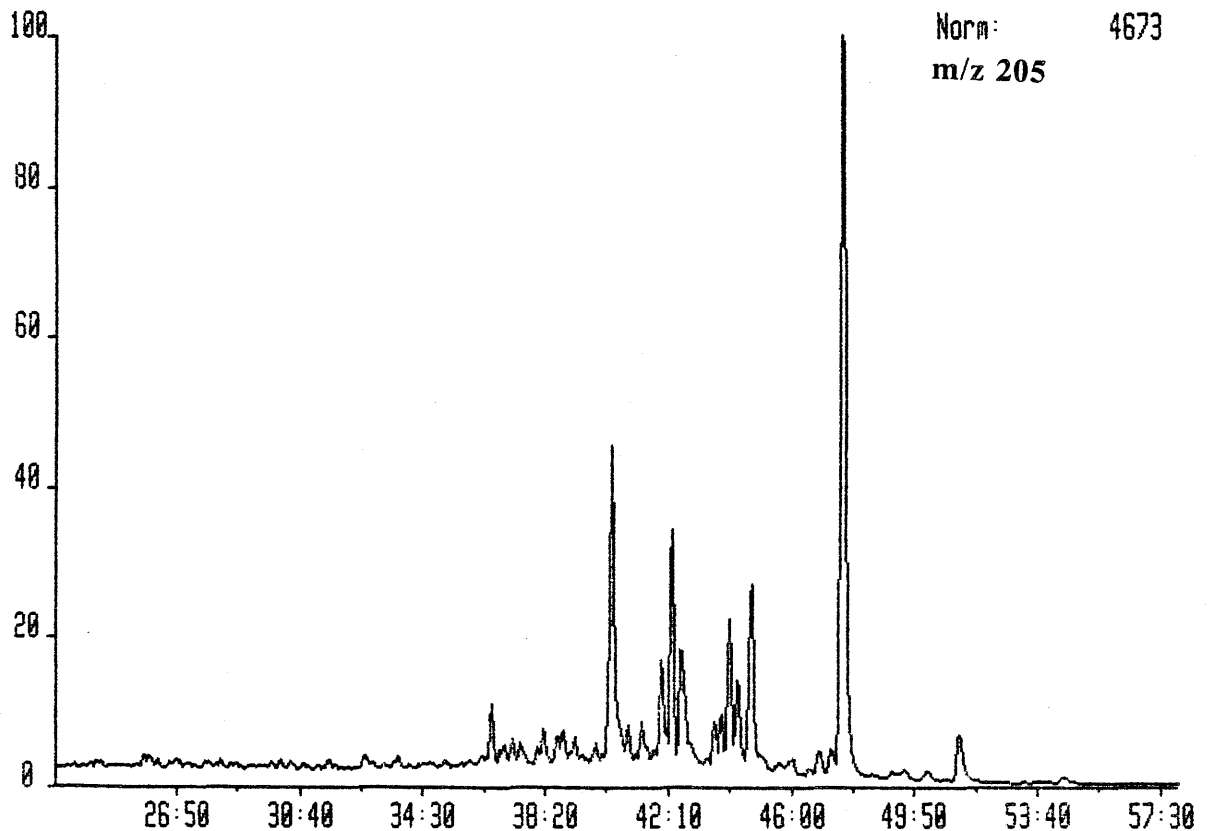
Norm: 2805
m/z 205

D257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



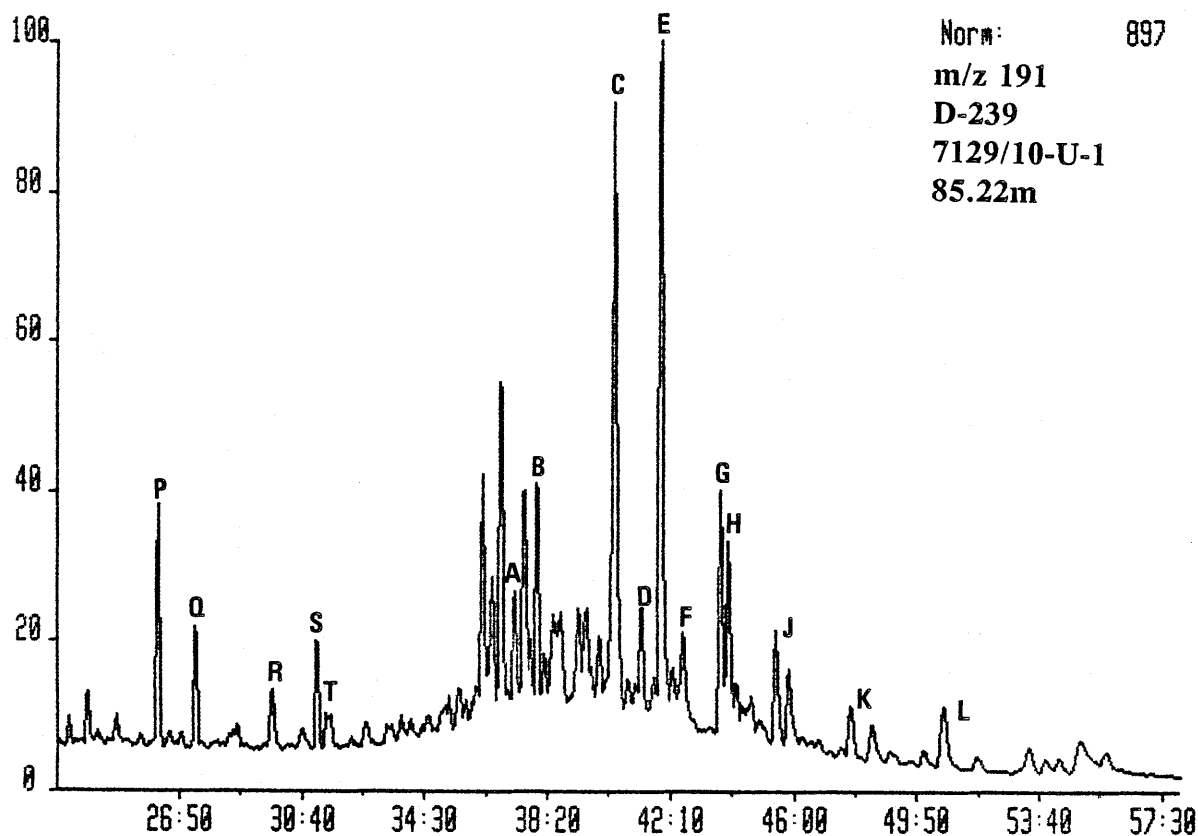
Norm: 11450
m/z 191
D-257
7129/10-U-1
82.90m

D257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23

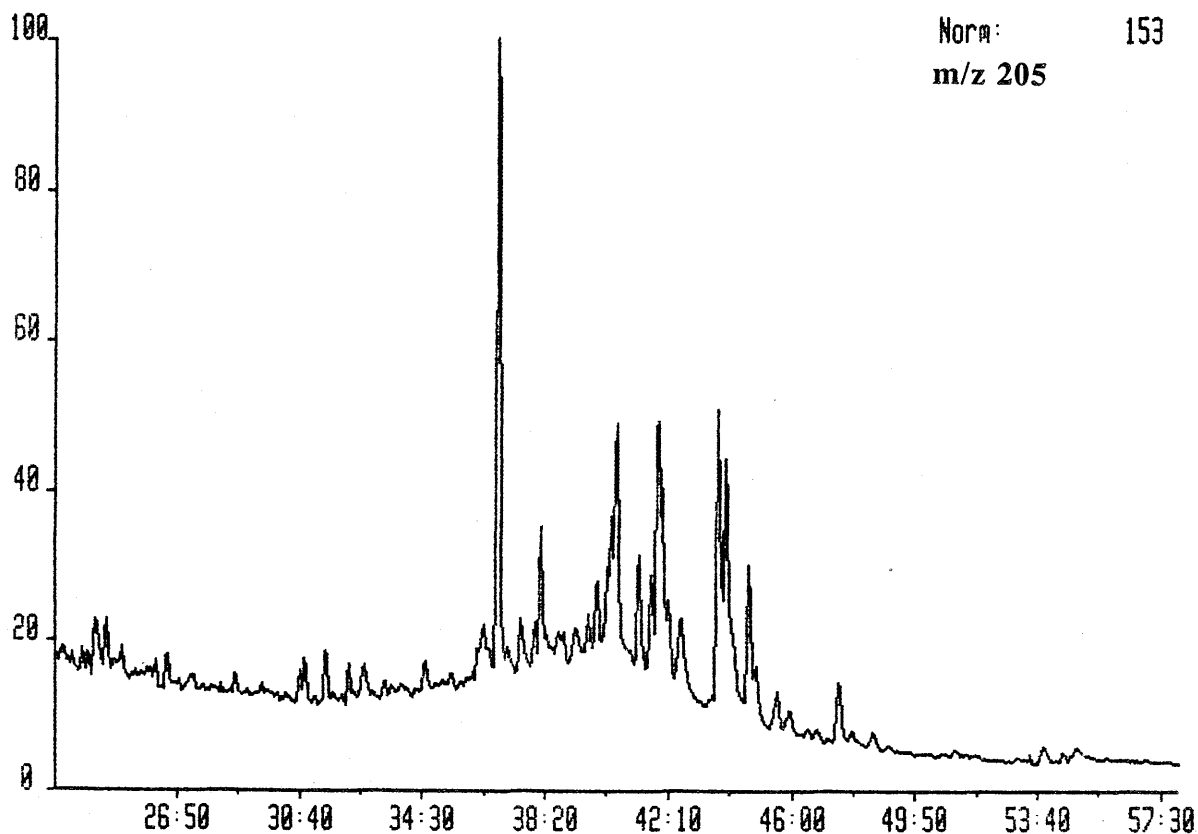


Norm: 4673
m/z 205

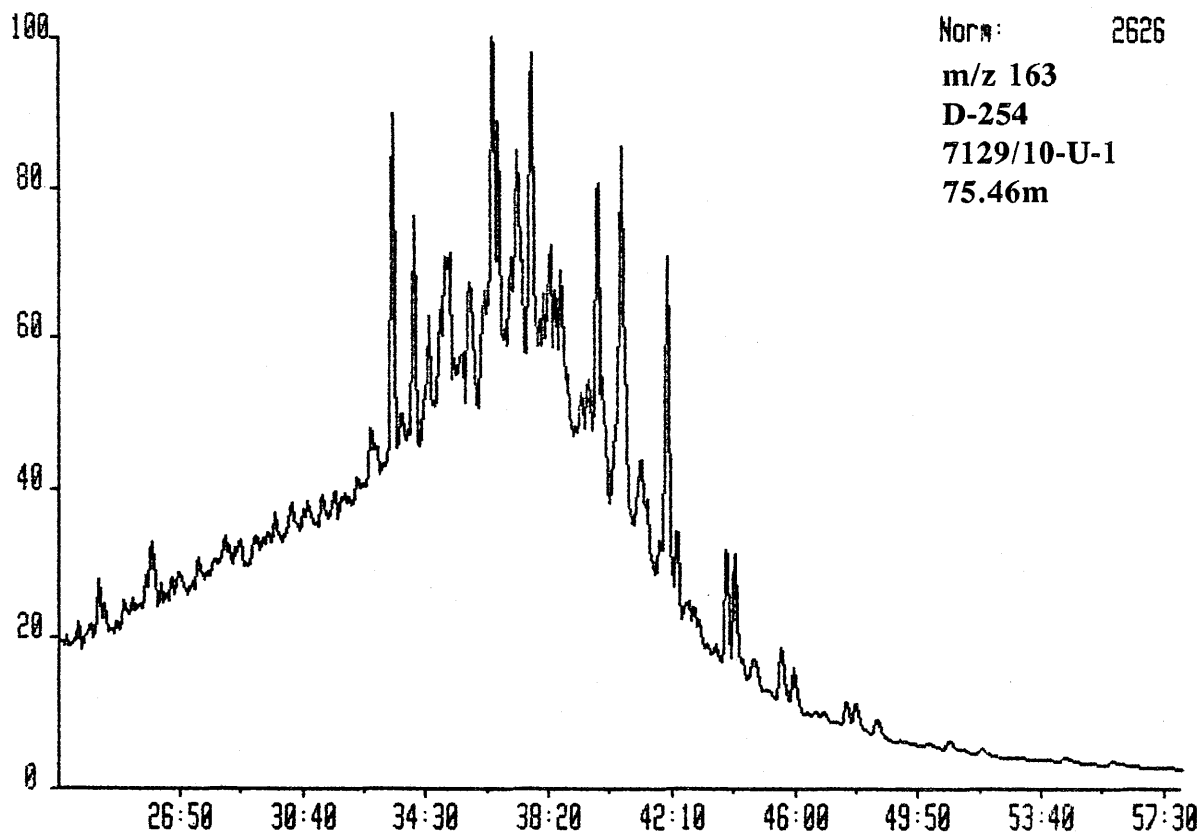
0239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



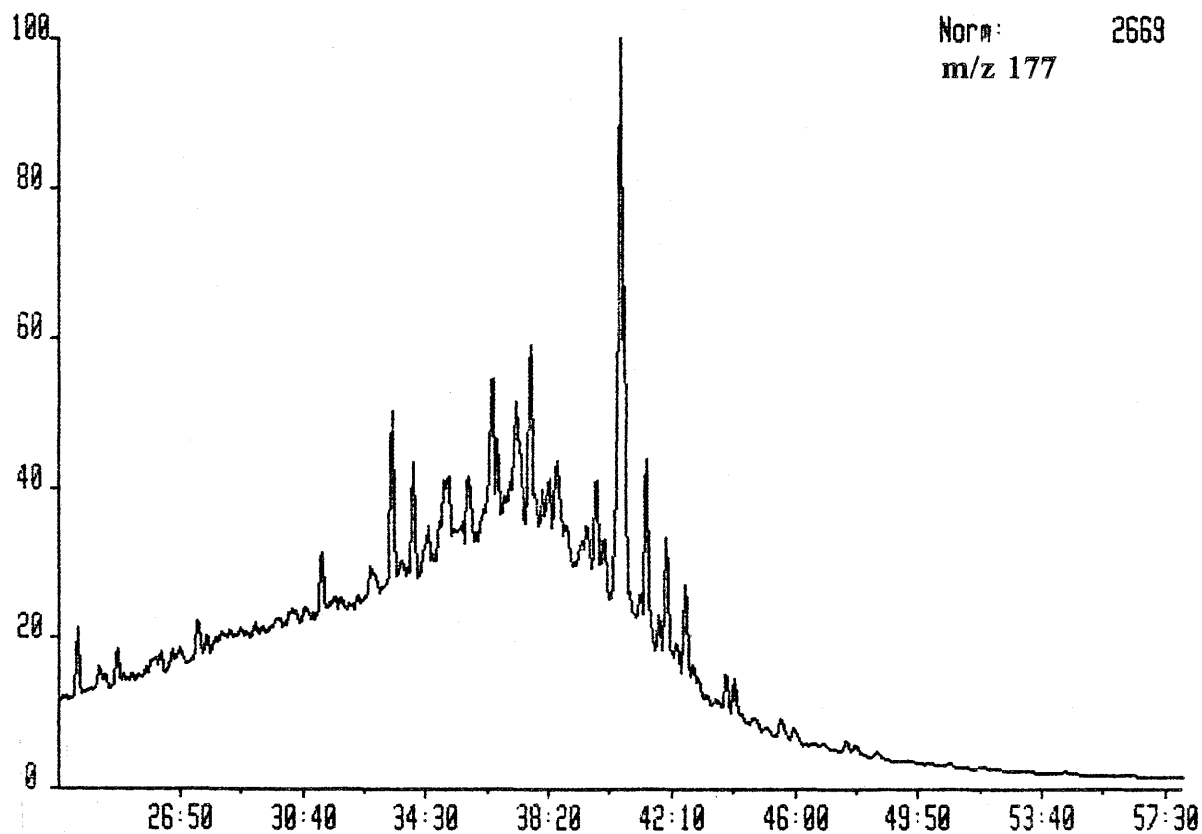
0239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



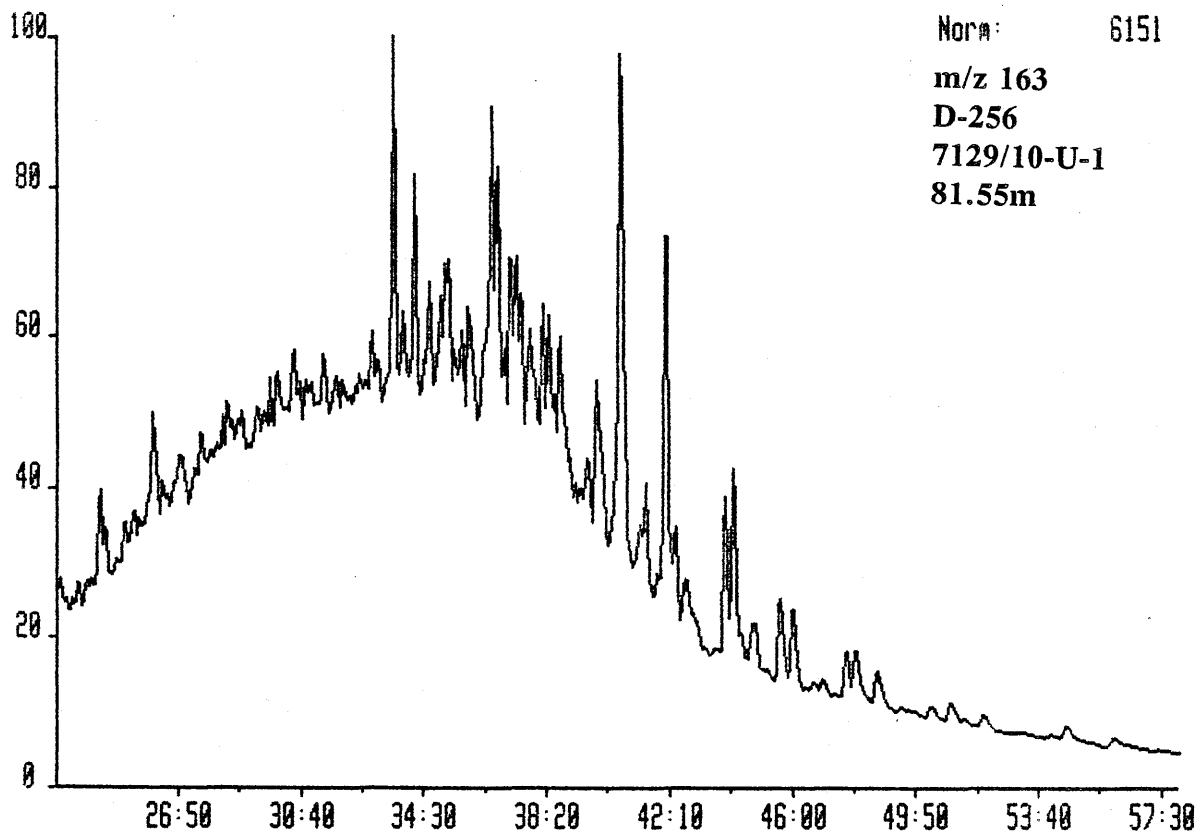
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



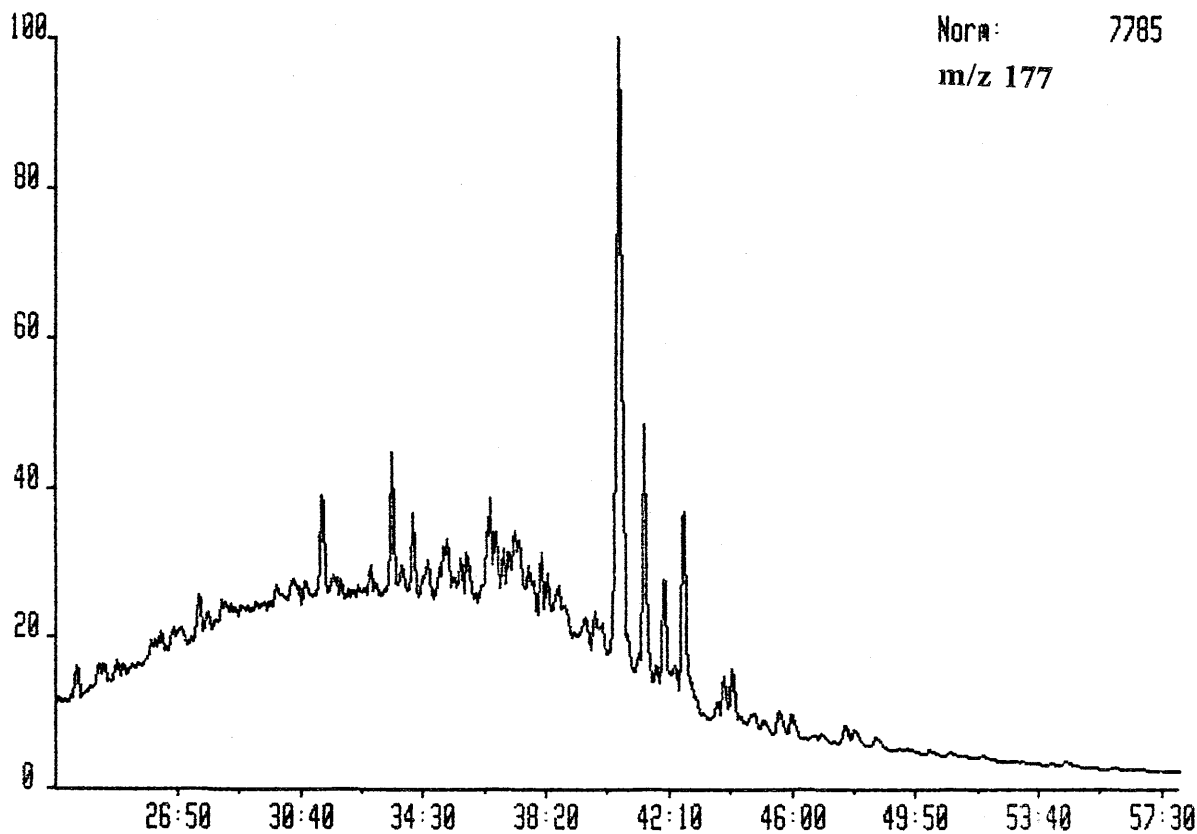
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



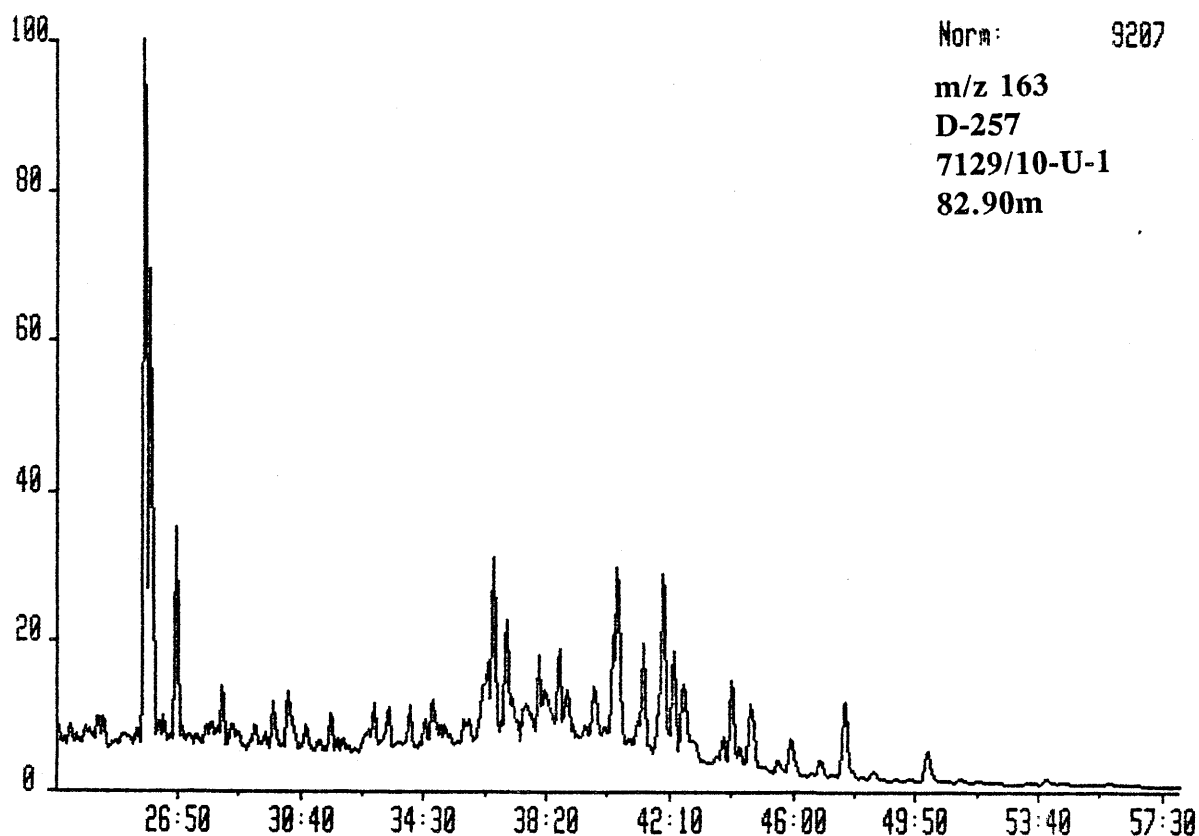
D256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



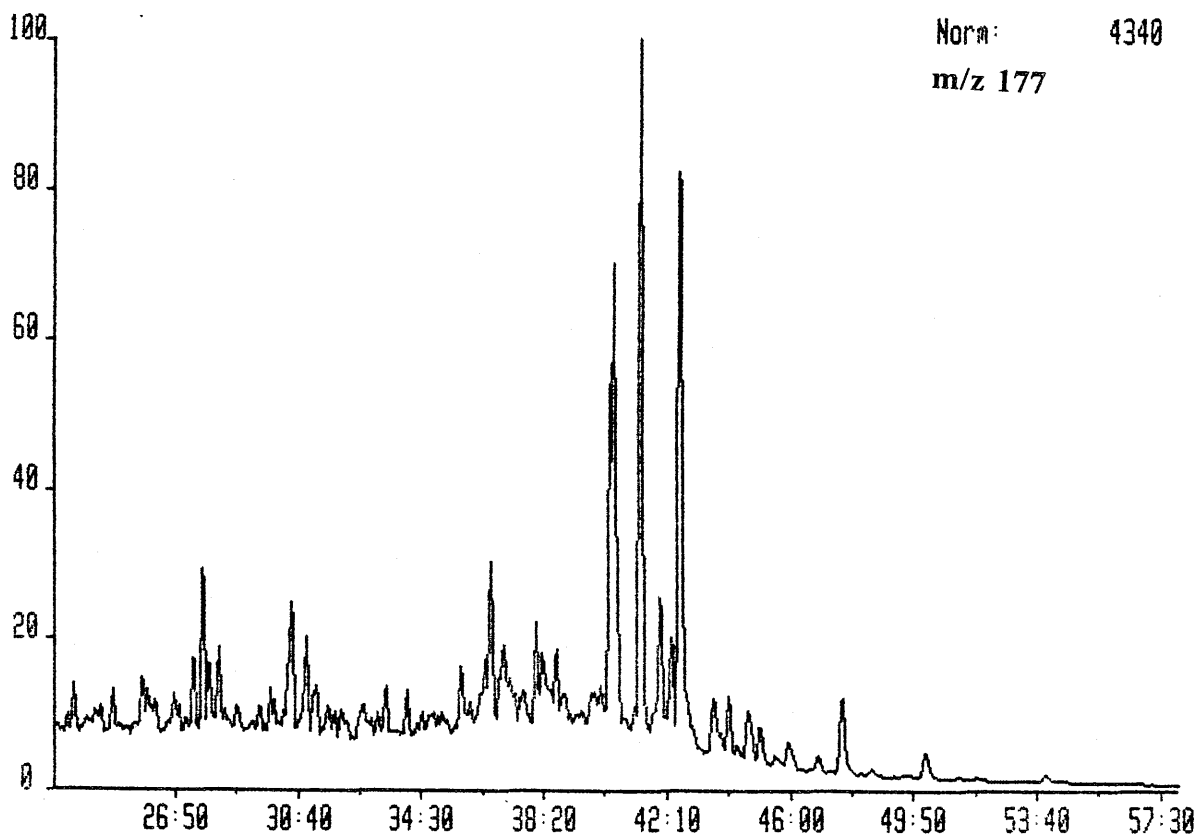
D256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



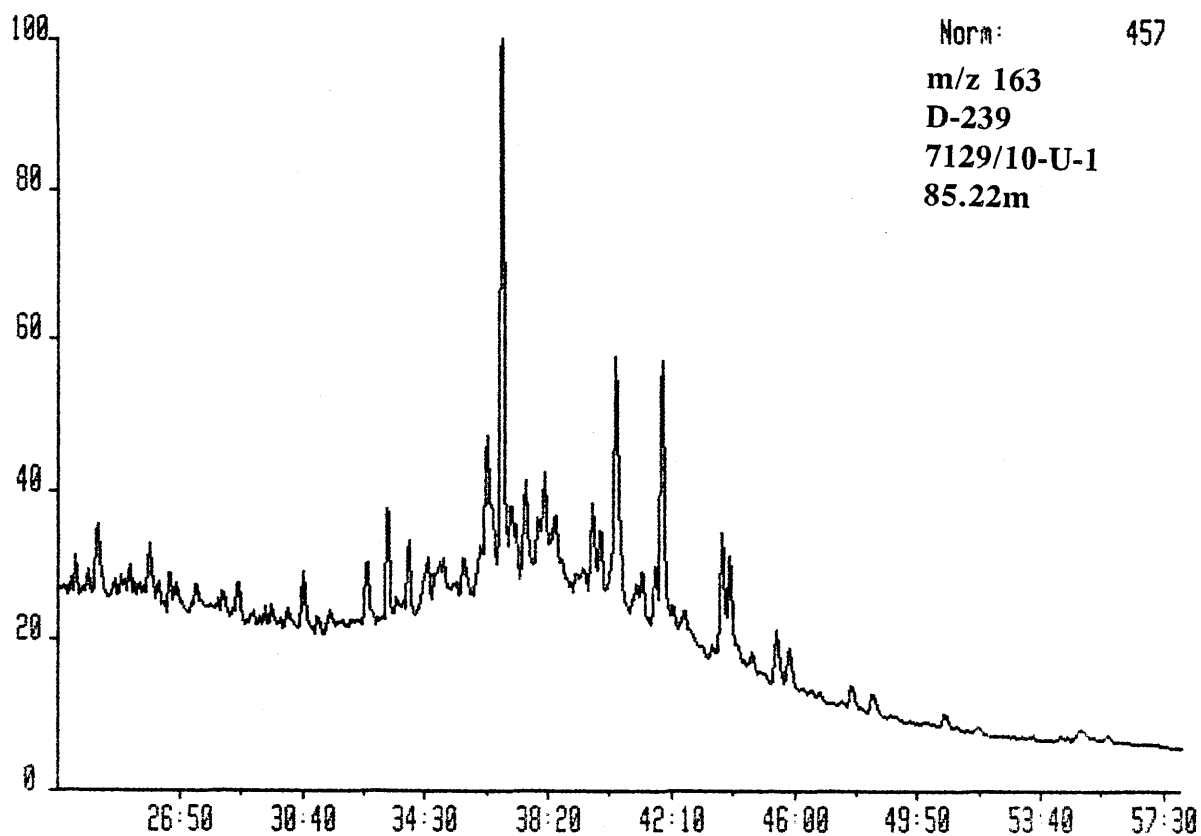
D257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

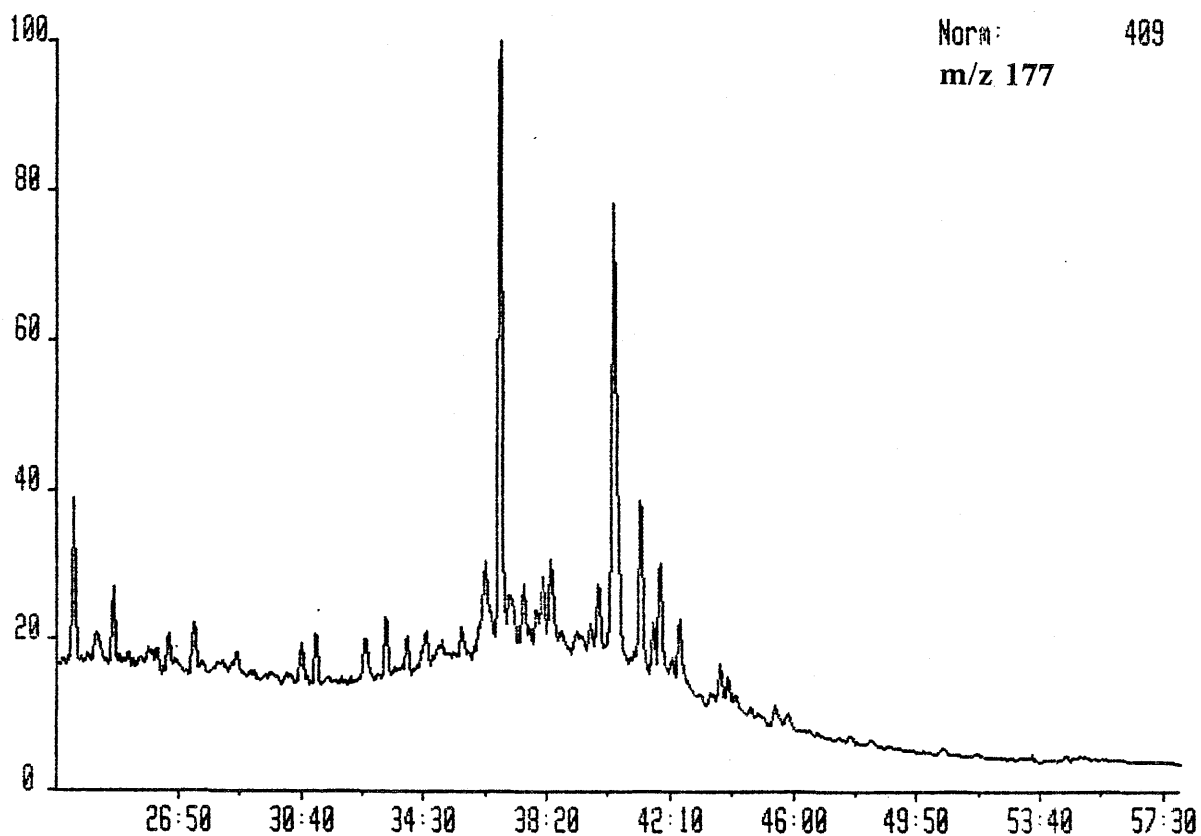
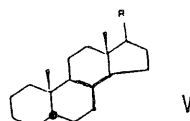
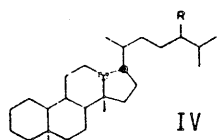
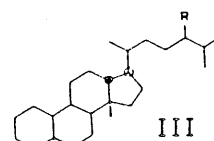
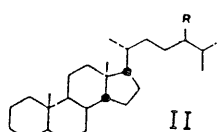
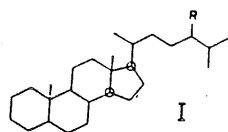


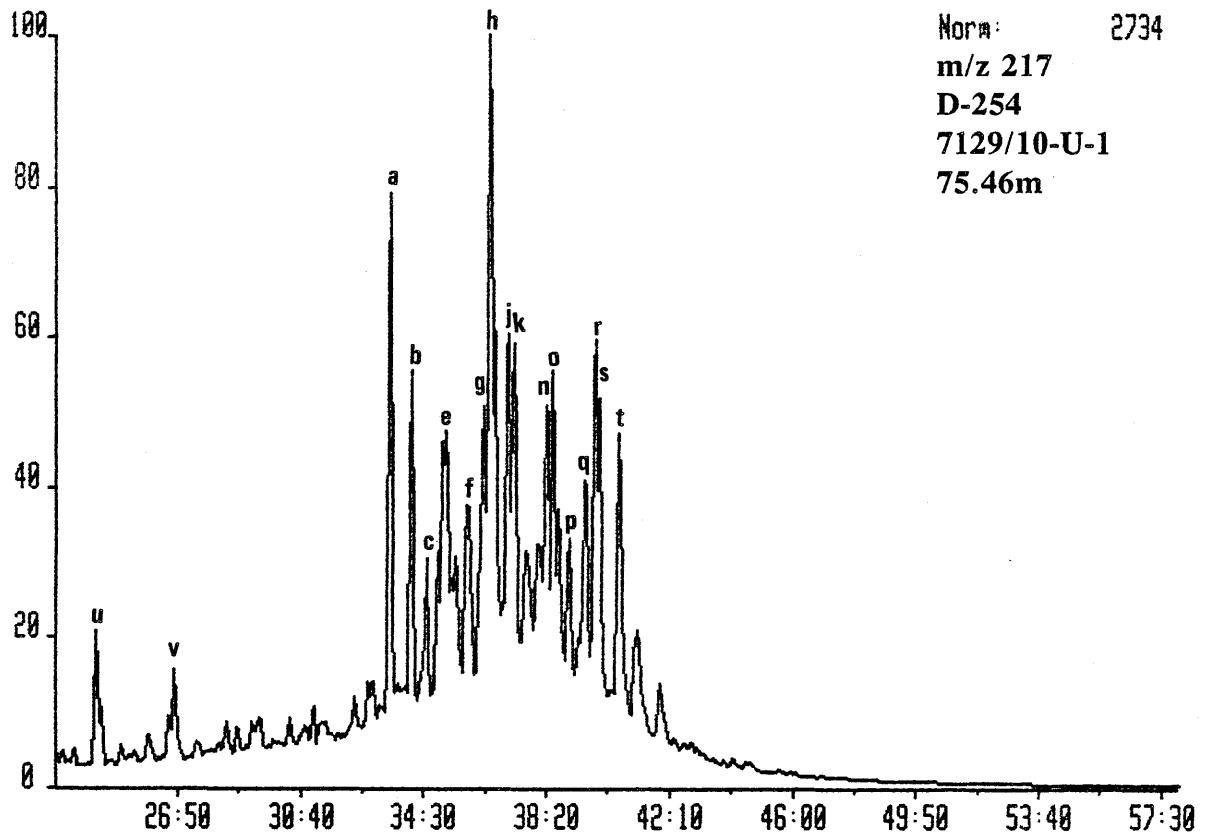
Figure A.II.3.4:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

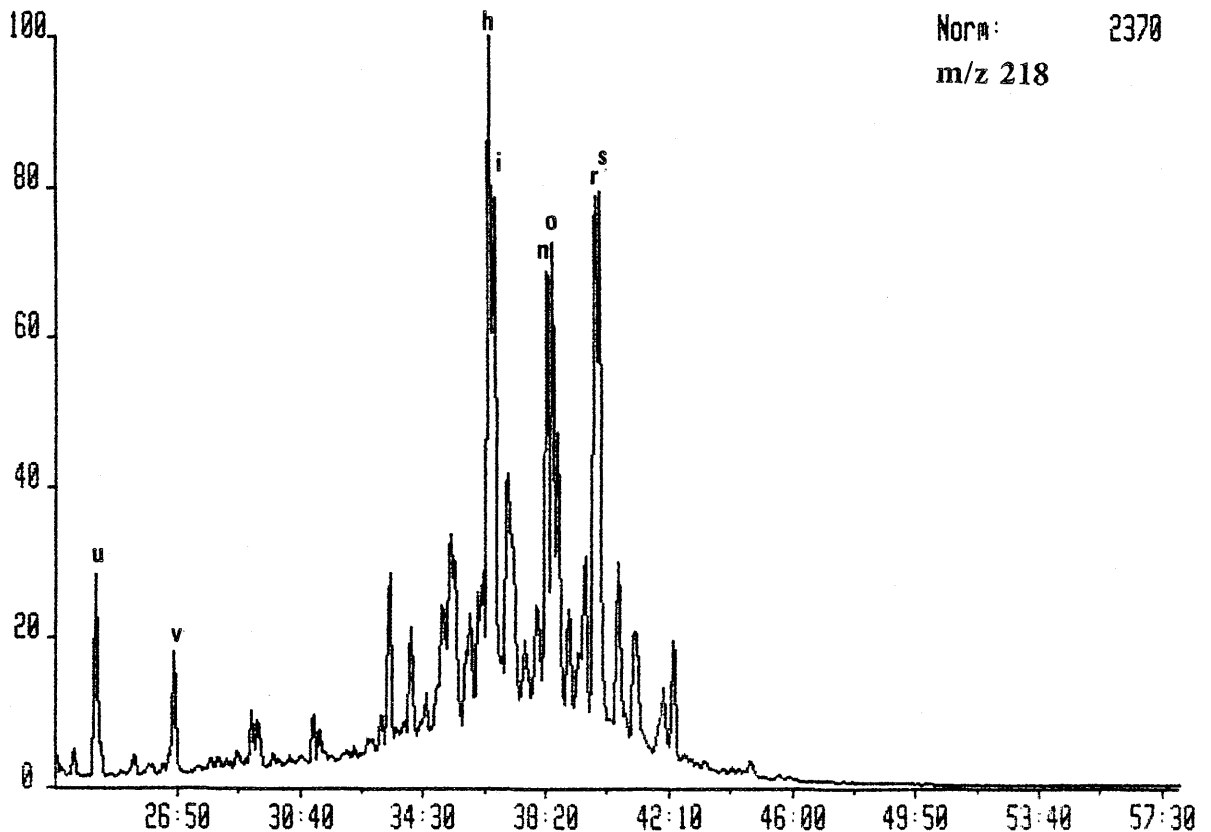
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V, R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V, R=C ₃ H ₇)
a	13 β (H), 17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III, R=H)
b	13 β (H), 17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III, R=H)
c	13 α (H), 17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV, R=H)
d	13 α (H), 17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV, R=H)
e	13 β (H), 17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III, R=CH ₃)
f	13 β (H), 17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III, R=CH ₃)
g	13 α (H), 17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV, R=CH ₃)
	+ 14 α (H), 17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I, R=H)
h	13 β (H), 17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II, R=H)
i	14 β (H), 17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II, R=H)
	+ 13 α (H), 17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV, R=CH ₃)
j	14 α (H), 17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I, R=H)
k	13 β (H), 17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
l	13 α (H), 17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
m	14 α (H), 17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I, R=CH ₃)
n	13 α (H), 17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II, R=CH ₃)
o	14 β (H), 17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II, R=CH ₃)
p	14 α (H), 17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I, R=CH ₃)
q	14 α (H), 17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)
r	14 β (H), 17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H), 17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
t	14 α (H), 17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)



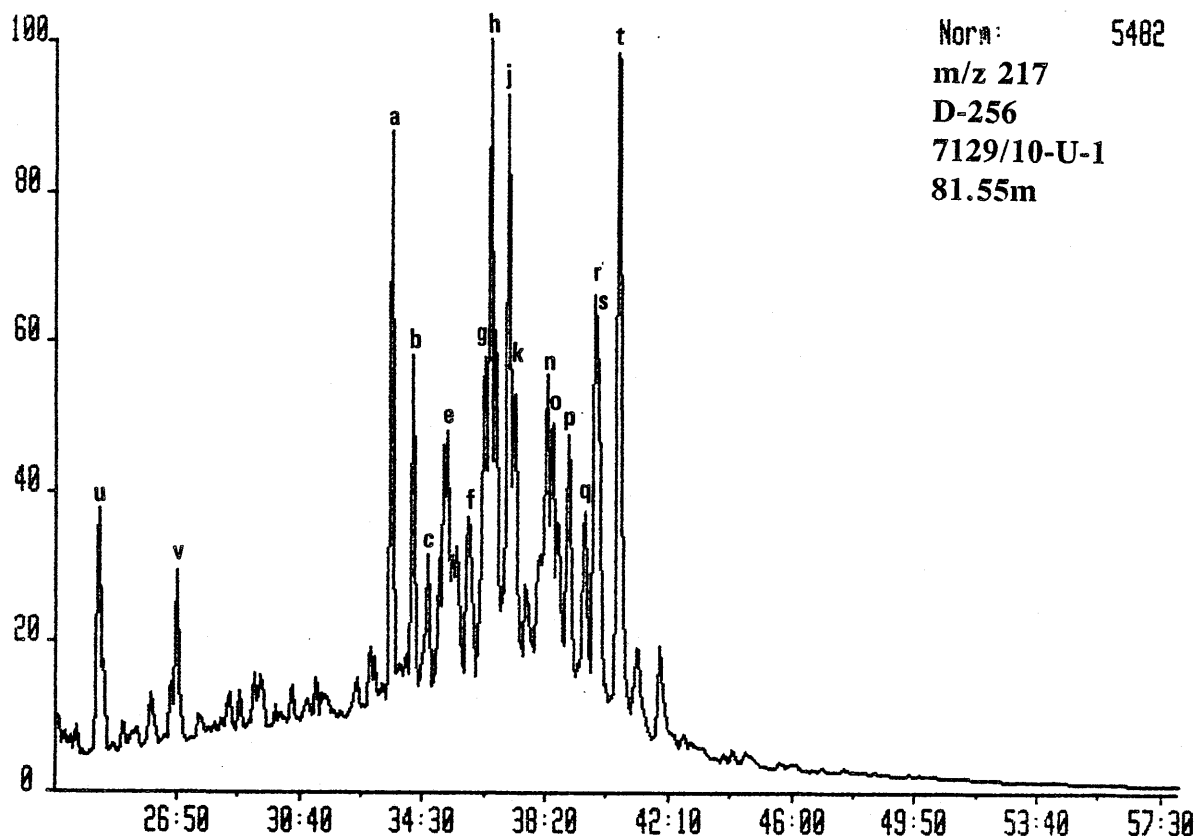
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



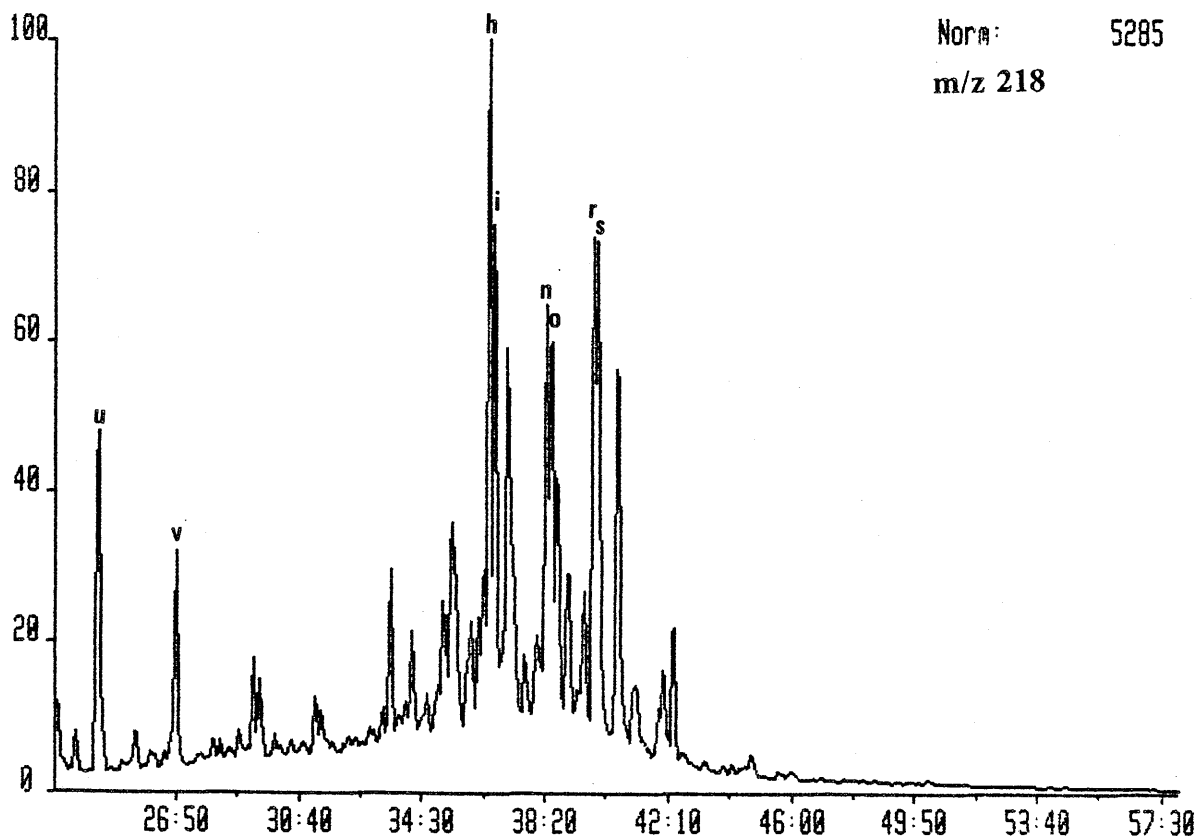
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



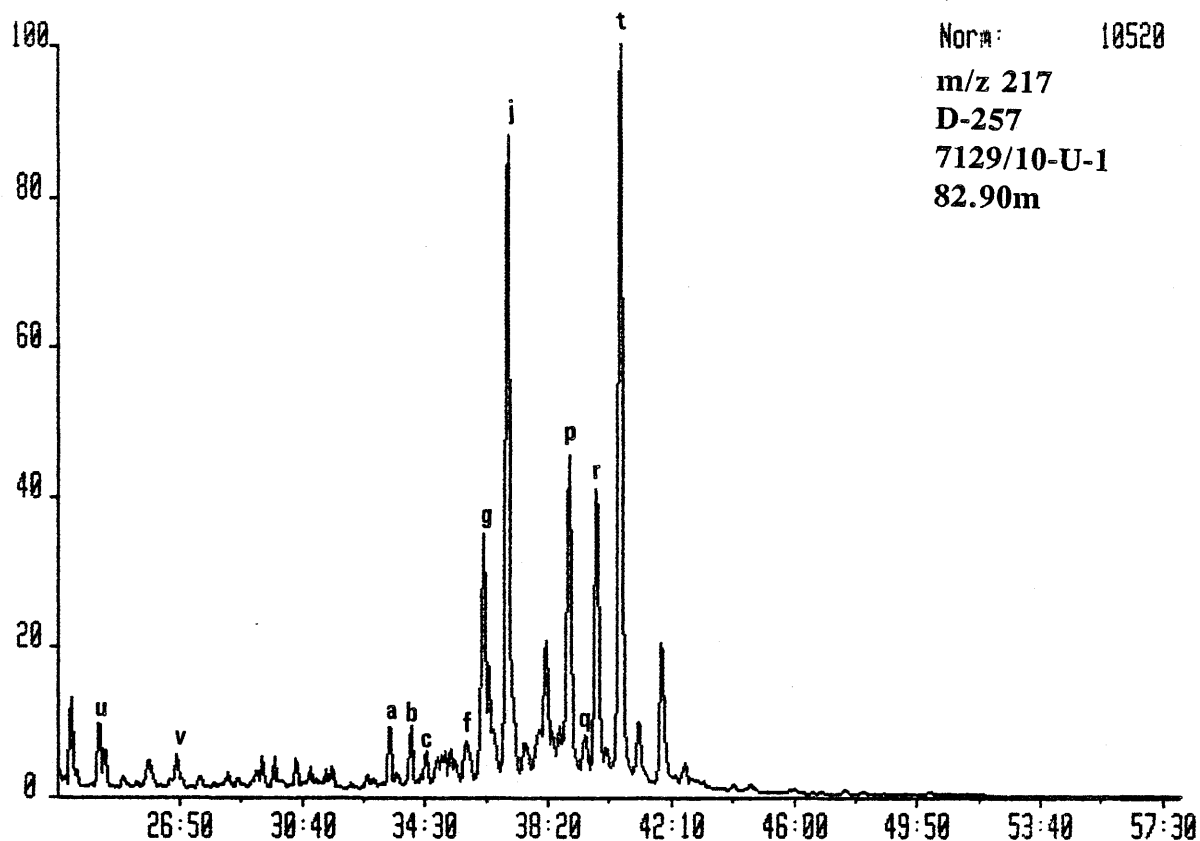
D256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



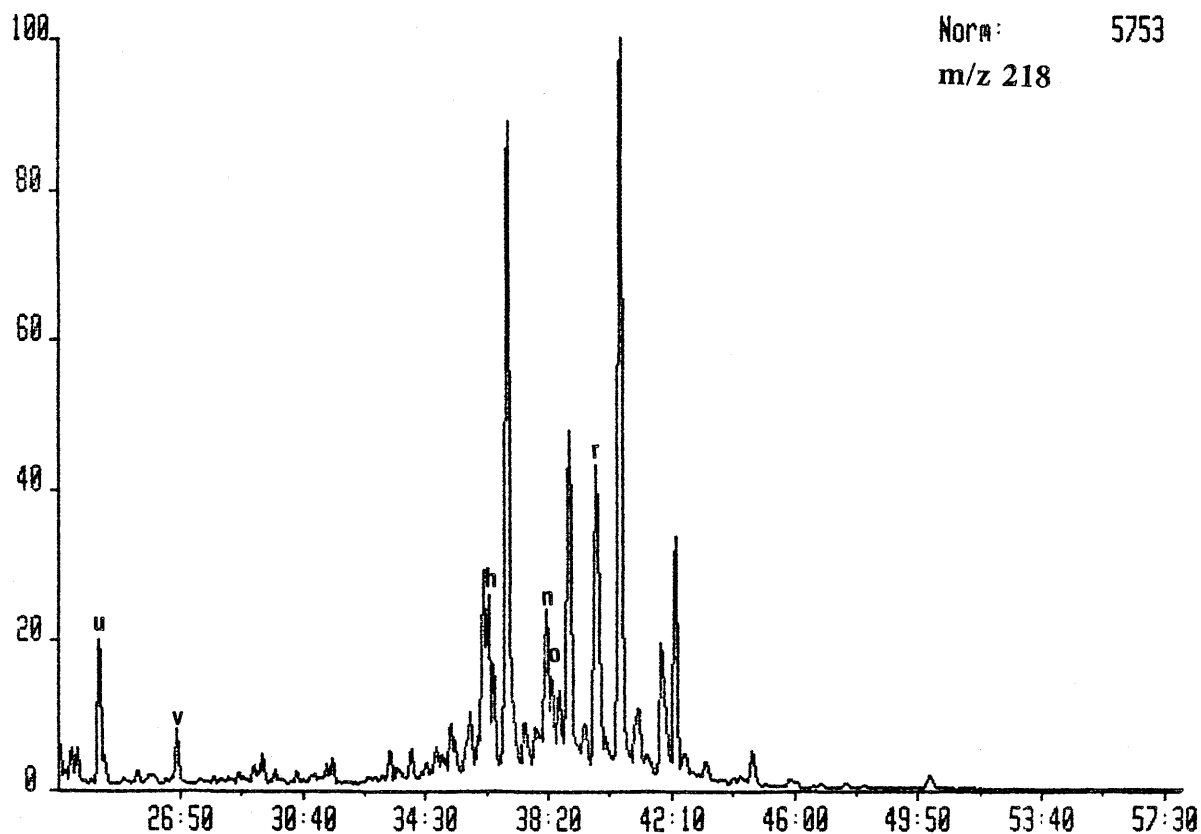
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



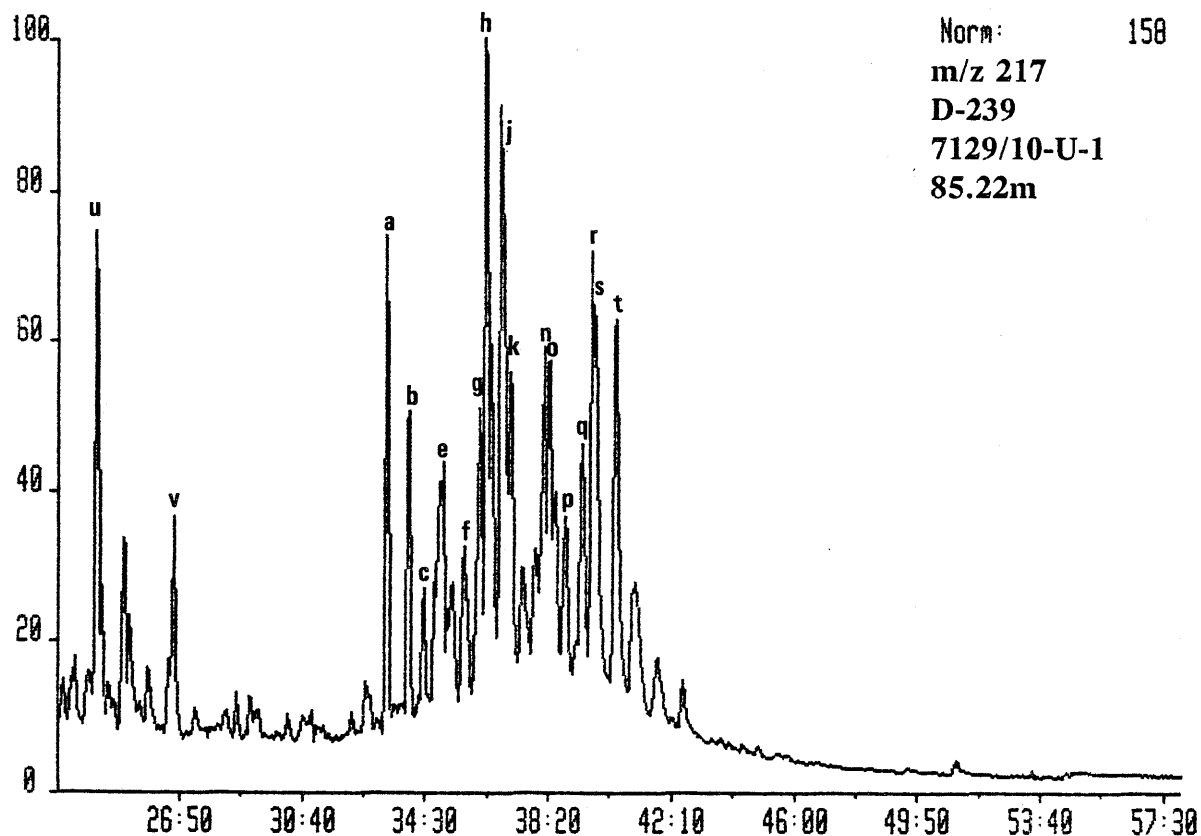
0257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



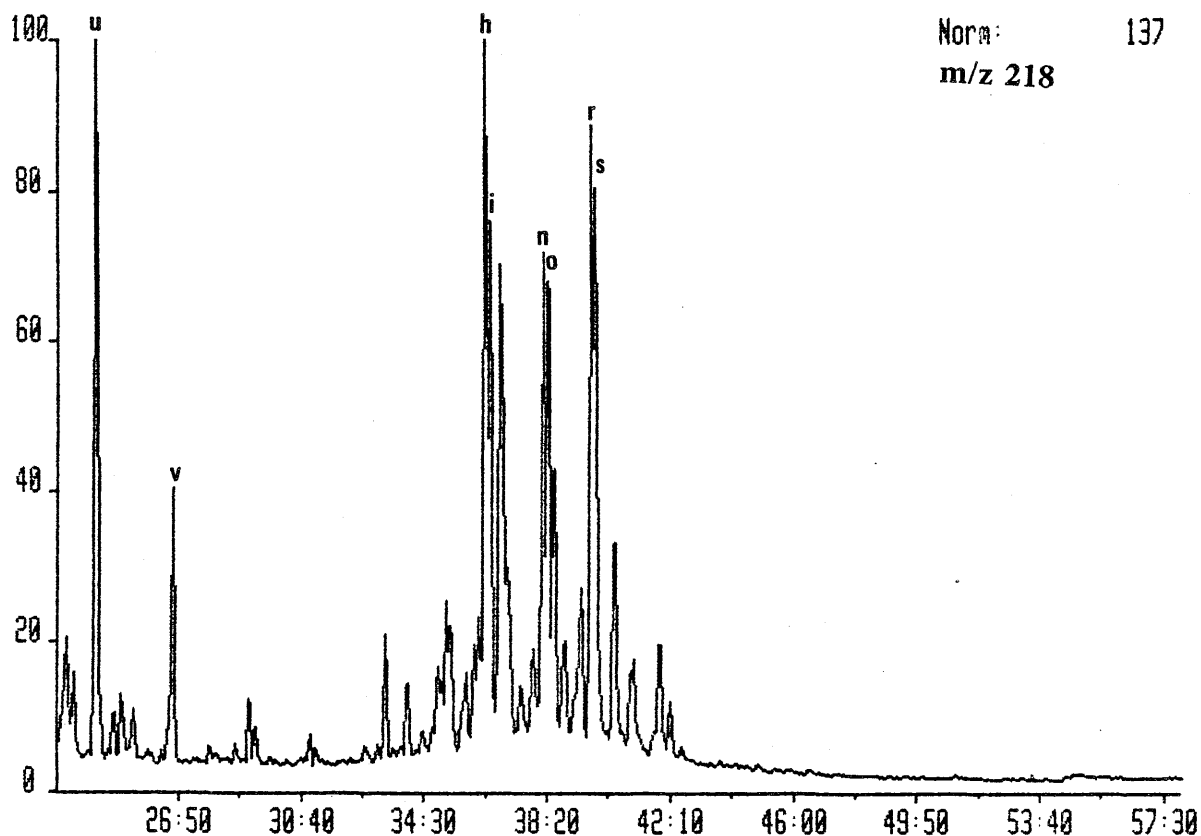
0257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



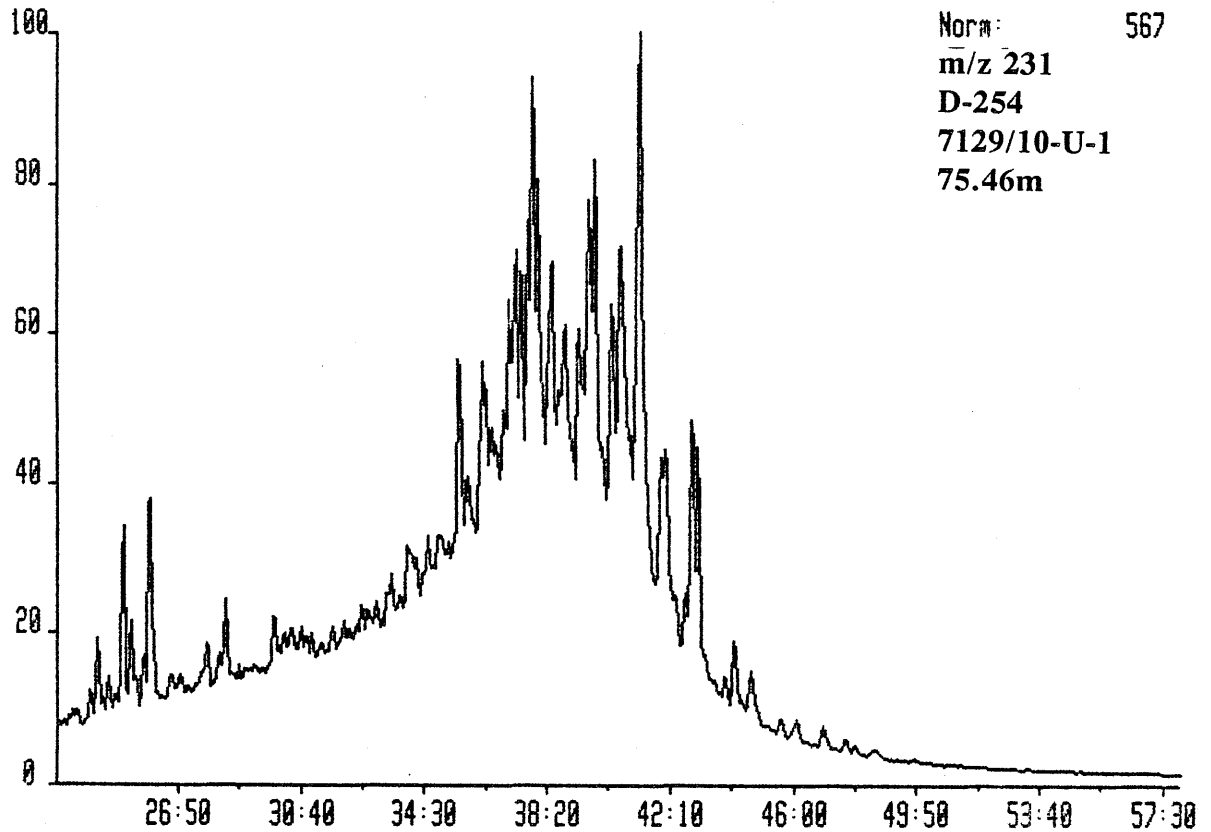
D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:21.3427.23



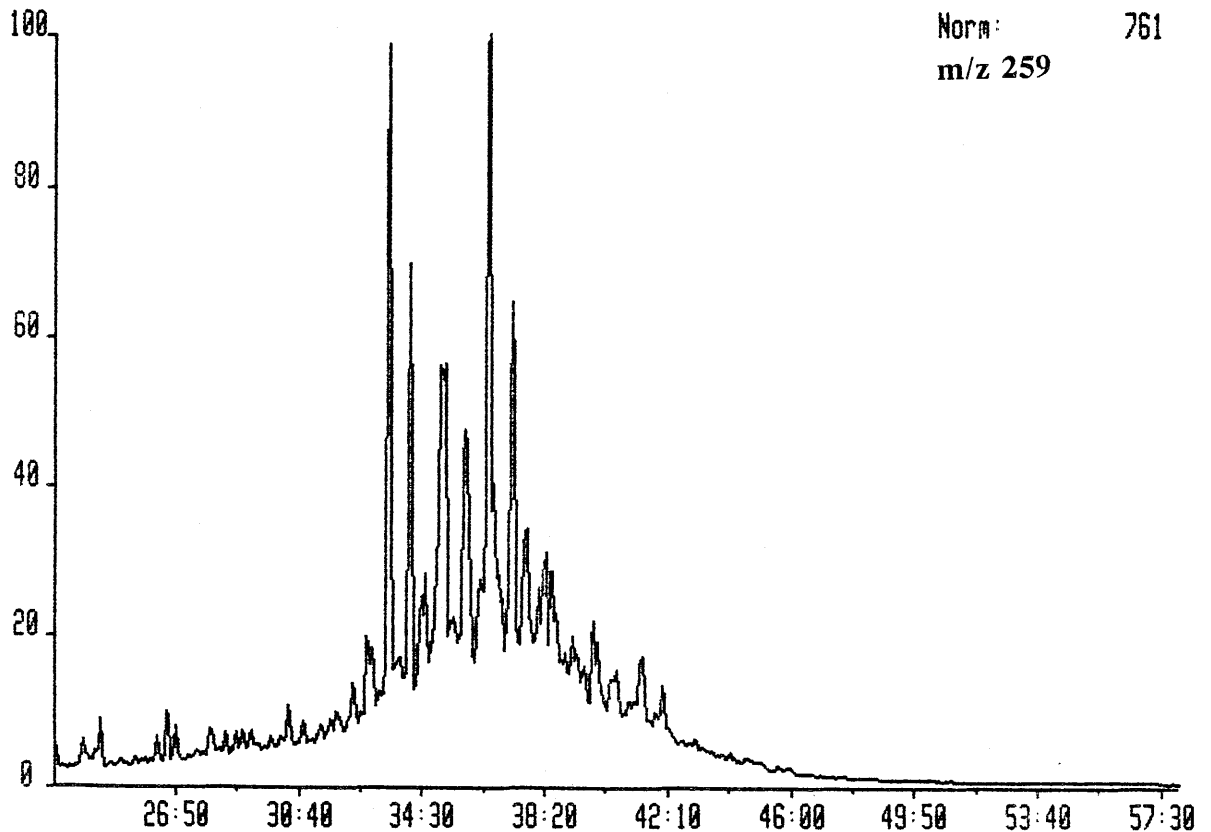
D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:21.3427.23



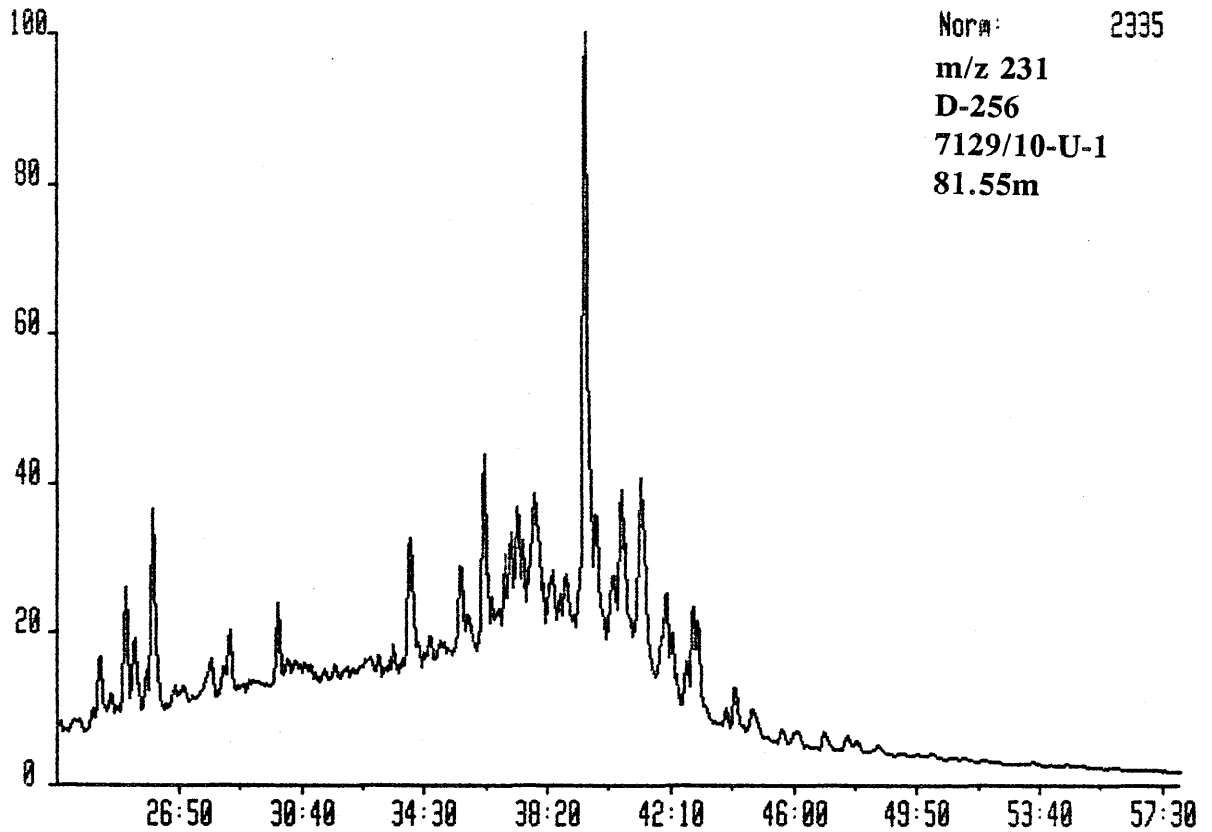
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



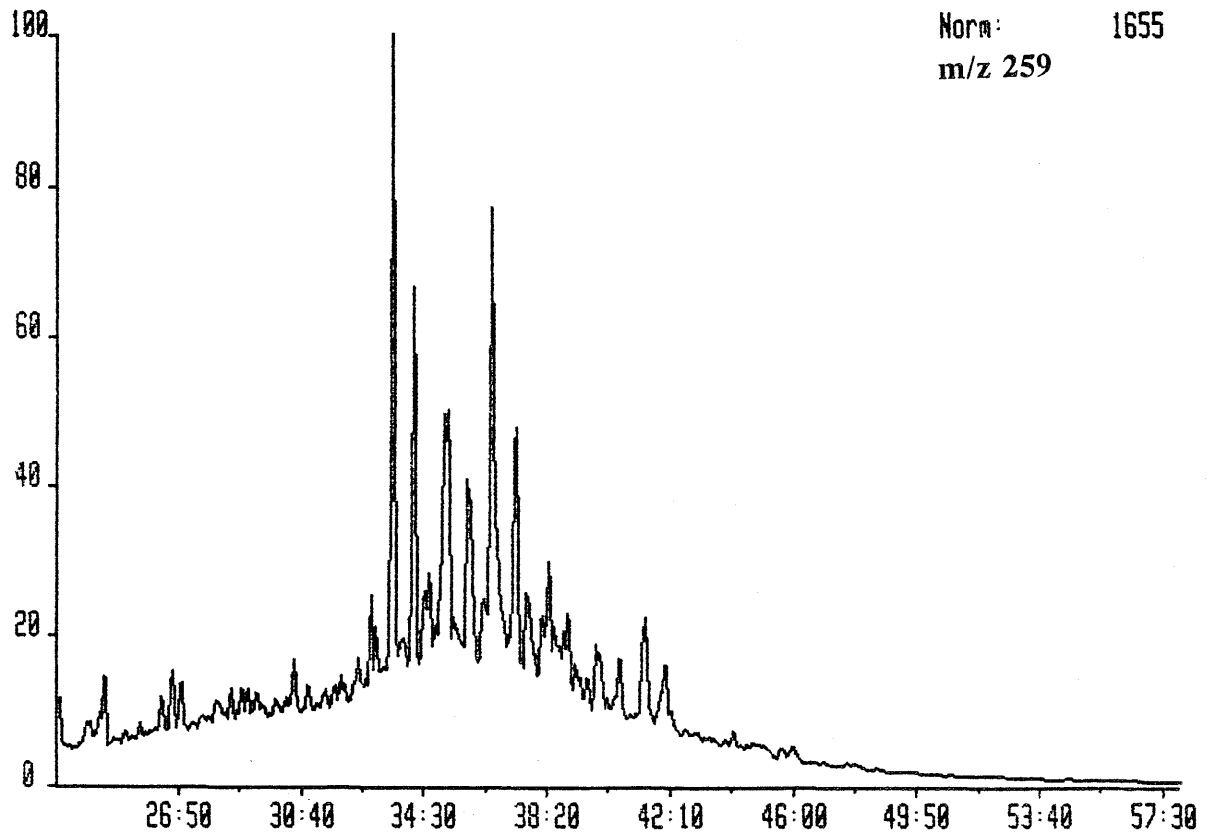
D254SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



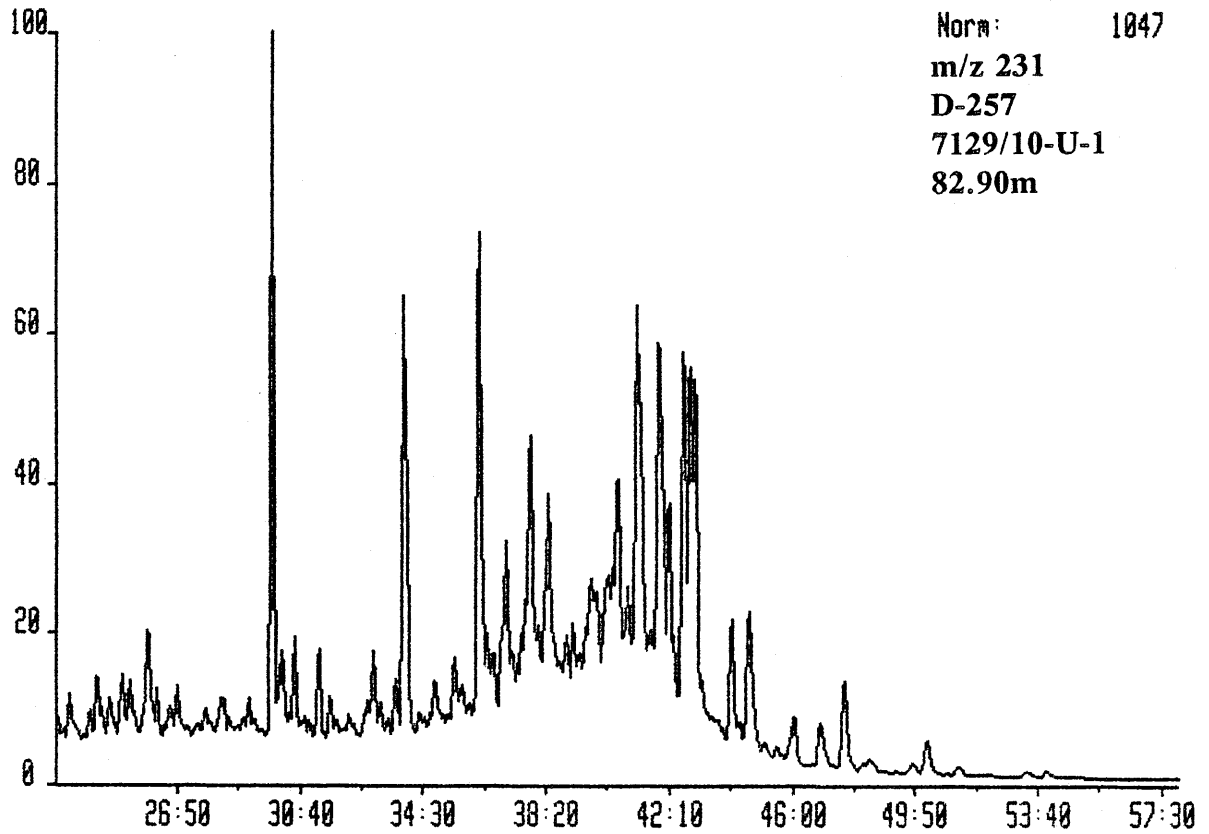
D256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



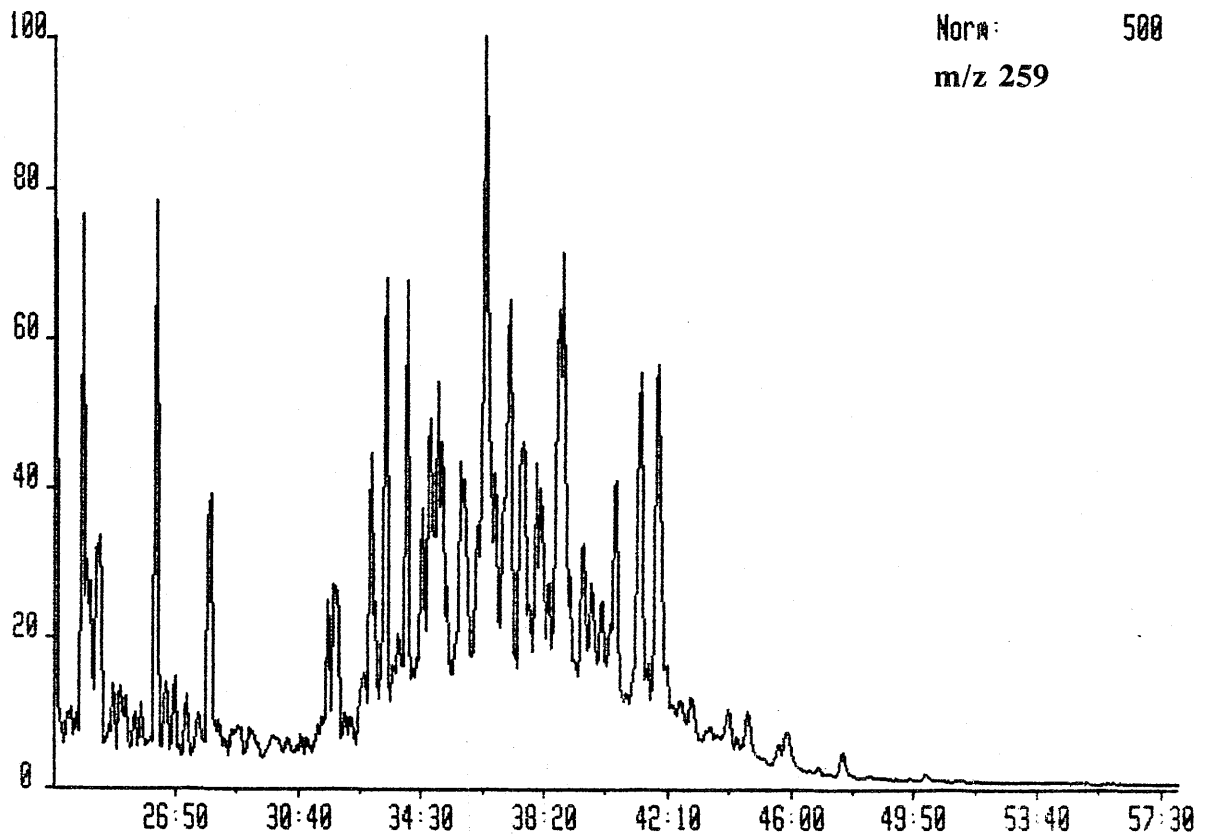
D256SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



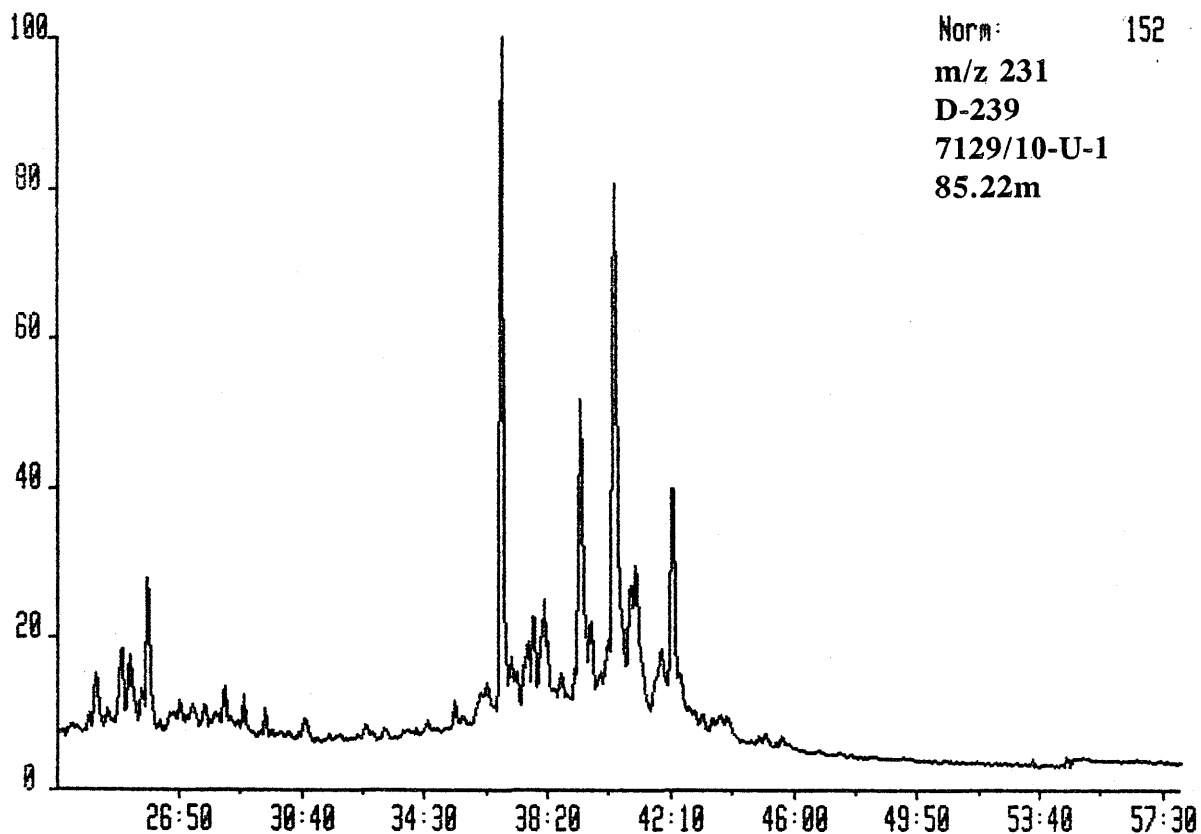
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Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D257SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 231.1000
 Text:21.3427.23



D239SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 259.1000
 Text:21.3427.23

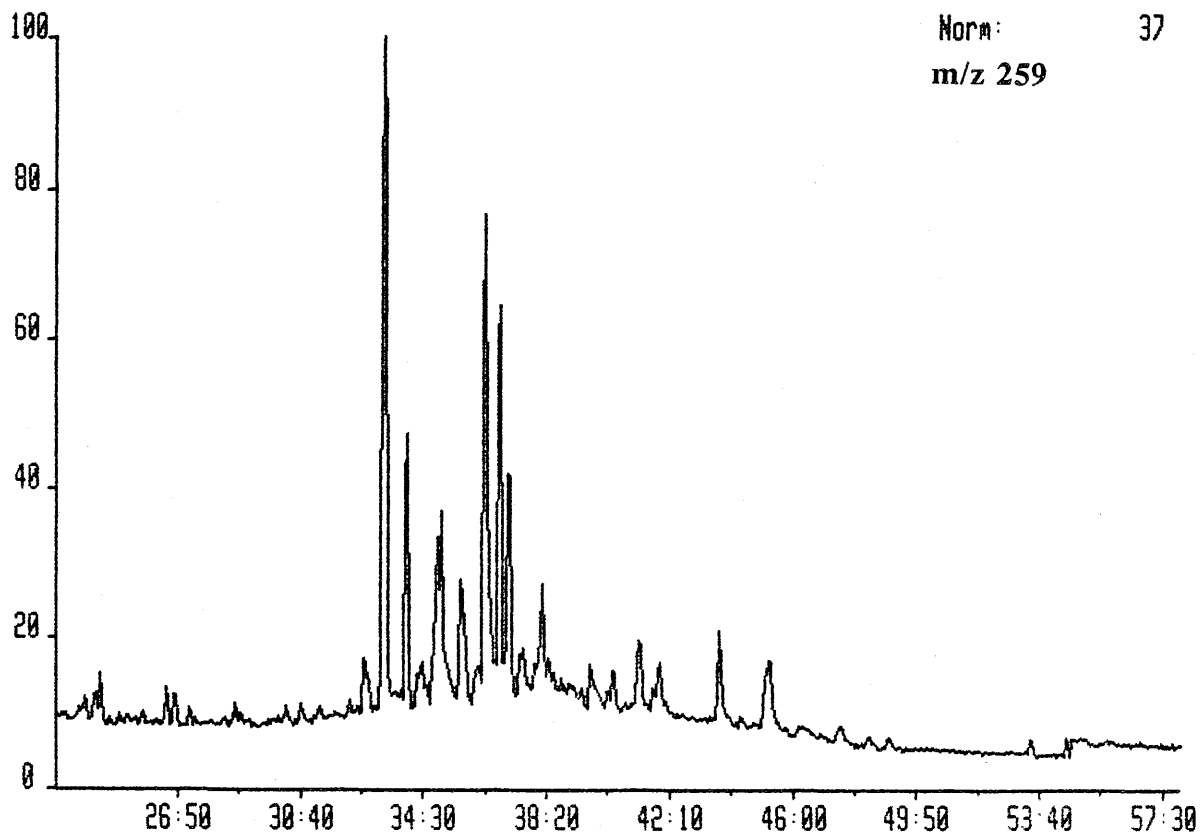


Figure A.II.3.5: Vitrinite reflectance histograms.

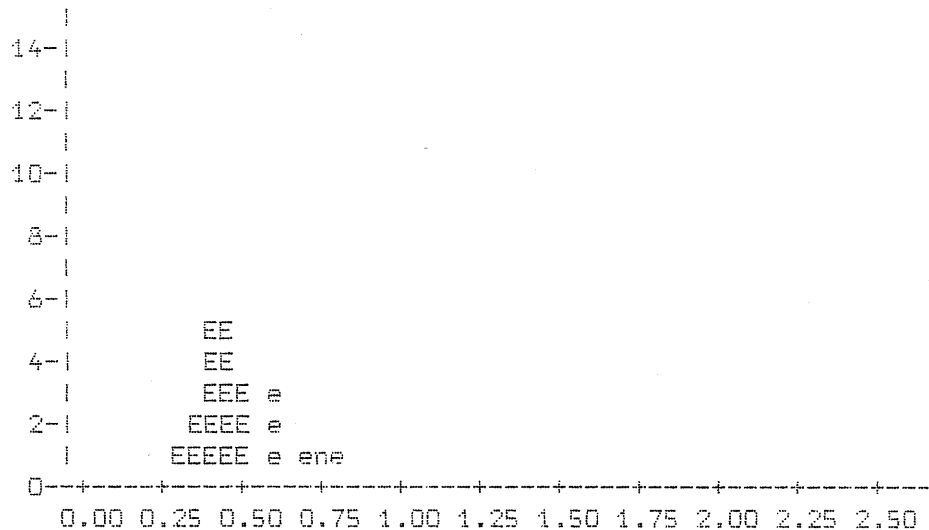
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

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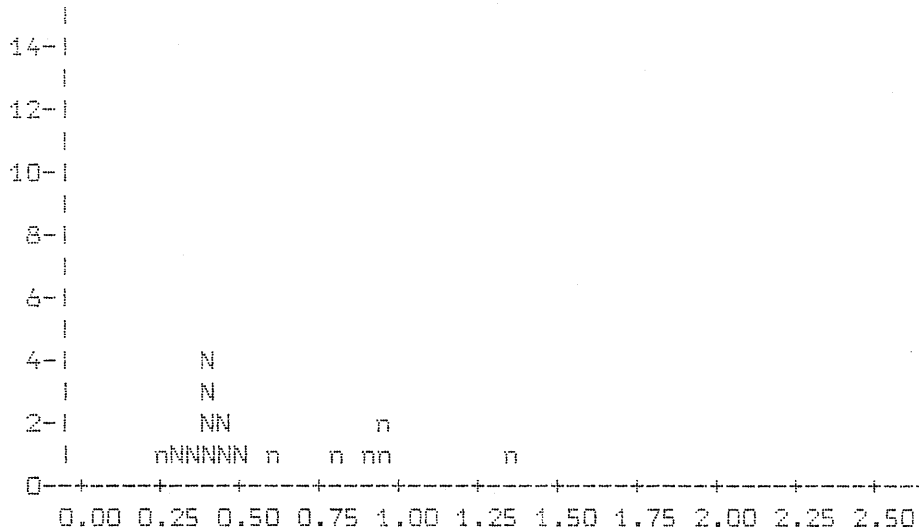


PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.32 0.55 ALL 16 0.44 0.06
 N 0.62 0.81 ALL 6 0.69 0.08
 OVERALL 22 0.51 0.13

ORDERED VALUES FOLLOW:

0.32E 0.38E 0.38E 0.40E 0.41E 0.42E 0.44E 0.44E 0.46E 0.46E 0.46E
 0.46E 0.49E 0.51E 0.54E 0.54E 0.62e 0.62e 0.62e 0.73e 0.75n 0.80e

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PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.31	0.52	ALL	9	0.43	0.06
N	0.28	0.29	ALL	1	0.28	0.00
N	0.60	1.00	ALL	5	0.86	0.16
OVERALL				16	0.61	0.31

ORDERED VALUES FOLLOW:

0.28n 0.31N 0.37N 0.40N 0.41N 0.43N 0.43N 0.48N 0.49N 0.51N 0.60n
 0.82n 0.91n 0.96n 0.99n 1.39n

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Core 7230/05-U-06

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Table A.II.4.3:	Vitrinite reflectance data.
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Figure A.II.4.6:	Vitrinite reflectance histograms.

Core 7230/05-U-06

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I	D 0390	36.48	280269						280269		0.00	*****	I
I	D 0398	40.97	232263						232263		0.00	*****	I
I	D 0407	45.67	33954	313					34267	313	0.91	*****	I
I	D 0418	49.84	21404						21404		0.00	*****	I
I	D 0422	51.37	22169						22169		0.00	*****	I
I	D 0427	54.87	20703						20703		0.00	*****	I
I	D 0434	60.92	19532	326					19858	326	1.64	*****	I
I	D 0442	67.00	20570						20570	.	0.00	*****	I
I	D 0470	88.37	17359						17359		0.00	*****	I

Table A.II.4.1b

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4
I	no.	m							C1-C4	C2-C4	NESS	-----
I											(%)	nC4
I	D 0390	36.48	27500	2942	4368			8603	34810	7310	21.00	*****
I	D 0398	40.97	324	29	43				396	71	18.06	*****
I	D 0407	45.67	1159	45	24	19			1246	87	6.97	*****
I	D 0418	49.84	341	32	34				407	66	16.22	*****
I	D 0422	51.37	584	37	47	14		51	682	98	14.34	*****
I	D 0427	54.87	1084	71	41	6	3	132	1204	120	9.99	2.14
I	D 0434	60.92	2830	104	110	42			3086	256	8.31	*****
I	D 0442	67.00	1073	53	61	13			1200	127	10.57	*****
I	D 0470	88.37	630	47	70				747	116	15.60	*****

Table A.II.4.1c

Core 7230/05-U-06

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	
	no.	m							C1-C4	C2-C4	NESS	-----	
											(%)	nC4	
I	D 0390	36.48	307769	2942	4368			8603	315079	7310	2.32	*****	I
I	D 0398	40.97	232587	29	43				232659	71	0.03	*****	I
I	D 0407	45.67	35113	358	24	19			35513	400	1.13	*****	I
I	D 0418	49.84	21745	32	34				21811	66	0.30	*****	I
I	D 0422	51.37	22753	37	47	14		51	22851	98	0.43	*****	I
I	D 0427	54.87	21787	71	41	6	3	132	21907	120	0.55	2.14	I
I	D 0434	60.92	22362	431	110	42			22944	583	2.54	*****	I
I	D 0442	67.00	21643	53	61	13			21770	127	0.58	*****	I
I	D 0470	88.37	17989	47	70				18106	116	0.64	*****	I

Table A.II.4.2

Core 7230/05-U-06

DATA FROM ROCK EVAL PYROLYSIS

IKU No.	DEPTH m/ft	S1 (mg/g ROCK)	S2 (mg/g ROCK)	S3 (mg/g ROCK)	TOC (%)	HYDR. INDEX (mg/g TOC)	OXYGEN INDEX	PETROLEUM POTENTIAL S1+S2	PROD. INDEX S1+S2	TEMP. MAX (C)
D 1998	29.04	1.38	2.00	3.69	14.07	14	26	3.38	0.41	401
D 1999	32.02	0.61	36.70	1.69	16.60	221	10	37.31	0.02	436
D 390	36.48	0.10	0.00	0.02	0.28	0	7	0.10	1.00	448
D 1996	37.89	0.20	0.73	1.91	15.09	5	13	0.93	0.22	418
D 1995	38.15	0.21	1.97	0.71	3.45	57	21	2.18	0.10	436
D 398	40.97	****	****	****	0.26	*****	****	*****	*****	***
D 403	41.44	****	****	****	0.16	*****	****	*****	*****	***
D 407	45.67	****	****	****	0.20	*****	****	*****	*****	***
D 418	49.84	0.19	5.37	0.30	3.86	139	8	5.56	0.03	431
D 422	51.37	****	****	****	0.39	*****	****	*****	*****	***
D 427	54.87	0.09	0.18	0.20	0.64	28	31	0.27	0.33	433
D 434	60.92	0.16	0.06	0.42	0.56	11	75	0.22	0.73	446
D 442	67	0.14	0.25	3.55	0.88	28	403	0.39	0.36	445
D 457	76.08	****	****	****	1.46	*****	****	*****	*****	***
D 470	88.37	0.19	0.13	0.38	0.71	18	54	0.32	0.59	360
D 479	92.88	****	****	****	0.52	*****	****	*****	*****	***
D 481	94.03	****	****	****	0.48	*****	****	*****	*****	***

DATE : 26 - 2 - 88.

Table A.II.4.3

Core number: 7230/05-U-06
Reference number: 21.3427.23
(1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-1998	-----	29.04	0.44 (29)	G	0.08	2-3
D-1999	-----	32.02	0.41 (26)	G	0.06	2-5
			0.66 (4)	R	0.05	
D-1996	-----	37.89	0.48 (27)	G	0.07	2?
			0.67 (3)	R	0.02	
D-1995	-----	38.15	0.42 (28)	G	0.06	2?
			0.69 (2)	R	0.01	
D-0421	-----	50.77	0.48 (50)	G	0.07	2-4

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.4.4
Well no.: 7230/05-U-06

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 421	50.77	Am: 15-20% Lm: 5% W+C: 75-80%	F-M-L	Poor	3.5 - 4.5	Sieved*) residue enriched in dark brown/black woody/coaly fragments.
D 1995	38.15	Am: 15-20% Lm: 5% W+C: 75-80%	F-M-L	Poor	3.5 - 4.5	As per sample D 421.
D 1996	37.89	Am: <5% Lm: <5% W+C: >90%	F-M-L	No palynomorphs observed	N.D.P.	Organic residue totally dominated by black opaque angular coaly fragments.
D 1998	29.04	Am: 10-15% Lm: 5-10% W+C: 75-80%	F-M-L	Poor	3.5 - 4.5?	Sieved*) residue enriched in dark brown and black woody and coaly fragments.
D 1999	32.02	Am: 60% Lm: 5-10% W: 15-20% C: 10-15%	F-M-L	Fair	4.0 - 4.5?	Organic residue dominated by dark, degraded, amorphous matter. Significant amount of dark brown, structured, woody phytoclasts and opaque, coaly fragments present. *) Only sieved residue available.

Abbreviations

Am Amorphous

Al Algal material

W Woody material

F Fine

Lm Liptinitic material

C Coaly fragments

M Medium

L Large

Table A.II.4.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7230/05-U-06

I	IKU-No.	DEPTH (m)	Asphaltenes		Polars		I
			(mg)		(mg)		
I							I
I	D 1999	32.02	43.1		13.4		I
I							I
I	D 422	51.37	1.0		0.6		I
I							I

Project no.: 21.3427.23
Well ident.: 7230/05-U-06
DATE : 1 - 3 - 88.

Table A.II.4.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	: : (g)	Rock Extr. (mg)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
D 1999	32.02	:	10.8	58.1	12.7	5.1	17.8	40.3	16.60
D 0422	51.37	:	14.5	2.5	0.8	0.4	1.2	1.3	0.39

Project no.: 21.3427.23
Well ident.: 7230/05-U-06
DATE : 1 - 3 - 88.

Table A.II.4.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

I		:						I
I	IKU-No	DEPTH :	EOM	Sat.	Aro.	HC	Non HC	I
I		(m) :						I
I		:						I
I	D 1999	32.02 :	5405	1181	474	1656	3749	I
I		:						I
I	D 0422	51.37 :	173	58	25	83	90	I
I		:						I

Project no.: 21.3427.23
Well ident.: 7230/05-U-06
DATE : 1 - 3 - 88.

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Table A.II.4.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 1999	32.02	32.6	7.1	2.9	10.0	22.6
D 0422	51.37	44.3	14.9	6.4	21.3	23.1

Project no.: 21.3427.23
Well ident.: 7230/05-U-06
DATE : 1 - 3 - 88.

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Table A.II.4.9

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 1999	32.02	:	21.9	8.8	30.6	249.0	69.4	44.2	I
I			:							I
I	D 0422	51.37	:	33.6	14.4	48.0	233.3	52.0	92.3	I
I			:							I

Table A.II.4.10

Core 7230/05-U-06

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	: PRISTANE	PRISTANE	PHYTANE	A	n-C17				I
I IKU No.	:	-----	A= -----	B= -----	---	-----	CPI	CPI		I
I	(m)	: PHYTANE	n-C17	n-C18	B	n-C27	1	2		I
I	:									I
I D 1999	32.02	: 5.4	1.9	0.3	5.8	0.4	2.1	2.2		I
I	:									I
I D 0422	51.37	: 2.1	2.2	0.6	3.6	0.1	1.3	1.4		I
I	:									I

DATE : 29 - 2 - 88.

Table A.II.4.11a:

Molecular ratios from sterane and terpane mass chromatograms.
Maturity ratios.

Core 7230/05-U-06

IKU code	Depth	$\alpha\beta/\alpha\beta+\beta\alpha^{1)}$	%22S ²⁾	% $\beta\beta^{3)}$	%20S ⁴⁾
D-1999	32.02	0.66	34.2	40.0	2.1
D-422	51.37	0.79	34.3	59.2	13.3

- 1) E/E+F in m/z 191
- 2) Average % distribution between first and second eluting isomers of extended hopanes (G-M in m/z 191)
- 3) $2(r+s)/(q+t+2(r+s))$ in m/z 217
- 4) $q/q+t$ in m/z 217

Table A.II.4.11b:

Molecular ratios from terpane and sterane mass chromatograms.
Maturity and source characteristic ratios.

Core 7230/05-U-06

IKU no.	Dept (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-1999	32.02	-	-	0.04	-	0.38
D-422	51.37	0.03	9.50	0.05	-	0.54

- 1) Relative abundance of tricyclic terpanes (Q/E in m/z 191)
- 2) B/A in m/z 191
- 3) Relative abundance of unknown (X/E in m/z 191)
- 4) Relative abundance of bisnorhopane (Z/E in m/z 191)
- 5) Relative abundance of C₂₇ rearranged steranes (a/a+j in m/z 217)

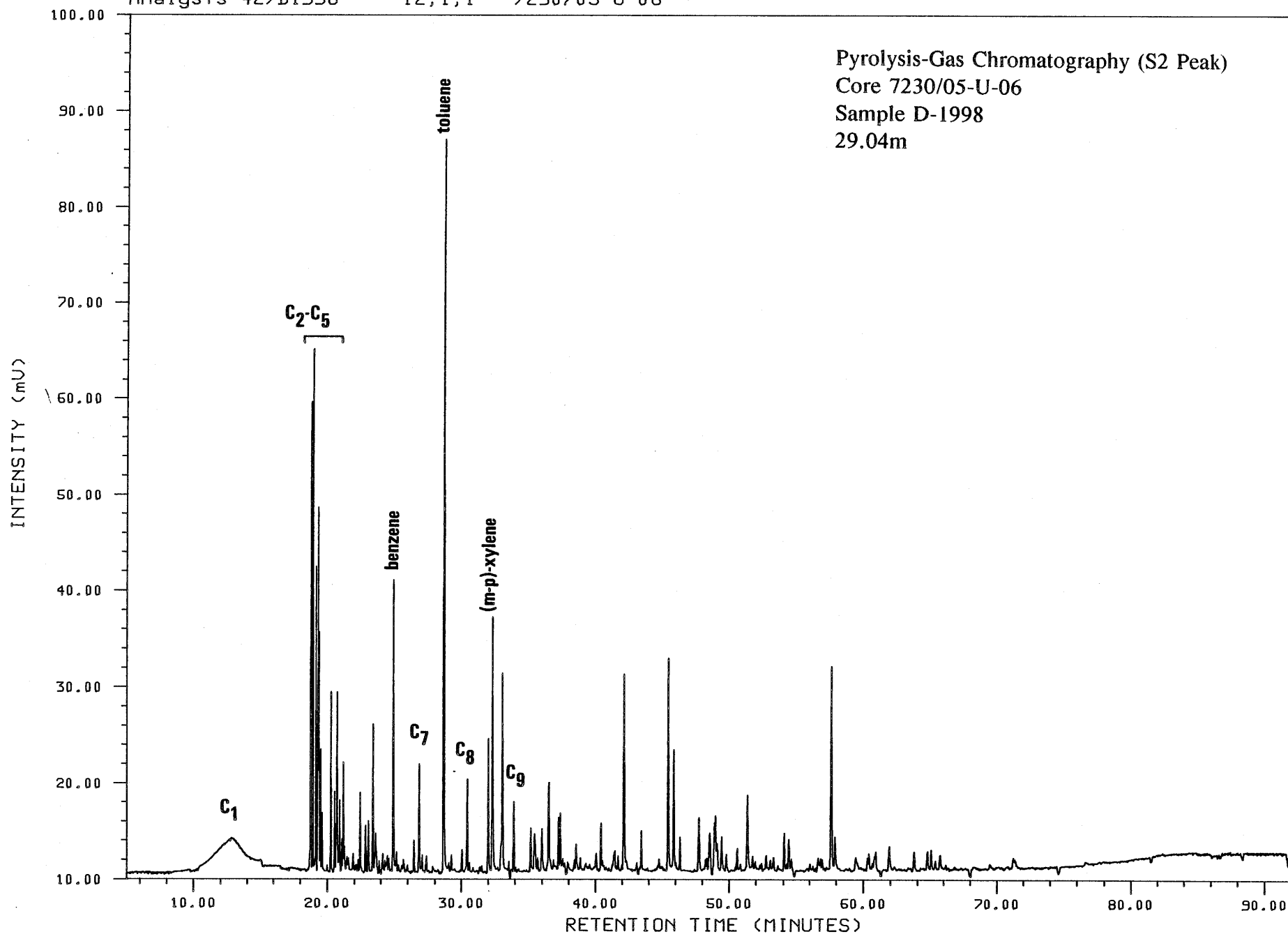
Figure A.II.4.1:

Pyrolysis-gas chromatograms (S2 peak)

Analysis 427D1998

12,1,1

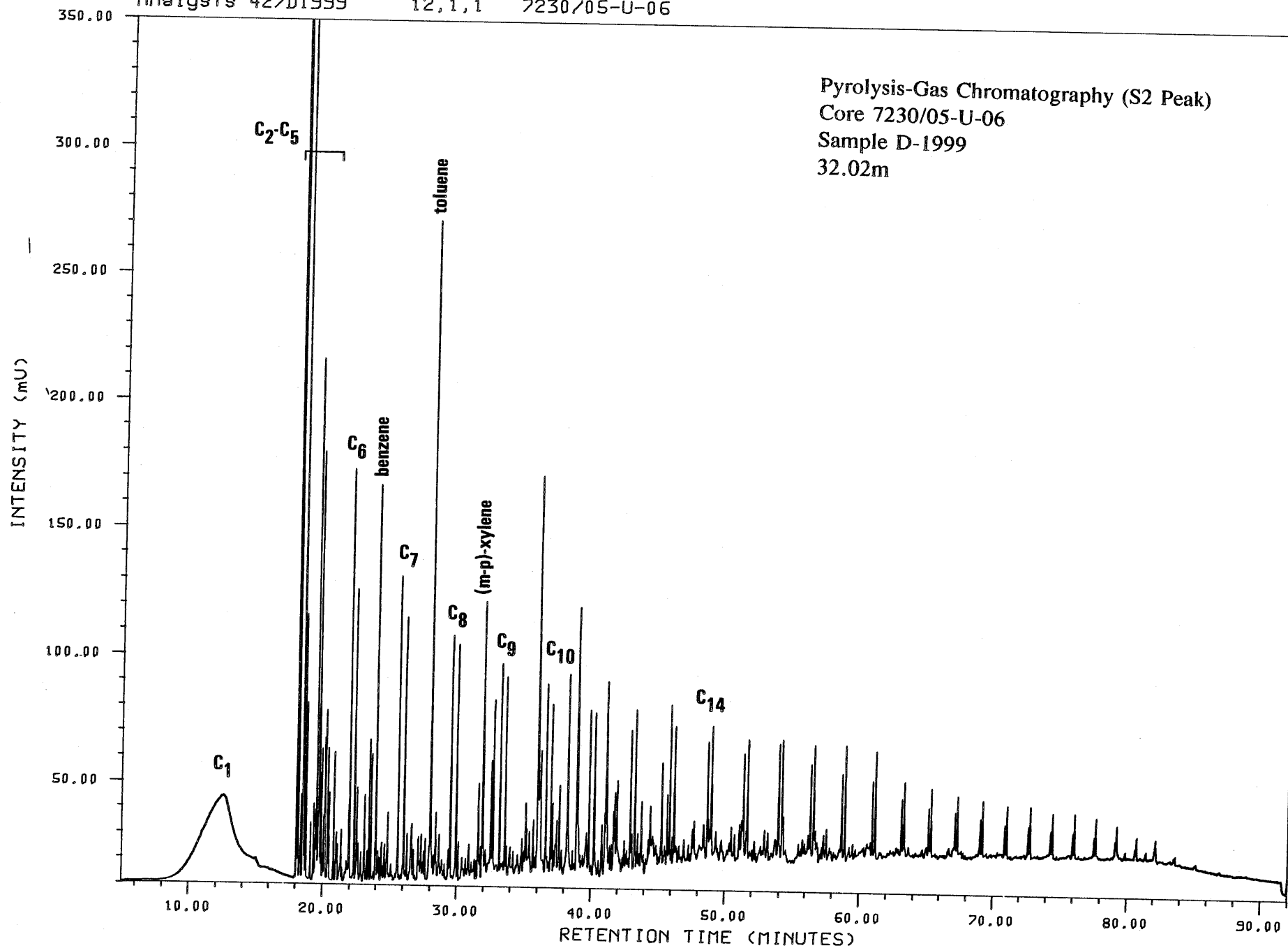
7230/05-U-06



Analysis 427D1999

12,1,1

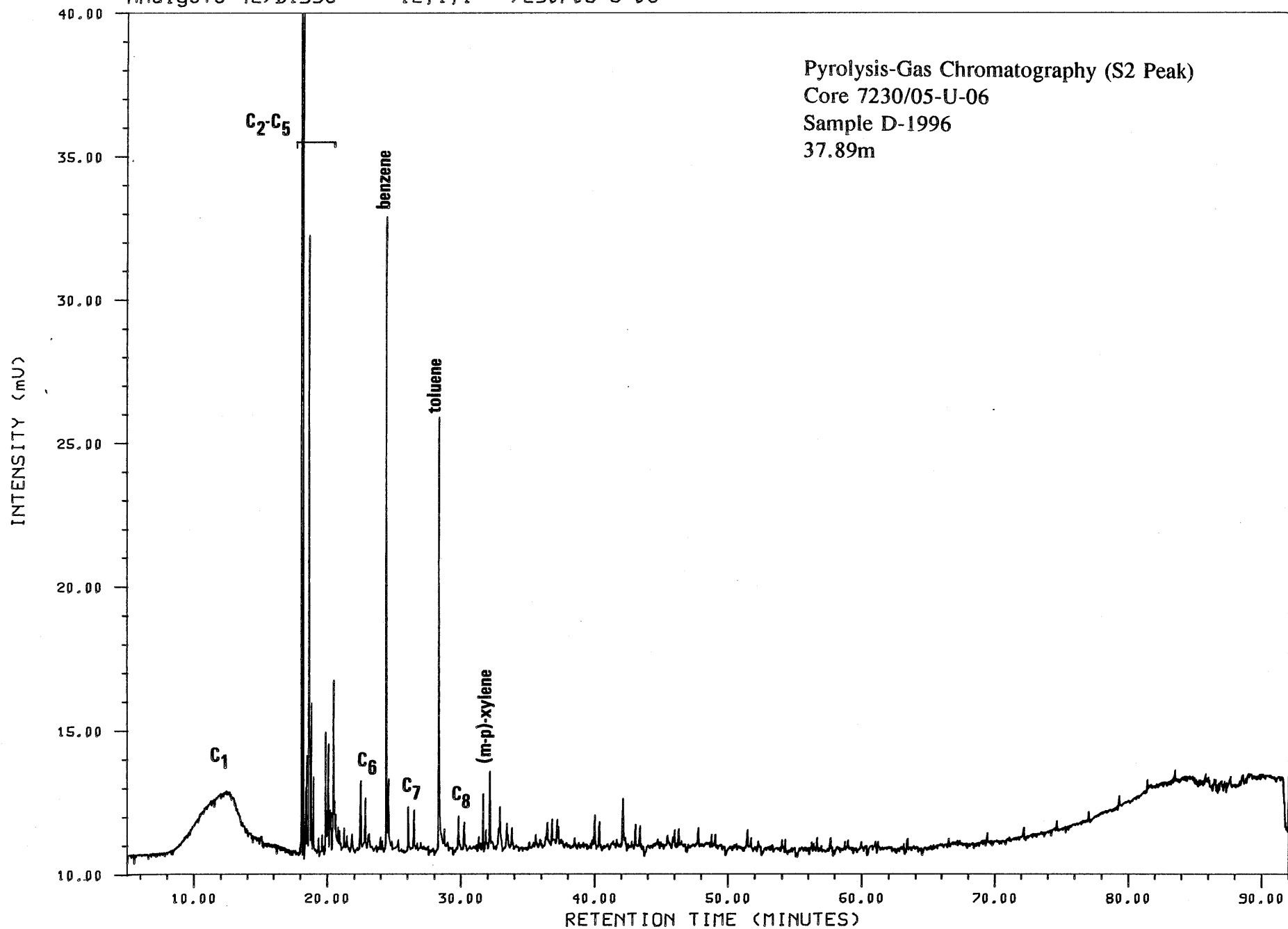
7230/05-U-06



Analysis 427D1996

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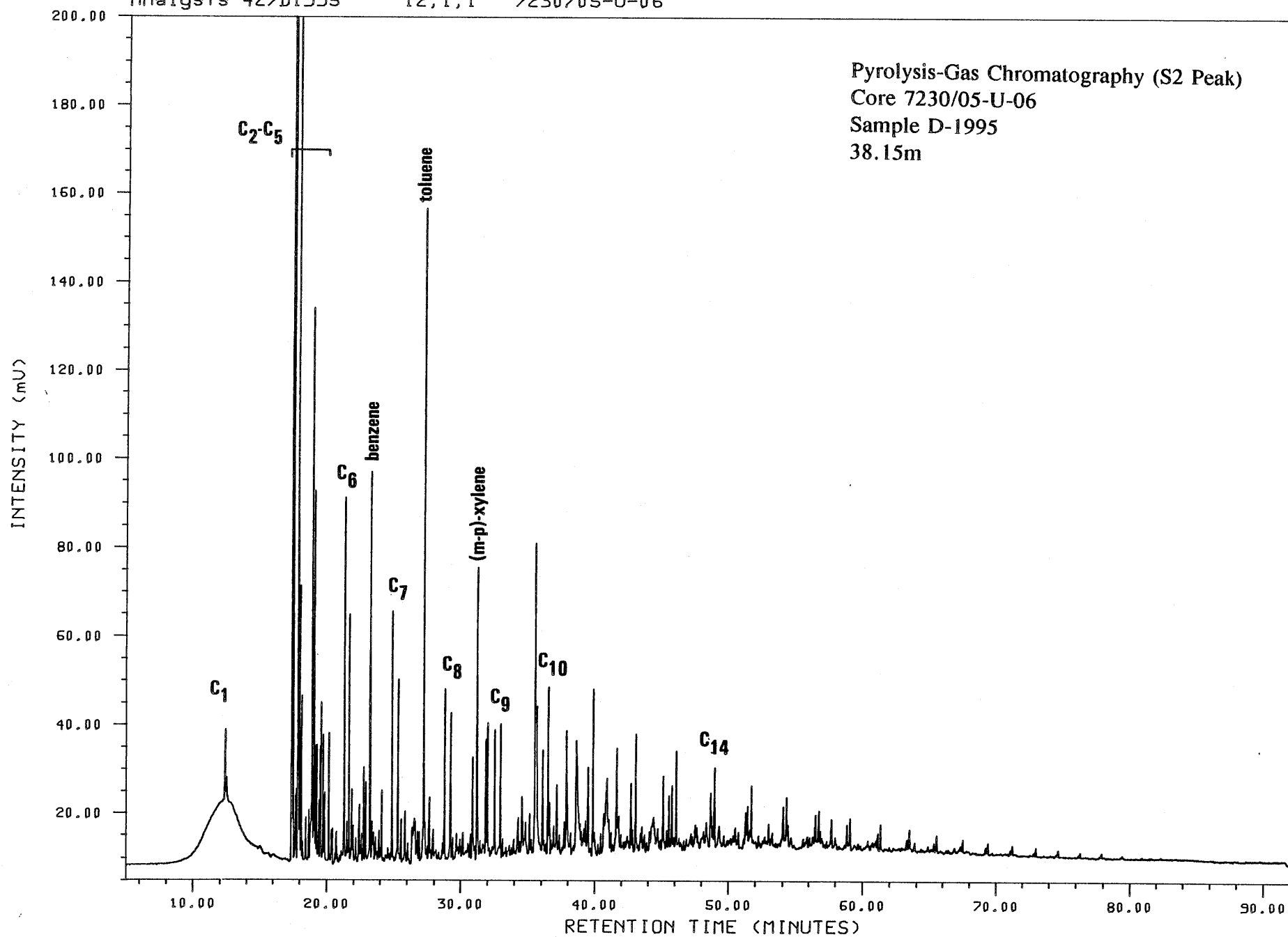
7230/05-U-06



Analysis 427D1995

12,1,1

7230/05-U-06



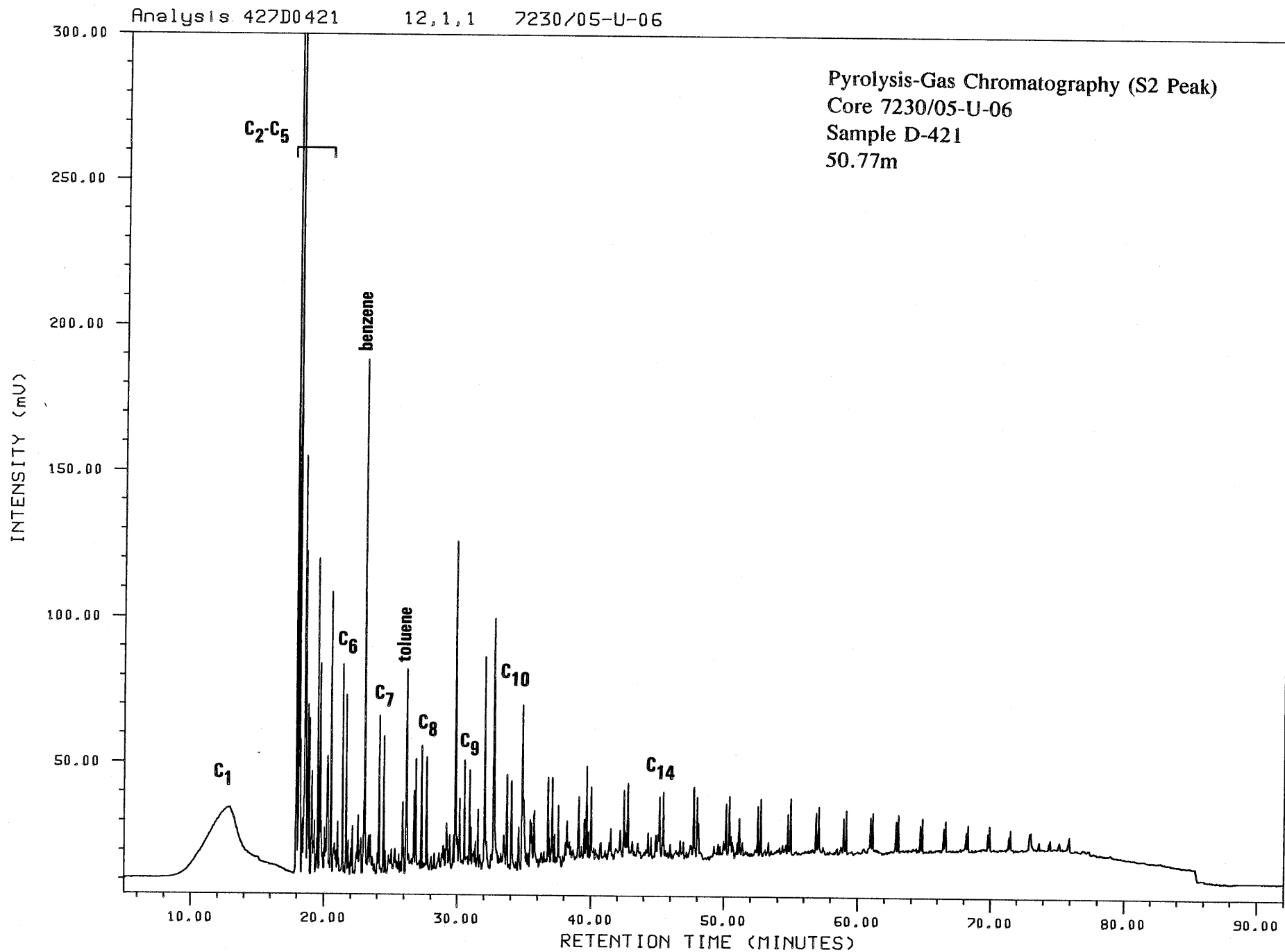


Figure A.II.4.2:

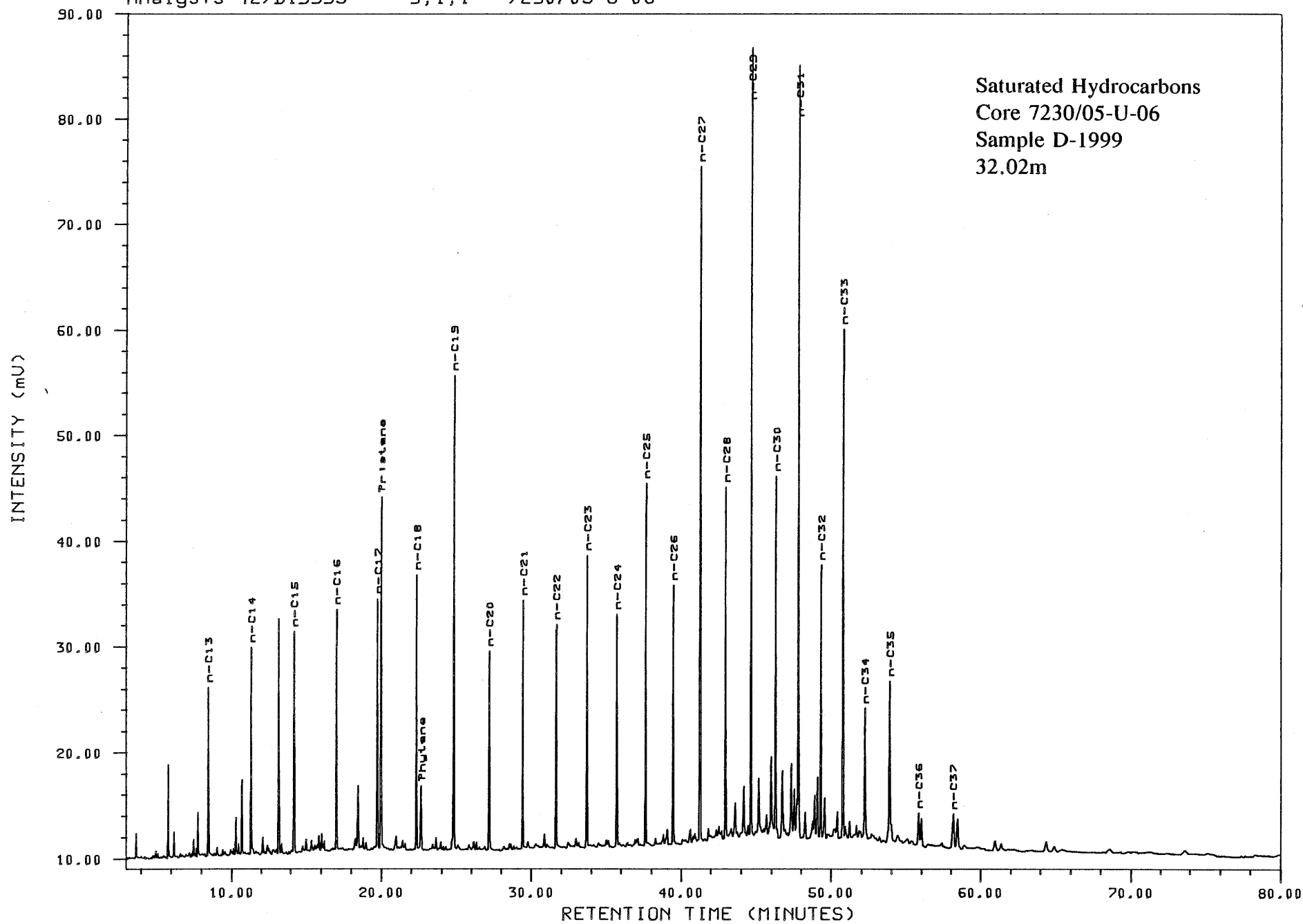
Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D1999S

3,1,1

7230/05-U-06



Analysis 427D0422S

2,1,1

7230/05-U-06

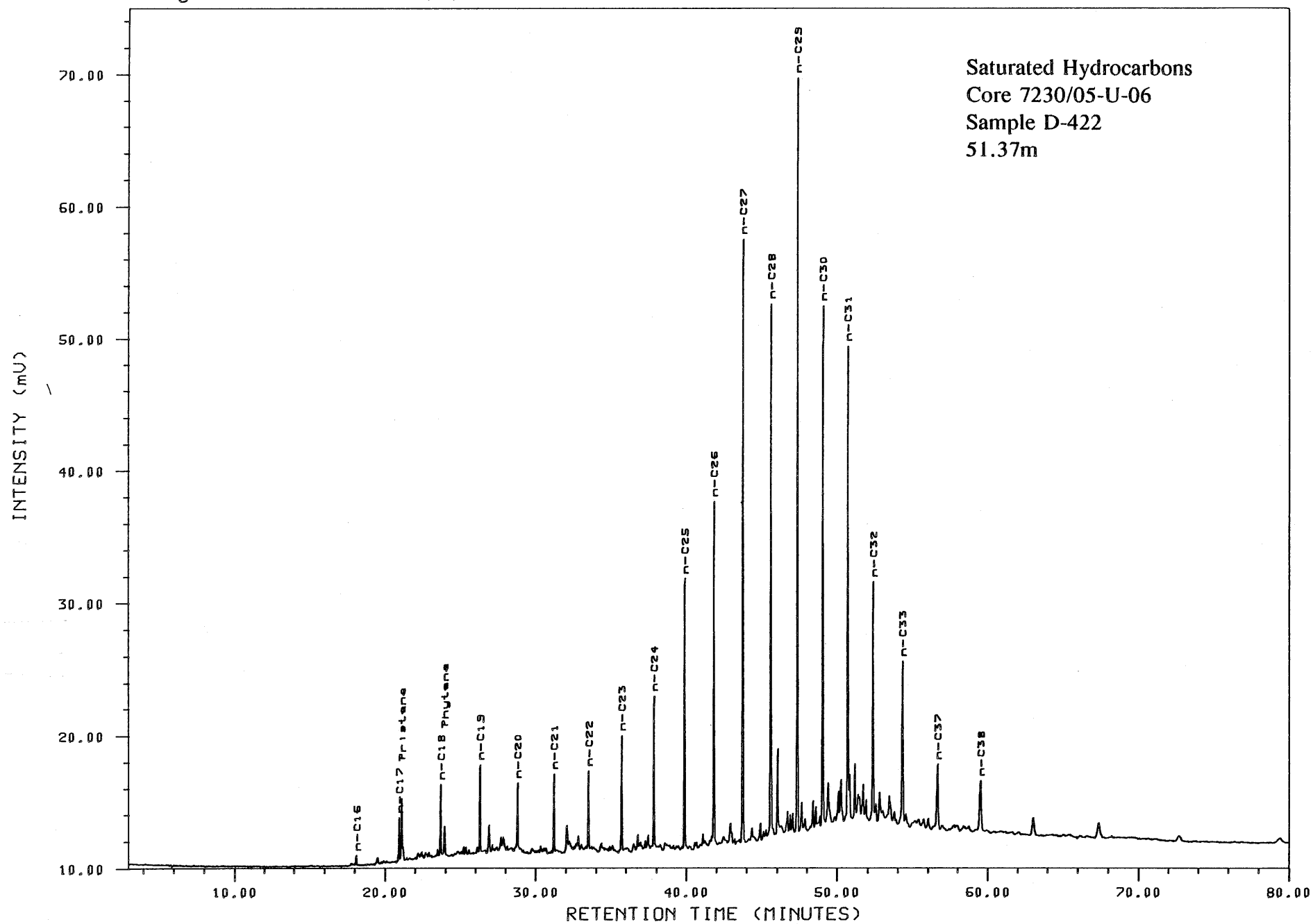
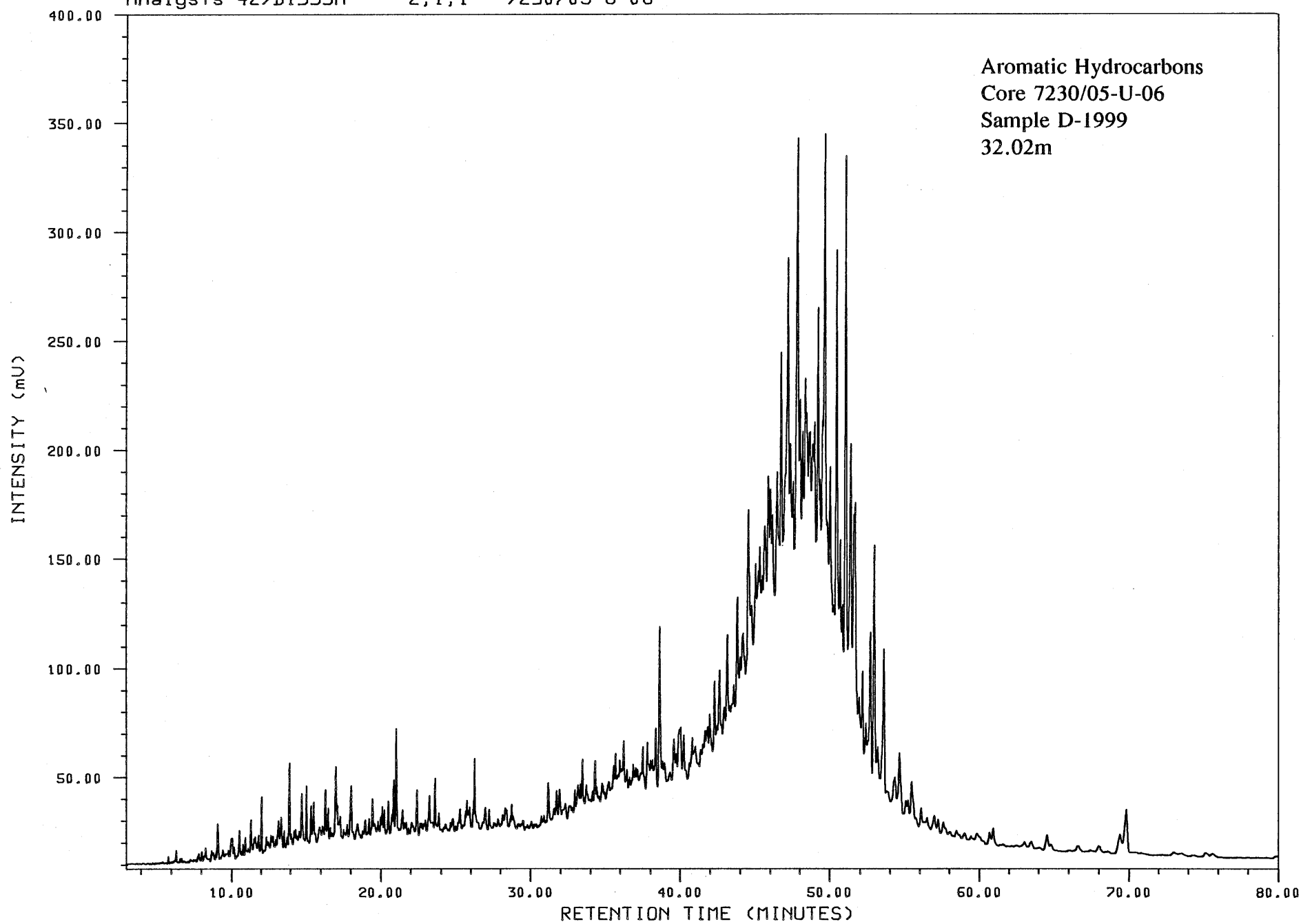


Figure A.II.4.3:

Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

Analysis 427D1999A 2,1,1 7230/05-U-06



Analysis 427D0422A 2,1,1 7230/05-U-06

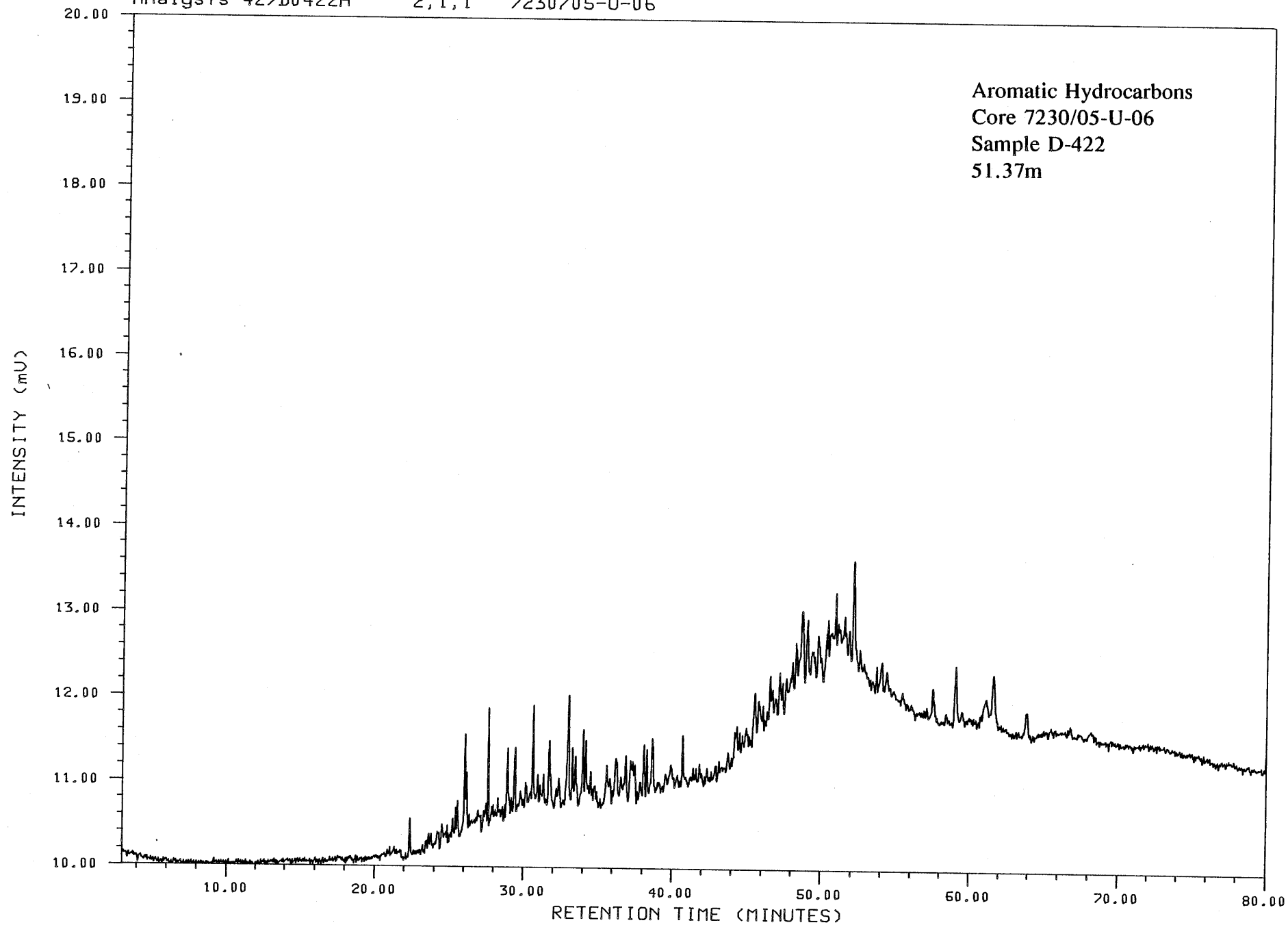
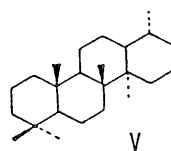
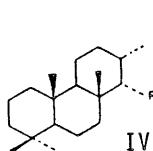
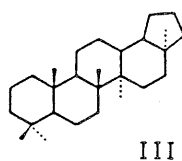
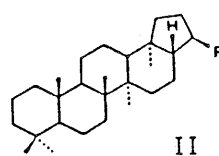
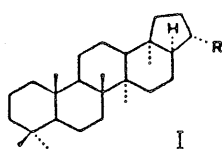


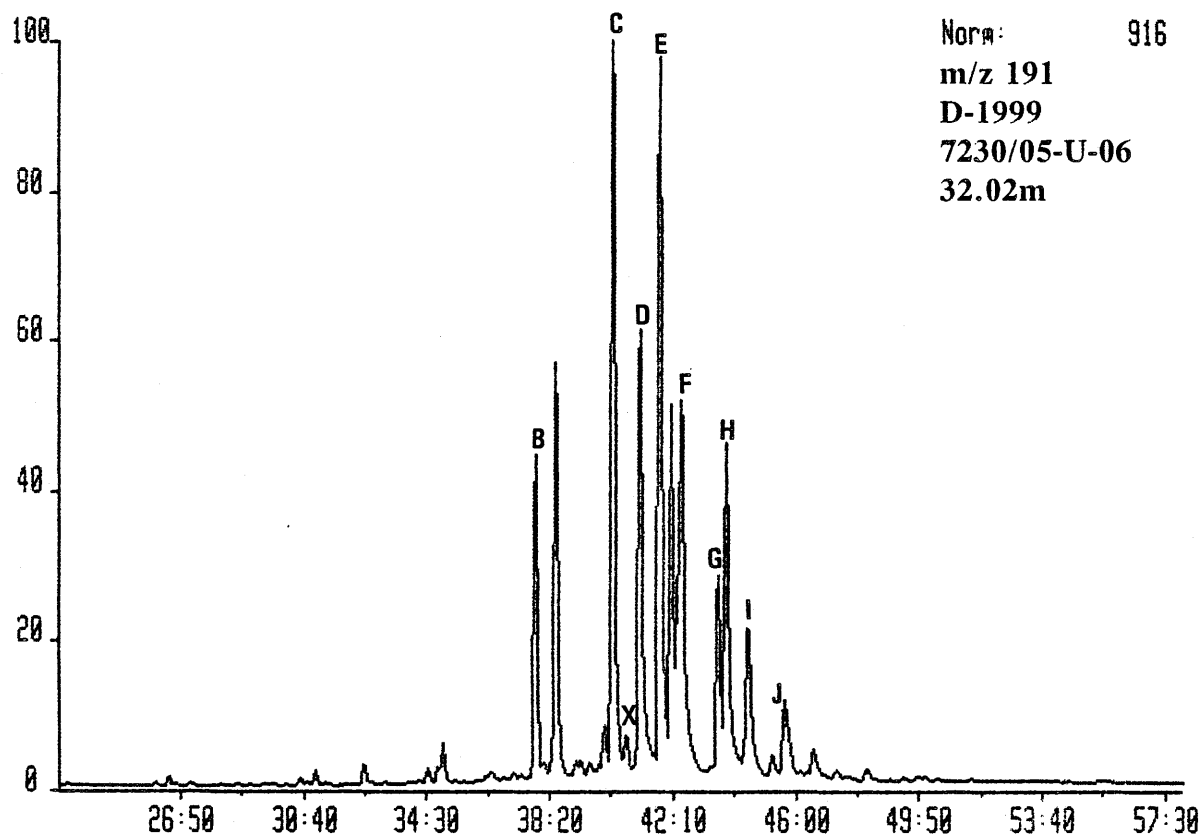
Figure A.II.4.4:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

P	tricyclic terpane	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trisorneohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trisnorhopane	$C_{27}H_{46}$	(I, R=H)
Z	bisnorhopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})

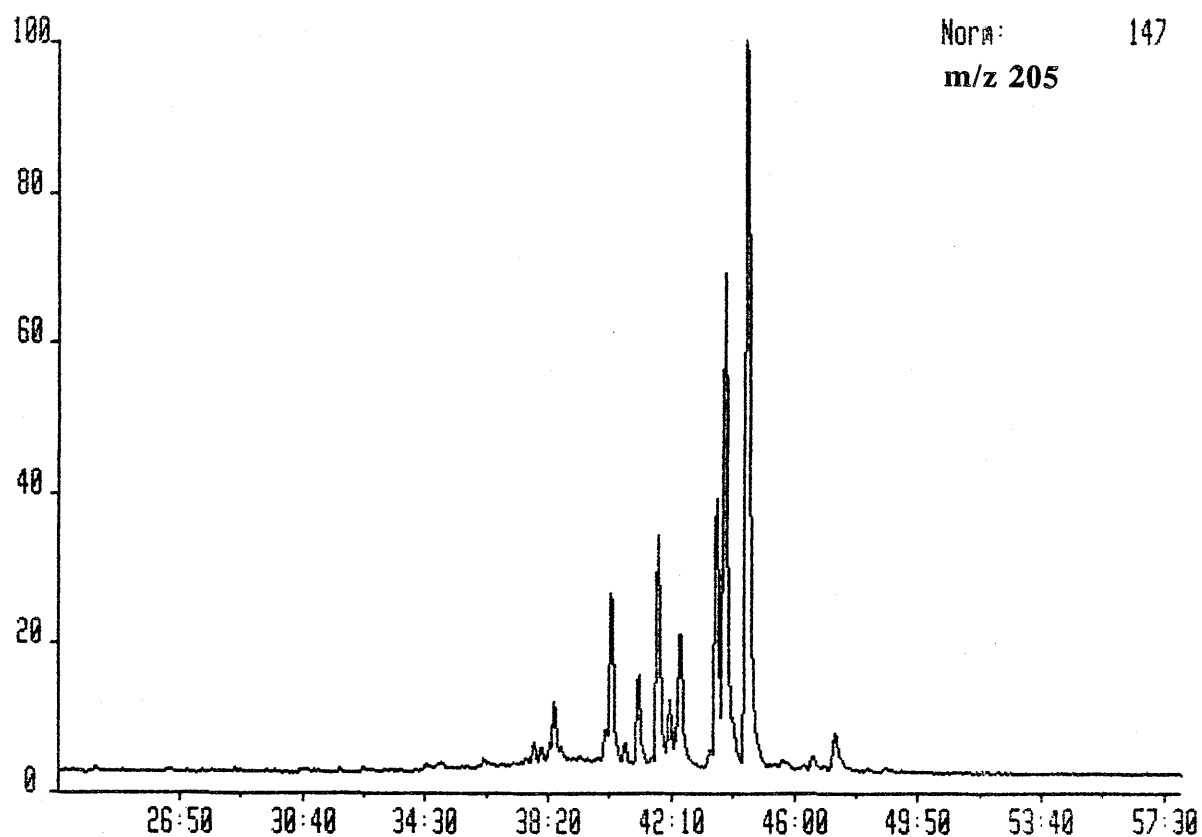


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Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



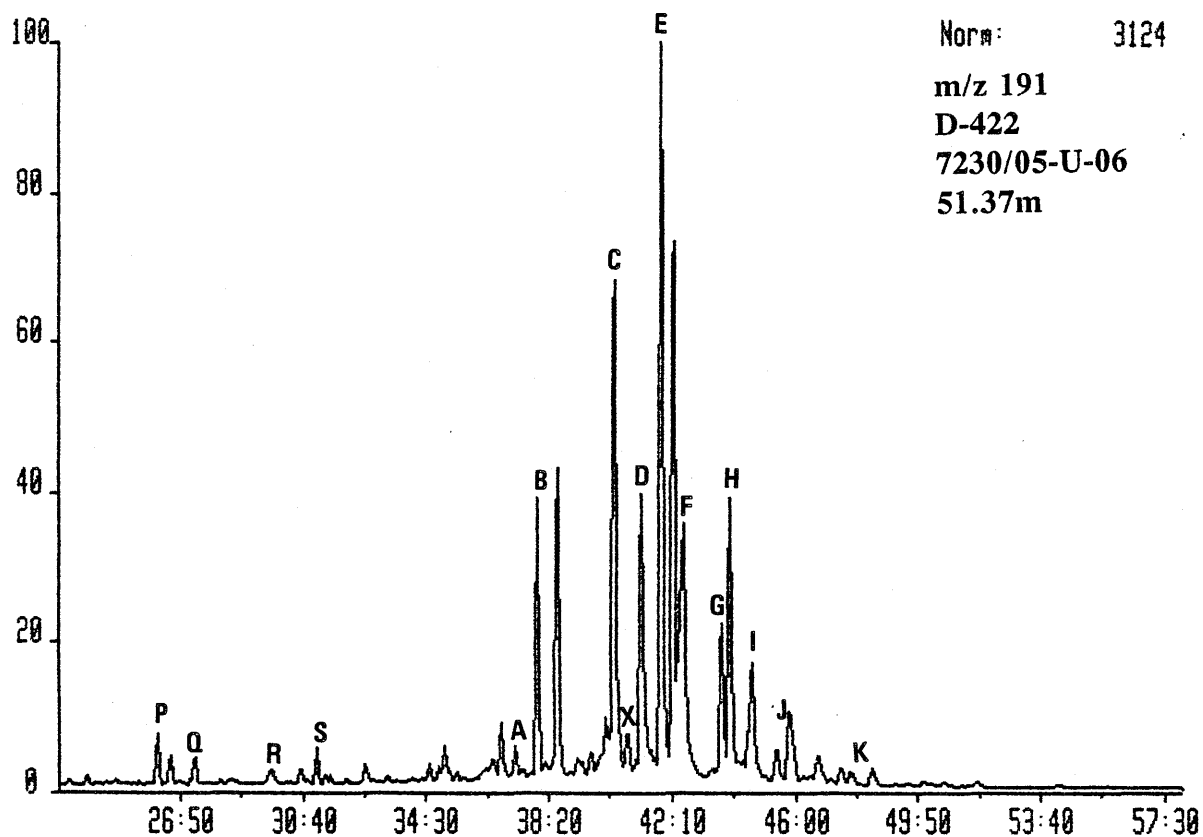
Norm: 916
m/z 191
D-1999
7230/05-U-06
32.02m

D1999SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23

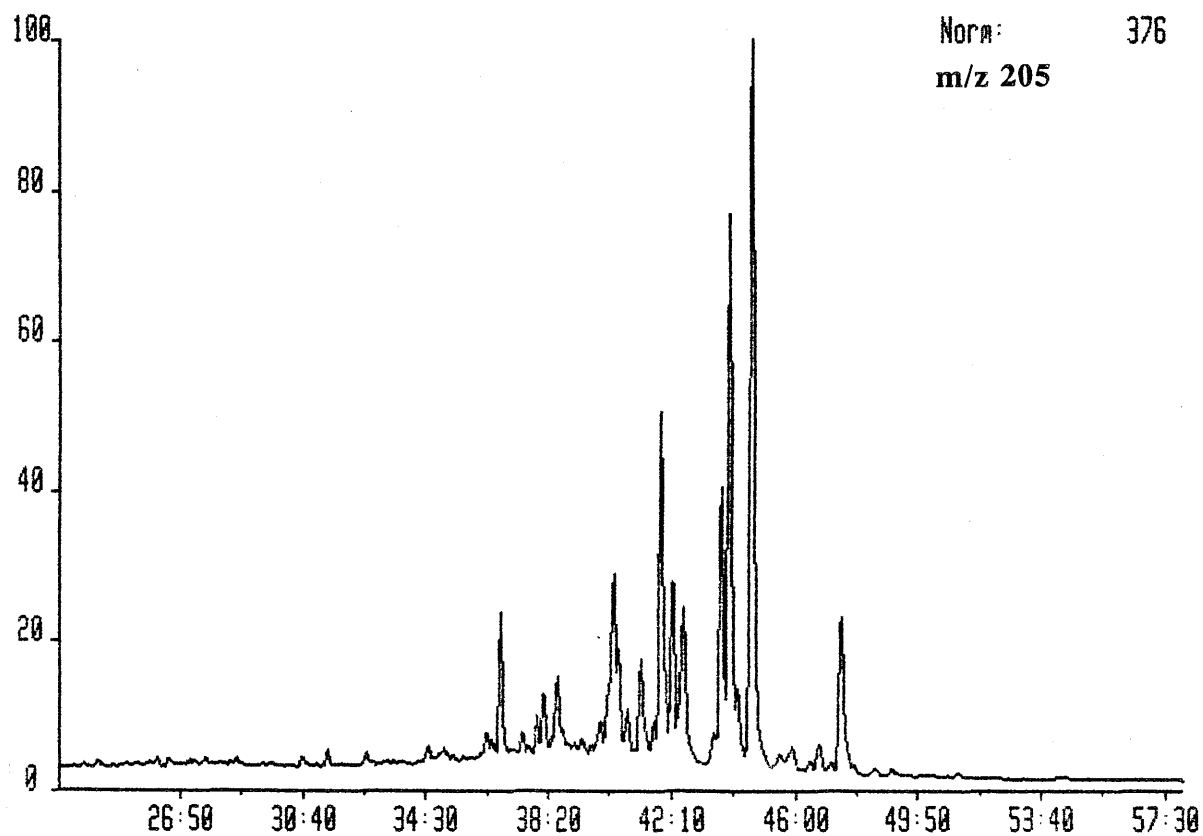


Norm: 147
m/z 205

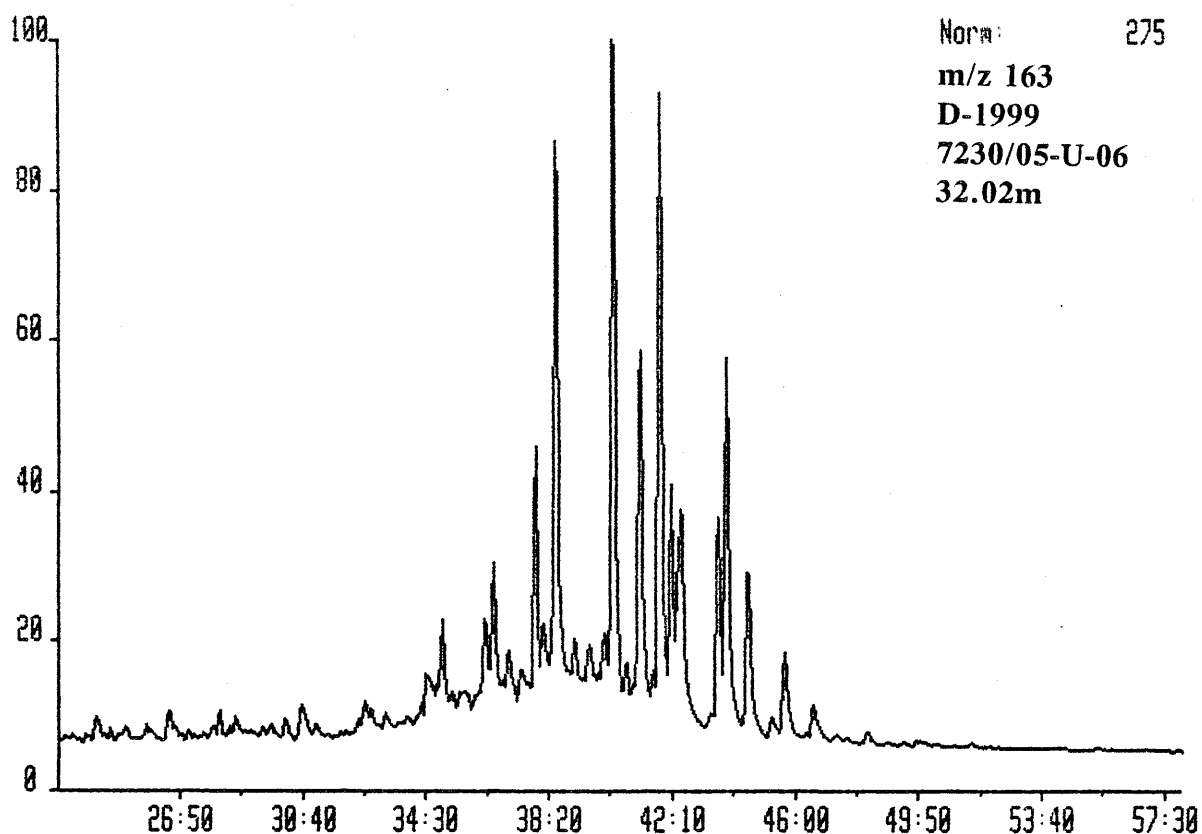
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Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



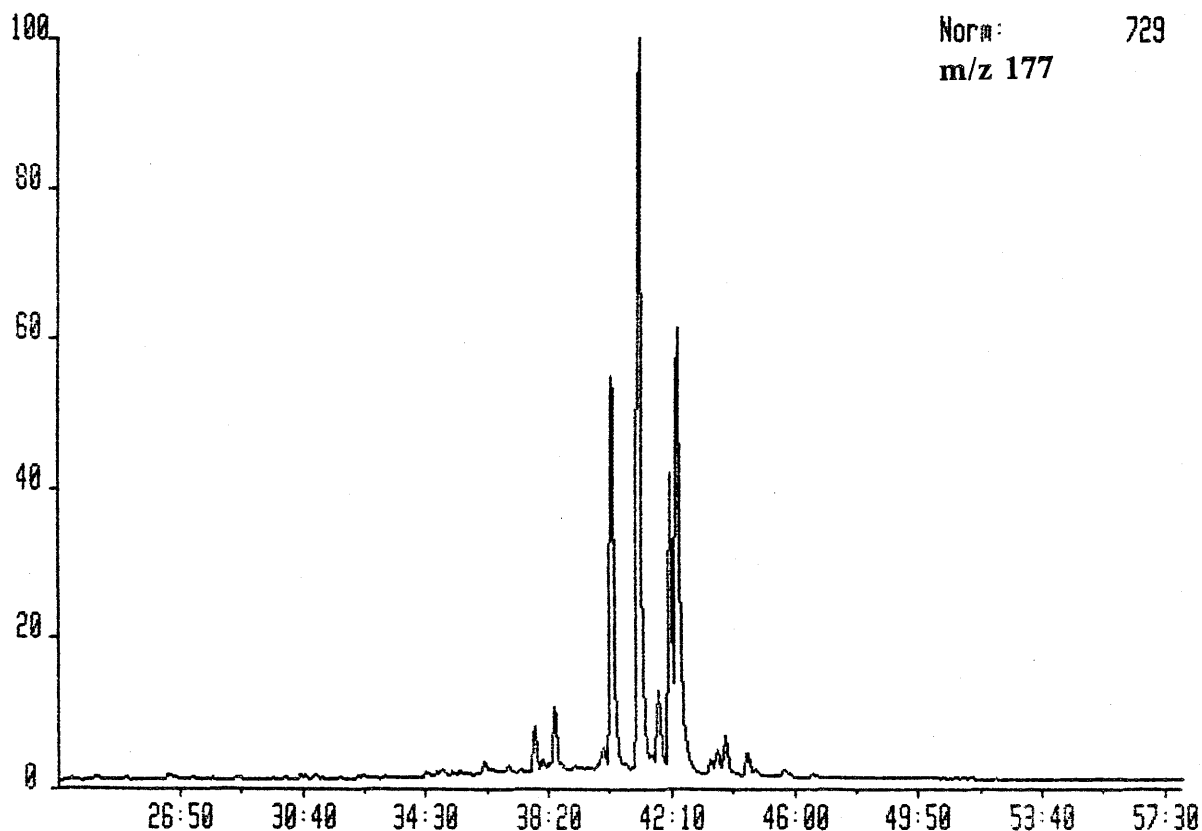
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Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



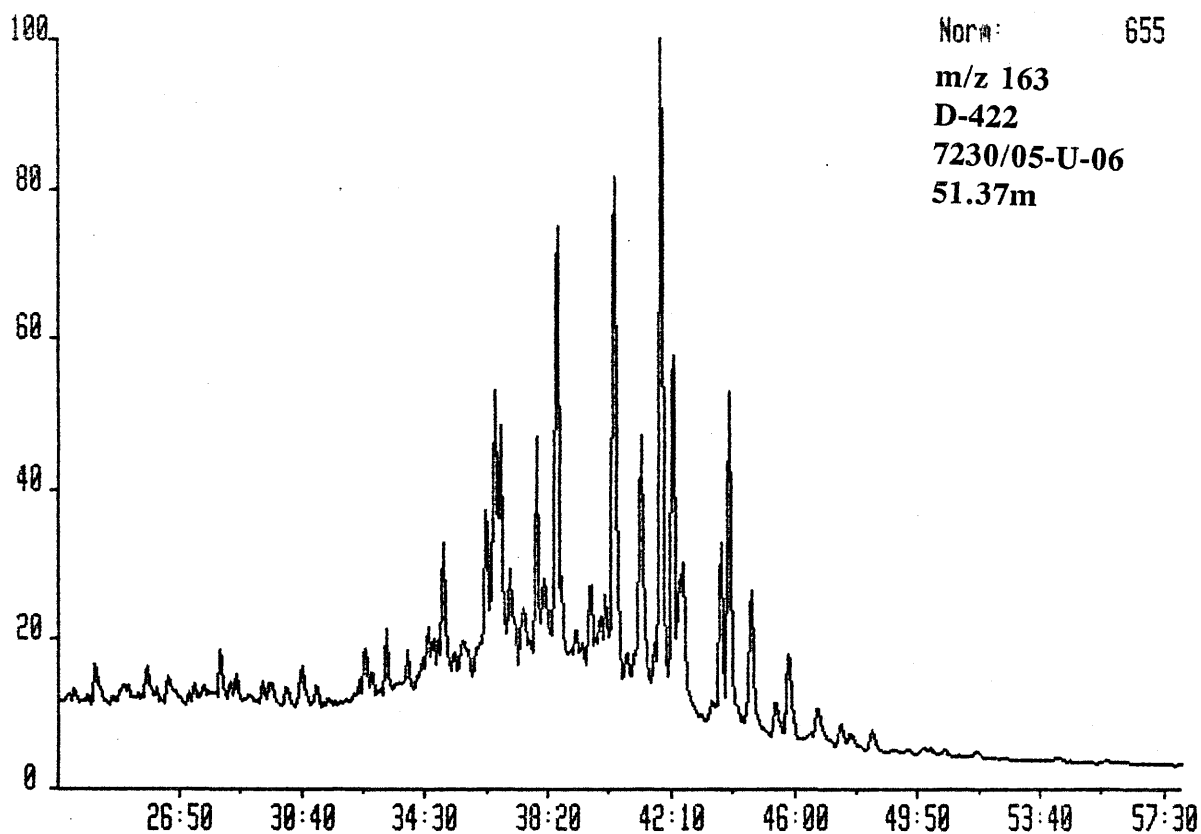
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 Sample 1 Injection 1 Group 1 Mass 163.1000
 Text:21.3427.23



D1999SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 177.1000
 Text:21.3427.23



D422SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D422SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

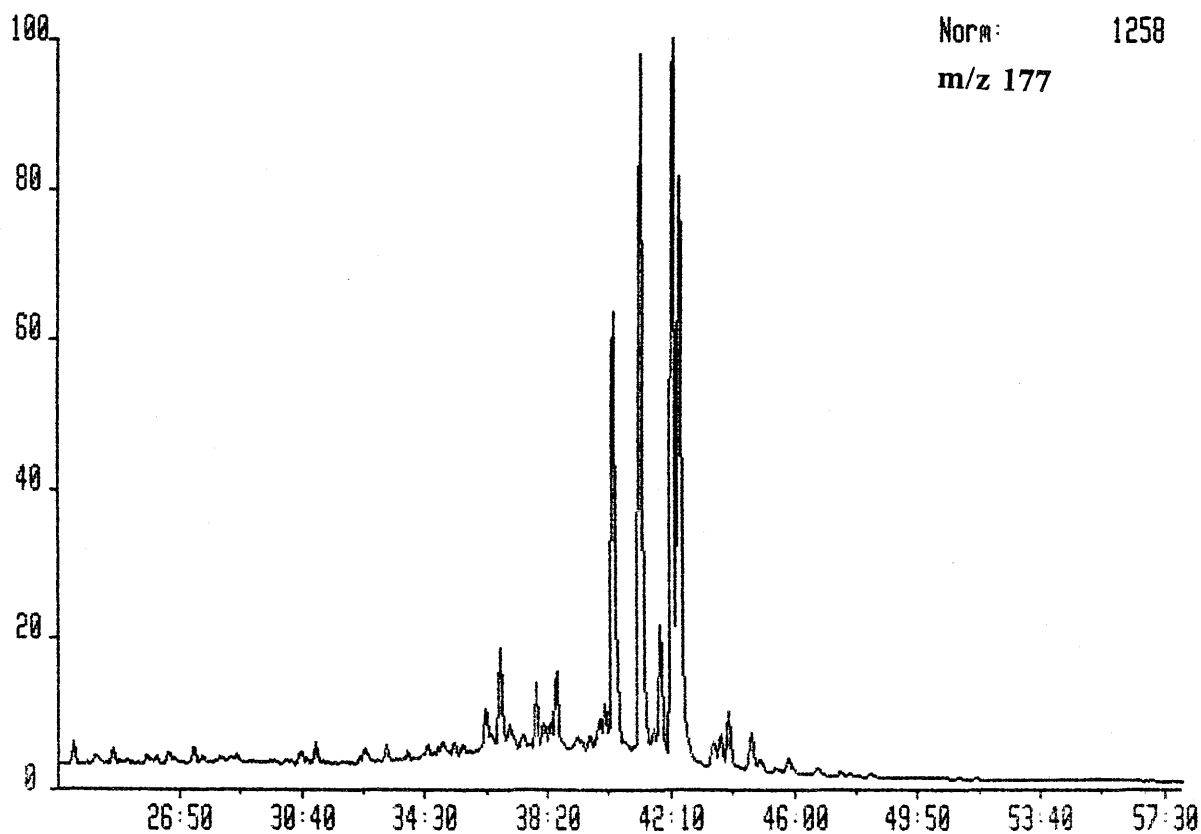
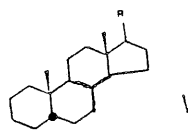
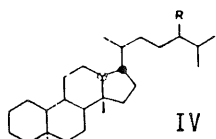
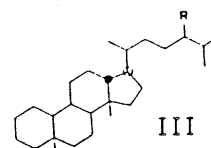
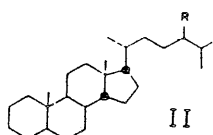
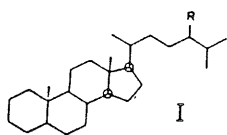


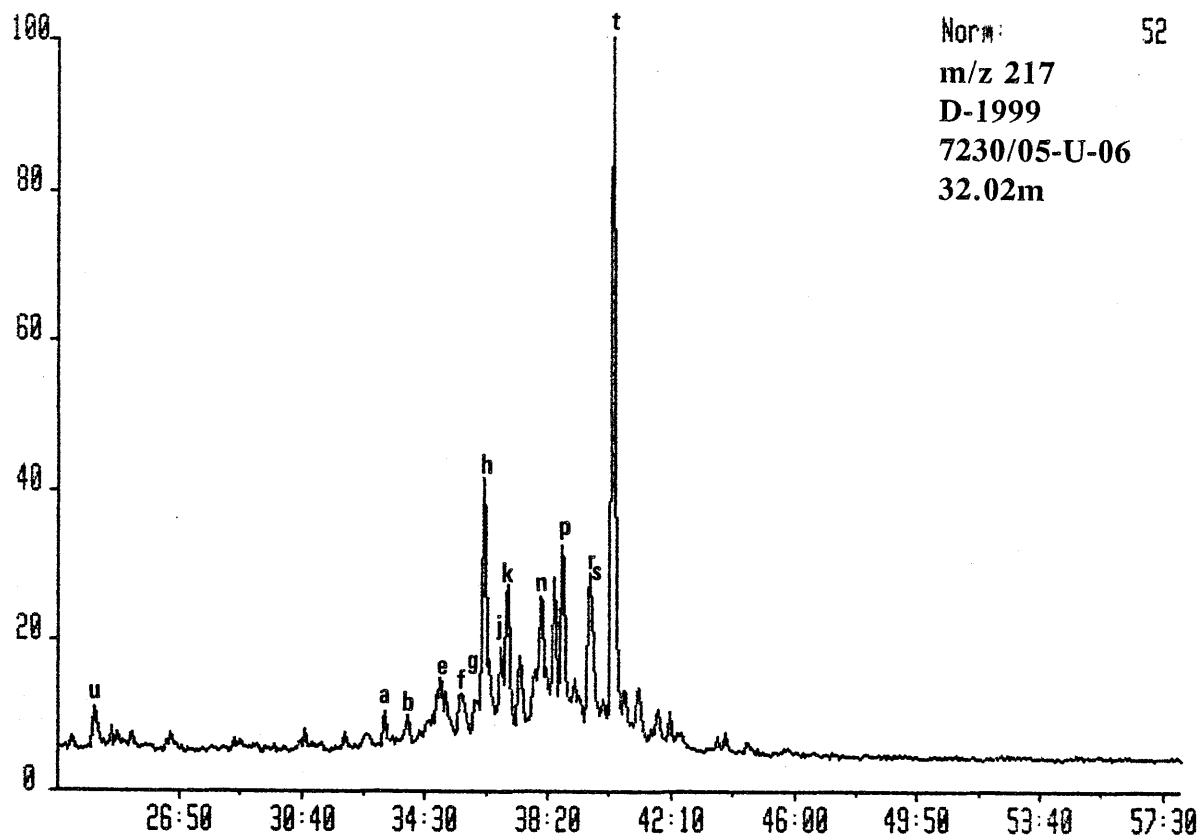
Figure A.II.4.5:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

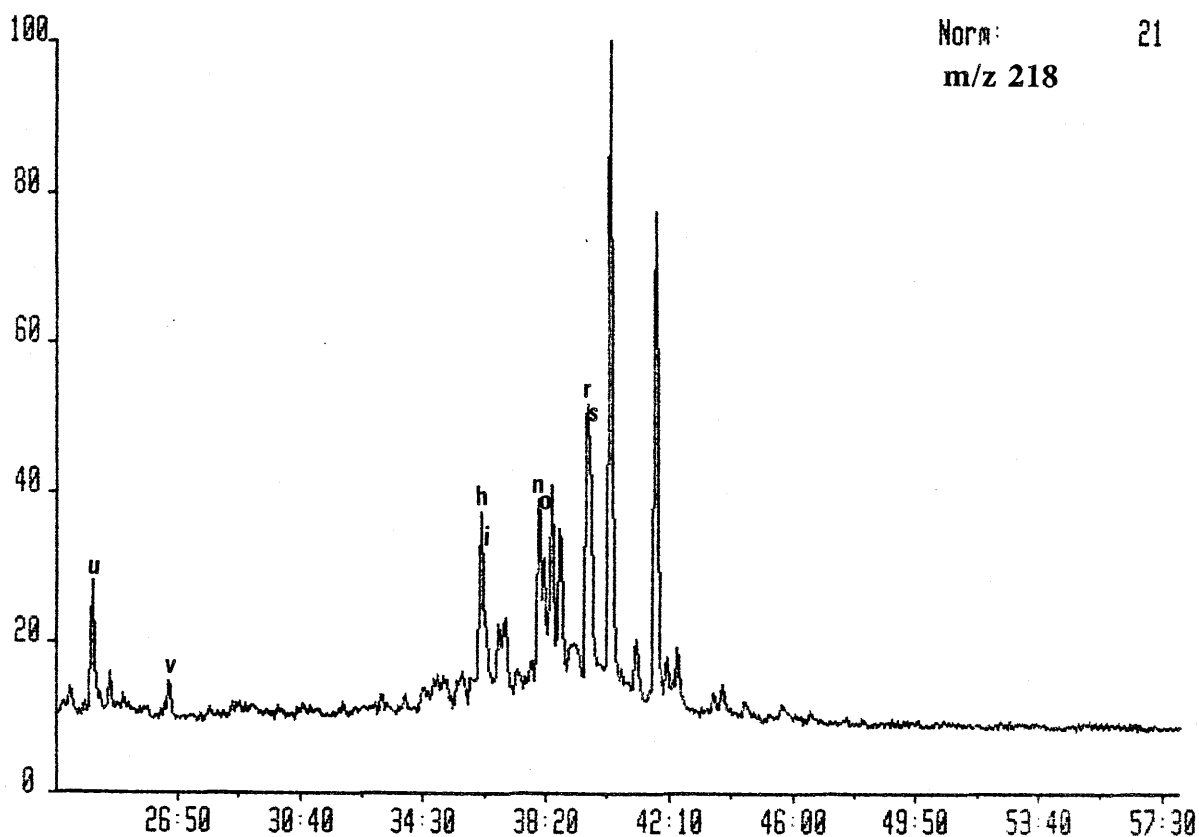
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V, R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V, R=C ₃ H ₇)
a	13 β (H), 17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III, R=H)
b	13 β (H), 17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III, R=H)
c	13 α (H), 17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV, R=H)
d	13 α (H), 17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV, R=H)
e	13 β (H), 17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III, R=CH ₃)
f	13 β (H), 17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III, R=CH ₃)
g	13 α (H), 17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV, R=CH ₃)
	+ 14 α (H), 17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I, R=H)
h	13 β (H), 17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II, R=H)
i	14 β (H), 17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II, R=H)
	+ 13 α (H), 17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV, R=CH ₃)
j	14 α (H), 17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I, R=H)
k	13 β (H), 17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
l	13 α (H), 17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
m	14 α (H), 17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I, R=CH ₃)
n	13 α (H), 17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II, R=CH ₃)
o	14 β (H), 17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II, R=CH ₃)
p	14 α (H), 17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I, R=CH ₃)
q	14 α (H), 17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)
r	14 β (H), 17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H), 17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
t	14 α (H), 17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)



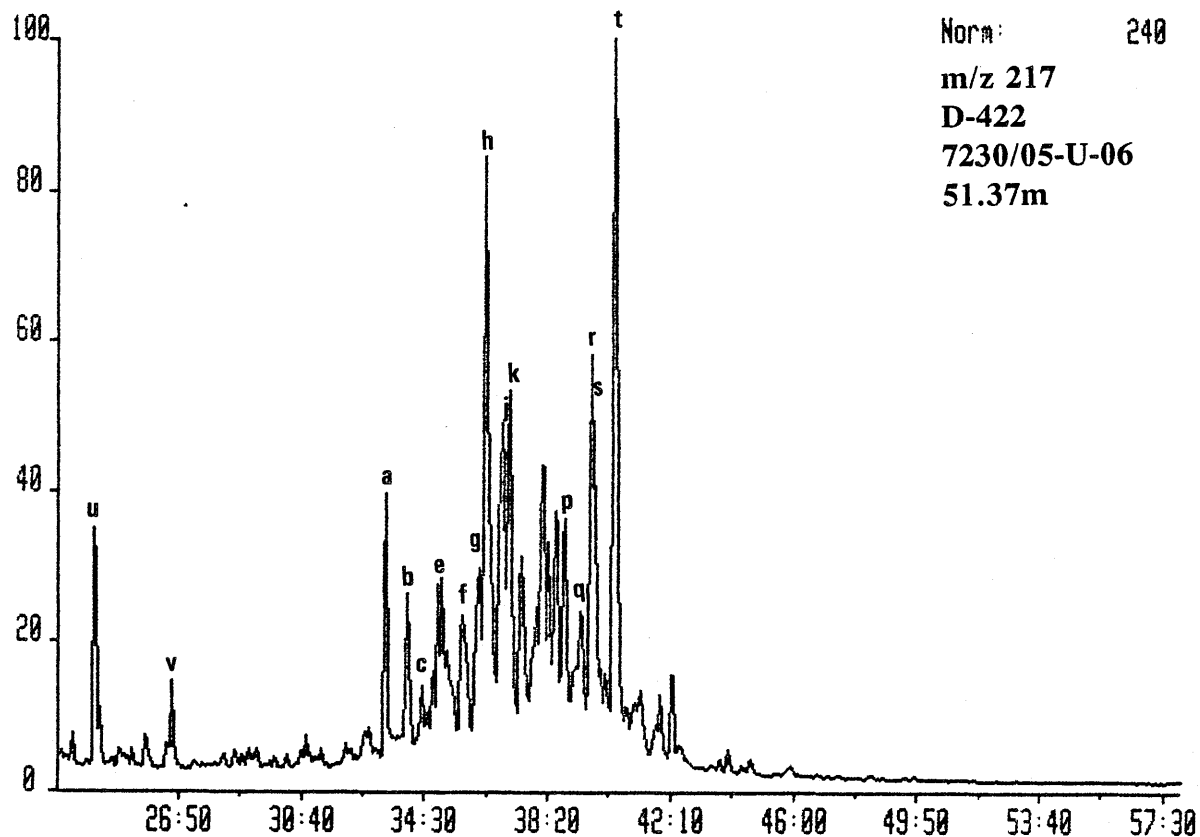
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Text:21.3427.23



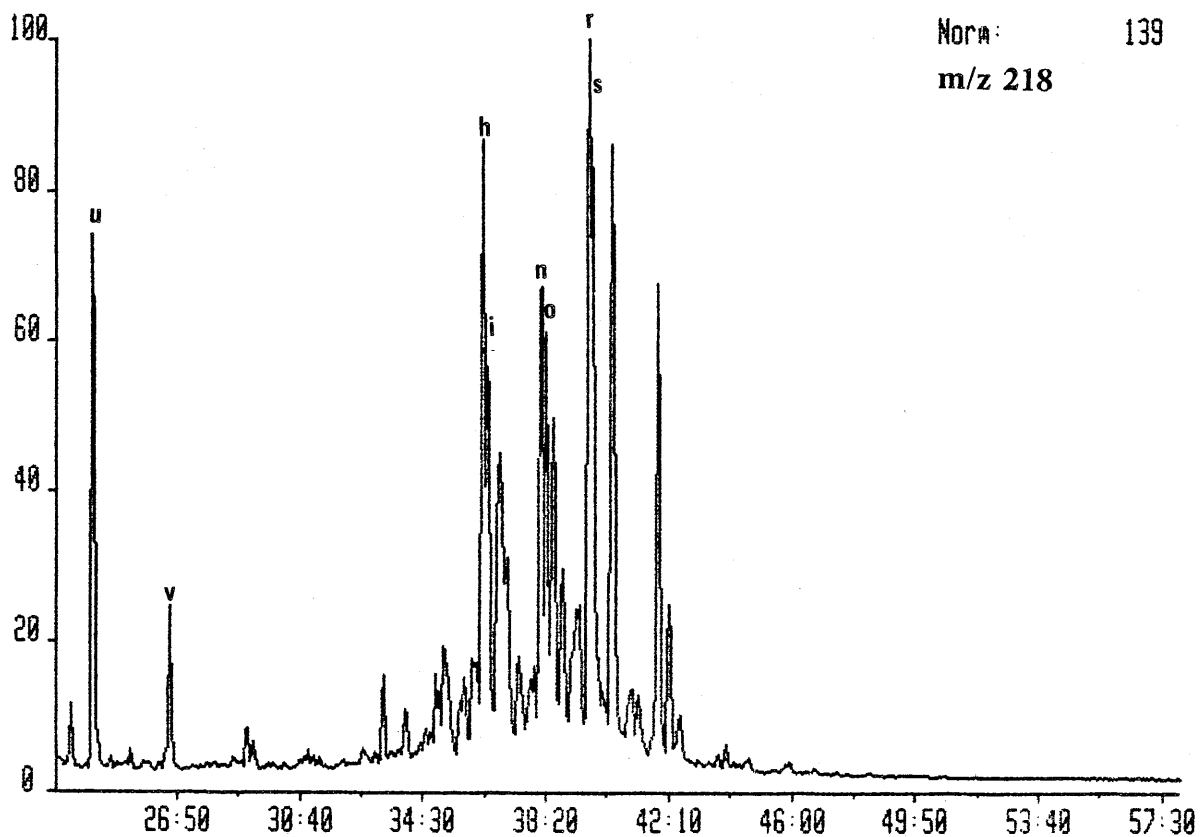
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Sample 1 Injection 1 Group 1 Mass 218.1000
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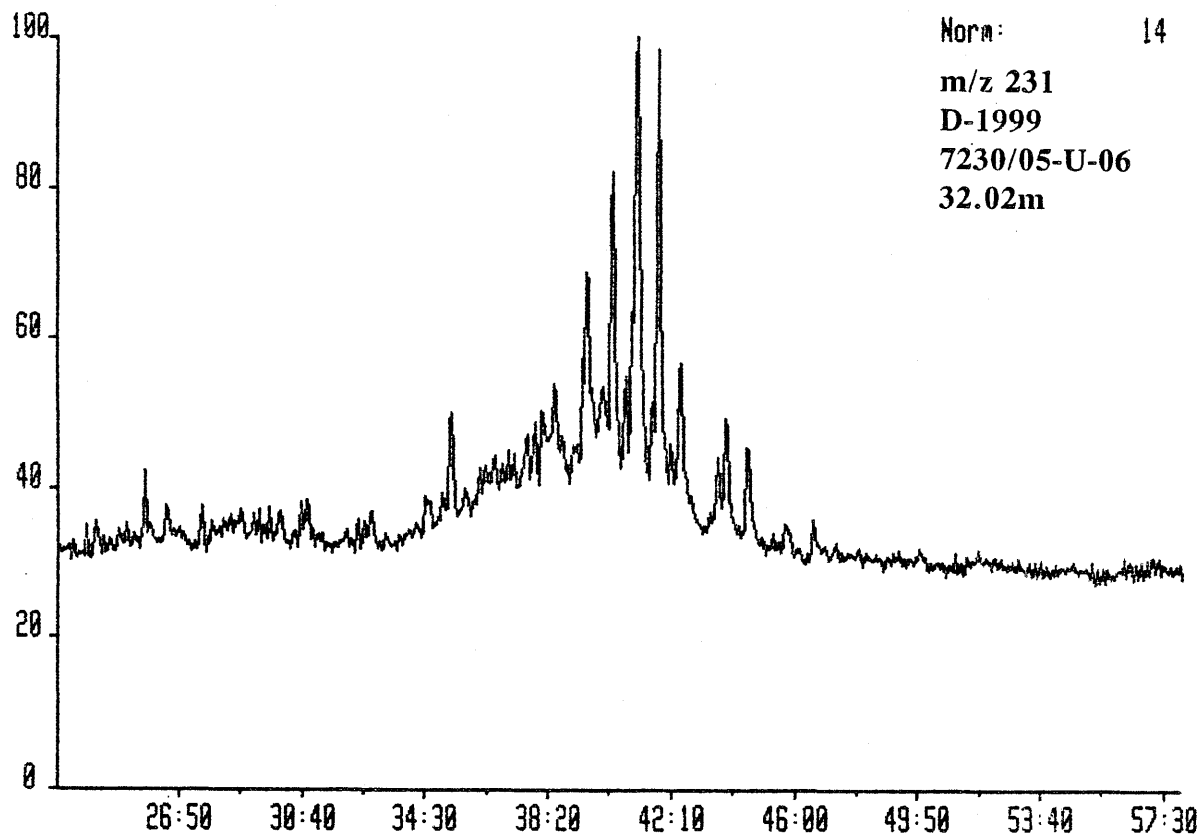
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



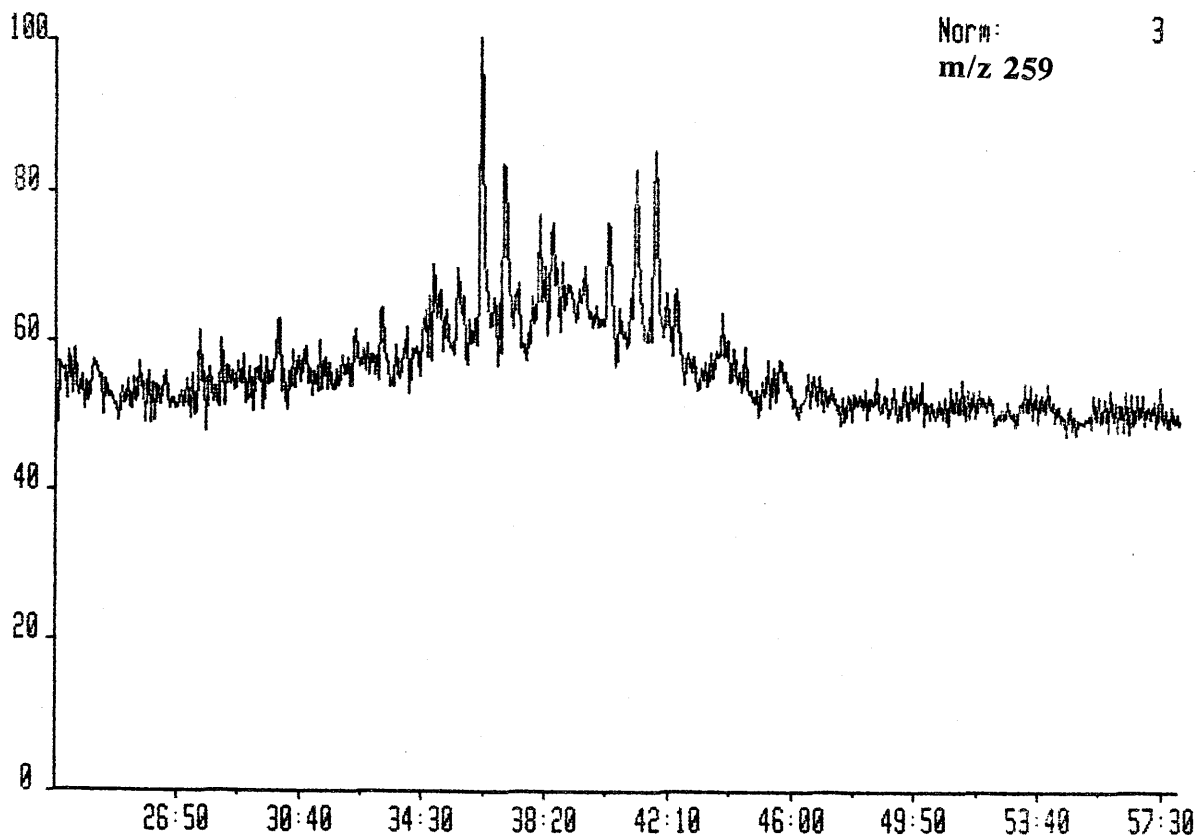
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Sample 1 Injection 1 Group 1 Mass 218.1000
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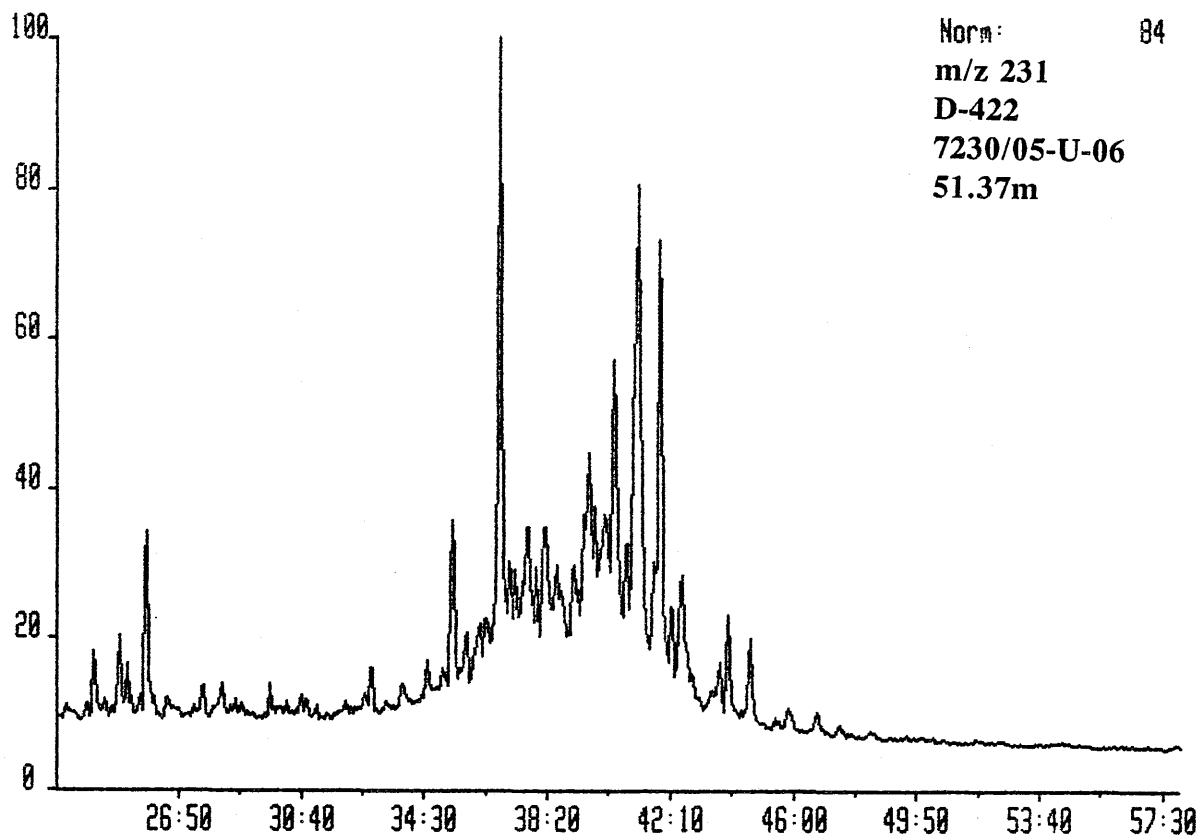
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Text:21.3427.23



D1999SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

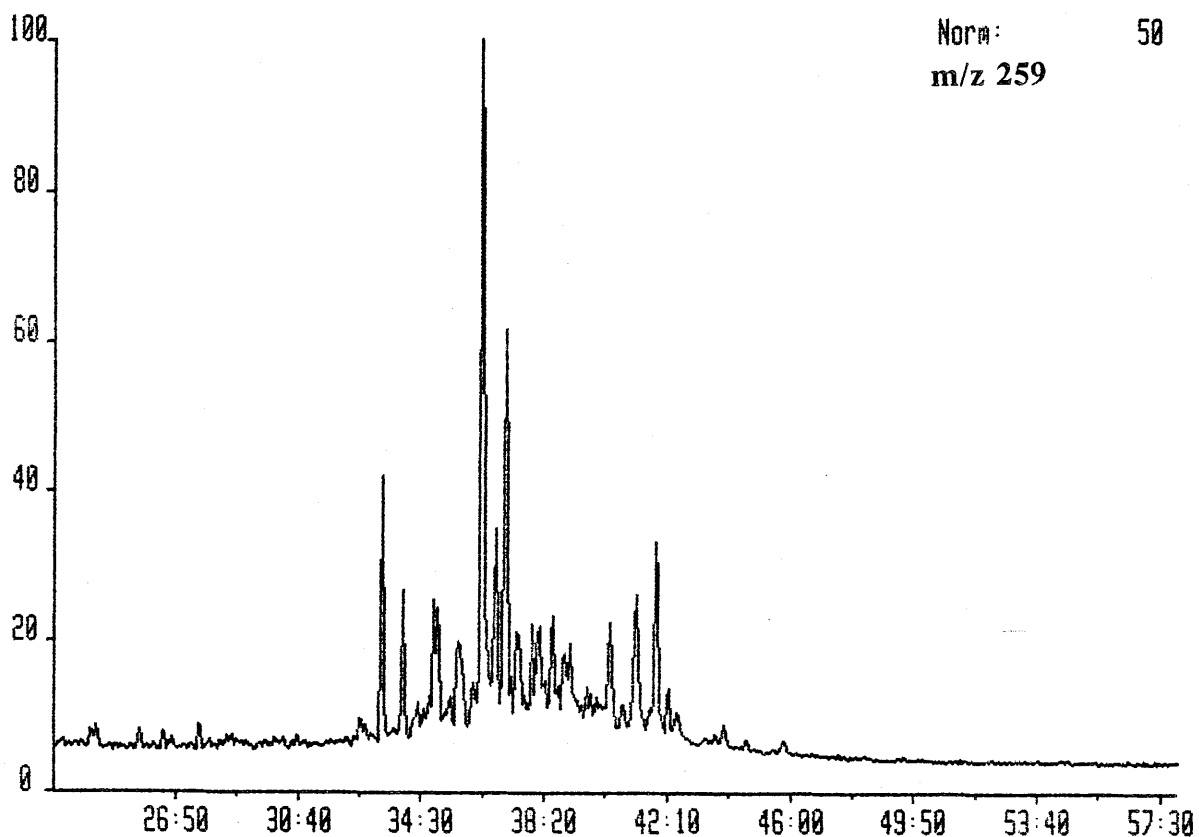


D422SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



Norm: 84
m/z 231
D-422
7230/05-U-06
51.37m

D422SAT 12-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



Norm: 50
m/z 259

Figure A.II.4.6: Vitrinite reflectance histograms.

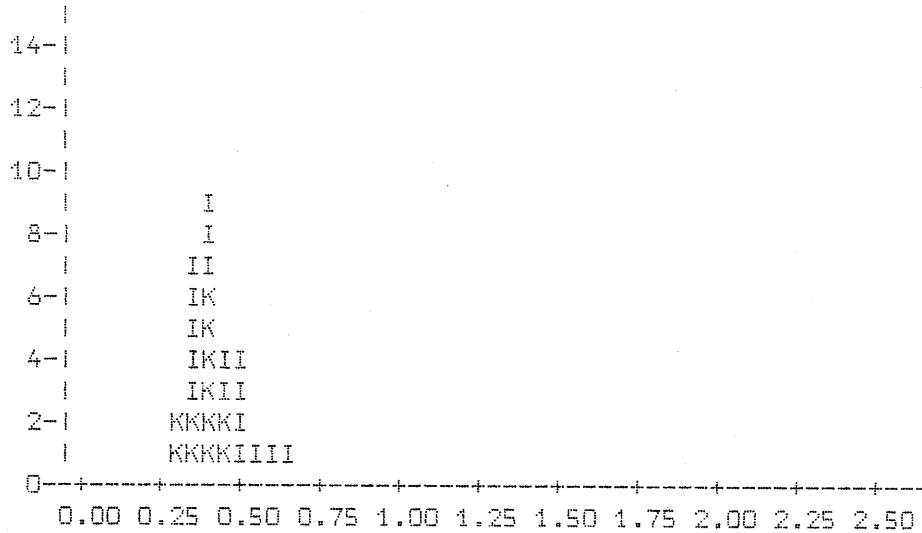
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

IKU# D-1998 29.OM 7230/5-U-6

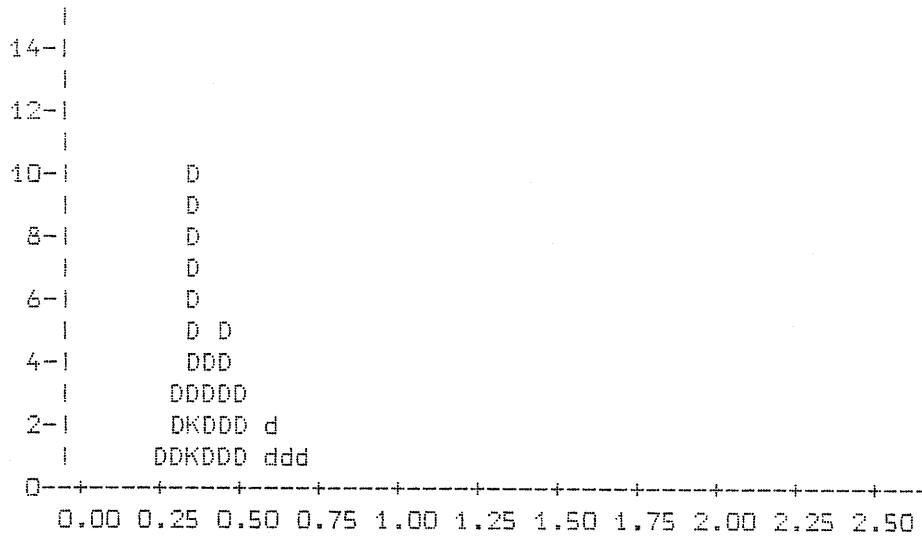


PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.34 0.67 ALL 29 0.44 0.08
 OVERALL 29 0.44 0.08

ORDERED VALUES FOLLOW:

0.34K 0.34K 0.35I 0.35K 0.36I 0.37I 0.37I 0.37I 0.39K 0.40K 0.40I
 0.40K 0.40K 0.43I 0.43I 0.44K 0.44K 0.44K 0.45I 0.46I 0.47K 0.49K
 0.50I 0.51I 0.53I 0.54I 0.57I 0.64I 0.66I

IKU# D-1999 32.0M 7230/5-U-6



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.29	0.55	ALL	26	0.41	0.06
N	0.61	0.73	ALL	4	0.66	0.05
OVERALL				30	0.44	0.11

ORDERED VALUES FOLLOW:

0.29D	0.32D	0.34D	0.34D	0.35D	0.36D	0.37K	0.37D	0.37D	0.38D	0.38D
0.38K	0.39D	0.39D	0.40D	0.41D	0.44D	0.44D	0.45D	0.45D	0.45D	0.46D
0.48D	0.50D	0.51D	0.54D	0.61d	0.63d	0.67d	0.72d			

```

14-|
|
12-|
|
10-|
|
8-|
|      KK
|      KK K
|      KKKK
|      KKKK
|      KKKK k
|      KKKK k
|      KKKKKK k
0-+-----+-----+-----+-----+-----+-----+-----+-----+
  0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

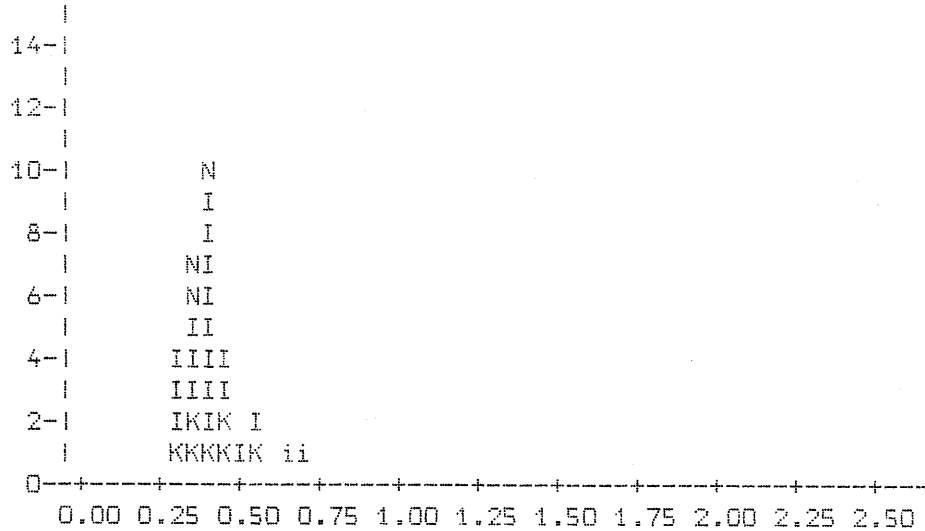
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PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.34	0.60	ALL	27	0.48	0.07
N	0.66	0.70	ALL	3	0.67	0.02
			OVERALL	30	0.50	0.09

ORDERED VALUES FOLLOW:

0.34k	0.39k	0.40k	0.40k	0.40k	0.42k	0.42k	0.42k	0.43k	0.45k	0.45k
0.46k	0.47k	0.47k	0.48k	0.48k	0.50k	0.51k	0.51k	0.51k	0.52k	0.55k
0.56k	0.57k	0.57k	0.59k	0.59k	0.66k	0.66k	0.69k			

IKU# D-1995 38.2M 7320/5-U-6

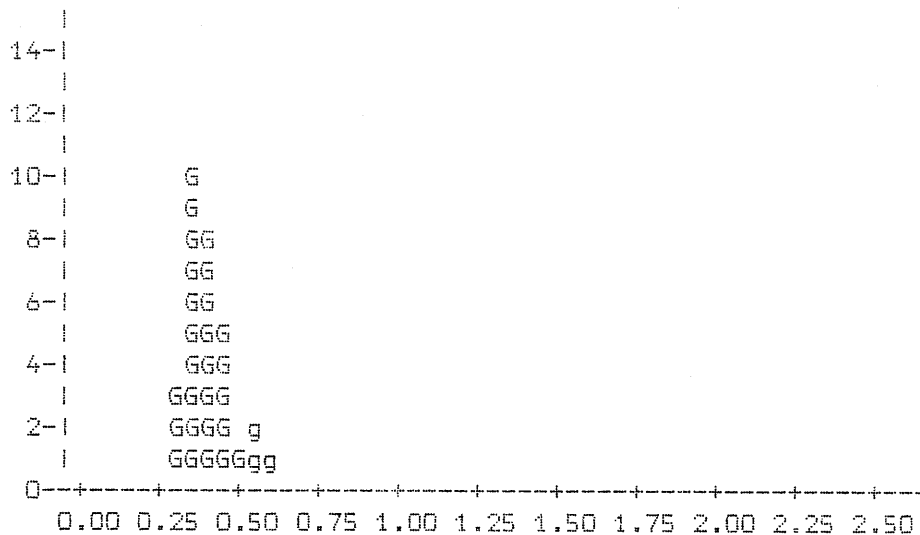


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.31	0.57	ALL	28	0.42	0.06
N	0.69	0.72	ALL	2	0.69	0.01
				OVERALL	30	0.44 0.09

ORDERED VALUES FOLLOW:

0.31I	0.33I	0.33I	0.34K	0.35K	0.37N	0.37I	0.39N	0.39I	0.39I	0.39K
0.40N	0.40I	0.40I	0.40I	0.42I	0.42I	0.43I	0.43I	0.44K	0.44I	0.45K
0.47K	0.47I	0.48I	0.54I	0.55I	0.56K	0.69I	0.70I			

IKU# D-1997 50.8M 7230/5-U-6



PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.34 0.52 ALL 27 0.41 0.05
 N 0.57 0.63 ALL 3 0.59 0.03
 OVERALL 30 0.43 0.07

ORDERED VALUES FOLLOW:

0.34G 0.34G 0.34G 0.35G 0.36G 0.36G 0.37G 0.37G 0.38G 0.38G 0.39G
 0.39G 0.39G 0.40G 0.40G 0.40G 0.40G 0.42G 0.43G 0.43G 0.44G 0.45G
 0.47G 0.49G 0.49G 0.49G 0.51G 0.57g 0.58g 0.62g

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Core 7230/05-U-05

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Table A.II.5.1a

CORE 7230/05-U-05

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I													I
I	D 0309	25.52	78						78		0.00	*****	I
I	D 0310	28.60	38	0					38	0	1.28	*****	I
I	D 0314	31.62	96						96		0.00	*****	I
I	D 0318	34.67	94	1					96	1	1.33	*****	I
I	D 0322	37.46	47						47		0.00	*****	I
I	D 0326	40.71	50						50		0.00	*****	I
I	D 0330	43.82	762						762		0.00	*****	I
I	D 0334	44.26	30						30		0.00	*****	I
I	D 0338	45.77	47						47		0.00	*****	I
I	D 0342	49.92	83						83		0.00	*****	I

CORE 7230/05-U-05

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I													I
I	D 0309	25.52	841	30	4				874	34	3.85	*****	I
I	D 0310	28.60	239	20	27				287	47	16.45	*****	I
I	D 0314	31.62	2284	76	76				2436	152	6.23	*****	I
I	D 0318	34.67	2227	85	96			64	2408	181	7.50	*****	I
I	D 0322	37.46	1800	67	77	12			1956	156	7.98	*****	I
I	D 0326	40.71	1250	57	61	22			1390	139	10.03	*****	I
I	D 0330	43.82	526	30	19	5			580	54	9.39	*****	I
I	D 0334	44.26	652	45	70			31	767	115	15.03	*****	I
I	D 0338	45.77	913	60	87	35		63	1095	182	16.64	*****	I
I	D 0342	49.92	506	43	68	41		84	658	151	23.02	*****	I

Table A.II.5.1c

CORE 7230/05-U-05

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

[illegible]

Table A.II.5.2

Core 7230/05-U-05

DATA FROM ROCK EVAL PYROLYSIS

[illegible]

Table A.II.5.2 (continued)

Core 7230/05-U-05

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	
I		m/ft	:	(	mg/g ROCK	)	(%)	(	mg/g TOC	)	S1+S2	S1+S2 (C)
I			:									
I	D 340	46.96	:	****	****	****	0.55	*****	****	*****	*****	***
I	D 344	48.47	:	****	****	****	0.27	*****	****	*****	*****	***
I	D 342	49.92	:	0.06	0.02	0.02	0.57	4	4	0.08	0.75	292
I			:									

DATE : 26 - 2 - 88.

Table A.II.5.3

Core number: 7230/05-U-05
Reference number: 21.3427.23
(1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-1986	-----	36.43	0.39 (23) 0.67 (1)	F R	0.07 0.00	3-4
D-1987	-----	38.67	0.38 (25) 0.61 (2)	F R	0.07 0.04	2-3
D-1988	-----	43.98	0.36 (26) 0.59 (3)	F R	0.07 0.02	2-3
D-1989	-----	44.11	0.35 (27)	F	0.08	3-4

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.5.4
Well no.: 7230/05-U-05

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 1986	36.43	Am: 25-30% Lm: 10-15% W+C: 60%	F-M-L	Fair-Poor	3.0 - 4.5	Organic residue rich in dark brown/black, woody/coaly fragments.
D 1987	38.67	Am: 55-60% Lm: 15-20% W: 15-20% C: 5%	F-M-L	Good-Fair	3.0 - 4.0	Organic residue dominated by finely dispersed, and larger clasts of thin, flakey amorphous matter, together with significant proportions of well preserved liptinitic material and structured woody phytoclasts.
D 1988	43.98	Am: 25-30% Lm: 25-30% W: 25-30% C: 10-15%	F-M-L	Good-Fair	3.0 - 4.0	Mainly as sample D 1987, but with less amorphous matter relative to determinable phytoclasts and palynomorphs.
D 1989	44.11	Am: 55-60% Lm: 15-20% W: 15-20% C: 5%	F-M-L	Fair	3.0 - 4.5	Comparable to sample D 1987.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.5.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7230/05-U-05

I			:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:		:		I
I		(m)	:	(mg)	:	(mg)	I
I			:		:		I
I	D 330	43.82	:	27.9	:	9.6	I
I	D 338	45.77	:	2.4	:	2.2	I
I	D 342	49.92	:	1.3	:	0.8	I
I			:		:		I

Project no.: 21.3427.23
 Well ident.: 7230/05-U-05
 DATE : 1 - 3 - 88.

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Table A.II.5.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

I			: Rock							I
I	IKU-No	DEPTH	: Extr.	EOM	Sat.	Aro.	HC	Non HC	TOC	I
I			:							I
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	I
I			:							I
I	D 0330	43.82	: 12.9	40.0	4.0	3.0	7.0	33.0	11.69	I
I			:							I
I	D 0338	45.77	: 14.9	5.0	0.6	0.5	1.1	3.9	0.54	I
I			:							I
I	D 0342	49.92	: 14.0	4.0	0.4	0.2	0.6	3.4	0.57	I
I			:							I

Project no.: 21.3427.23
Well ident.: 7230/05-U-05
DATE : 1 - 3 - 88.

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Table A.II.5.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

I		:							I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC	I
I		(m)	:						I
I			:						I
I	D 0330	43.82	:	3110	311	233	544	2566	I
I	D 0338	45.77	:	336	40	32	73	263	I
I	D 0342	49.92	:	285	26	17	43	242	I
I			:						I

Project no.: 21.3427.23
Well ident.: 7230/05-U-05
DATE : 1 - 3 - 88.

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Table A.II.5.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC	I
I		(m)	:						I
I			:						I
I	D 0330	43.82	:	26.6	2.7	2.0	4.7	22.0	I
I	D 0338	45.77	:	62.2	7.5	6.0	13.4	48.8	I
I	D 0342	49.92	:	50.0	4.5	3.0	7.5	42.5	I
I			:						I

Project no.: 21.3427.23
Well ident.: 7230/05-U-05
DATE : 1 - 3 - 88.

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Table A.II.5.9

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 0330	43.82	:	10.0	7.5	17.5	133.3	82.5	21.2	I
I	D 0338	45.77	:	12.0	9.6	21.6	125.0	78.4	27.6	I
I	D 0342	49.92	:	9.0	6.0	15.0	150.0	85.0	17.6	I
I			:							I

Table A.II.5.10

Core 7230/05-U-05

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I IKU No.	:	-----	A=	-----	B=	-----	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I	-----	-----	-----	-----	-----	-----	-----	-----	-----	I
I		:								I
I D 0330	43.82	:	6.2	5.3	0.8	7.0	0.2	1.9	2.1	I
I		:								I
I D 0338	45.77	:	1.7	1.1	0.4	2.6	0.2	1.5	1.5	I
I		:								I
I D 0342	49.92	:	1.5	0.6	0.2	2.7	0.1	1.6	1.8	I
I		:								I

DATE : 29 - 2 - 88.

Table A.II.5.11a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7230/05-U-05

IKU code	Depth	$\alpha\beta/\alpha\beta+\beta\alpha^{1)}$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-330	43.82	0.70	25.8	55.9	4.1
D-338	45.77	0.69	22.3	55.8	6.8
D-342	49.92	0.58	52.8	28.7	2.5

1) E/E+F in m/z 191

2) Average % distribution between first and second eluting isomers of extended hopanes (G-M in m/z 191)

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217

4) $q/q+t$ in m/z 217

Table A.II.5.11b:

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7230/05-U-05

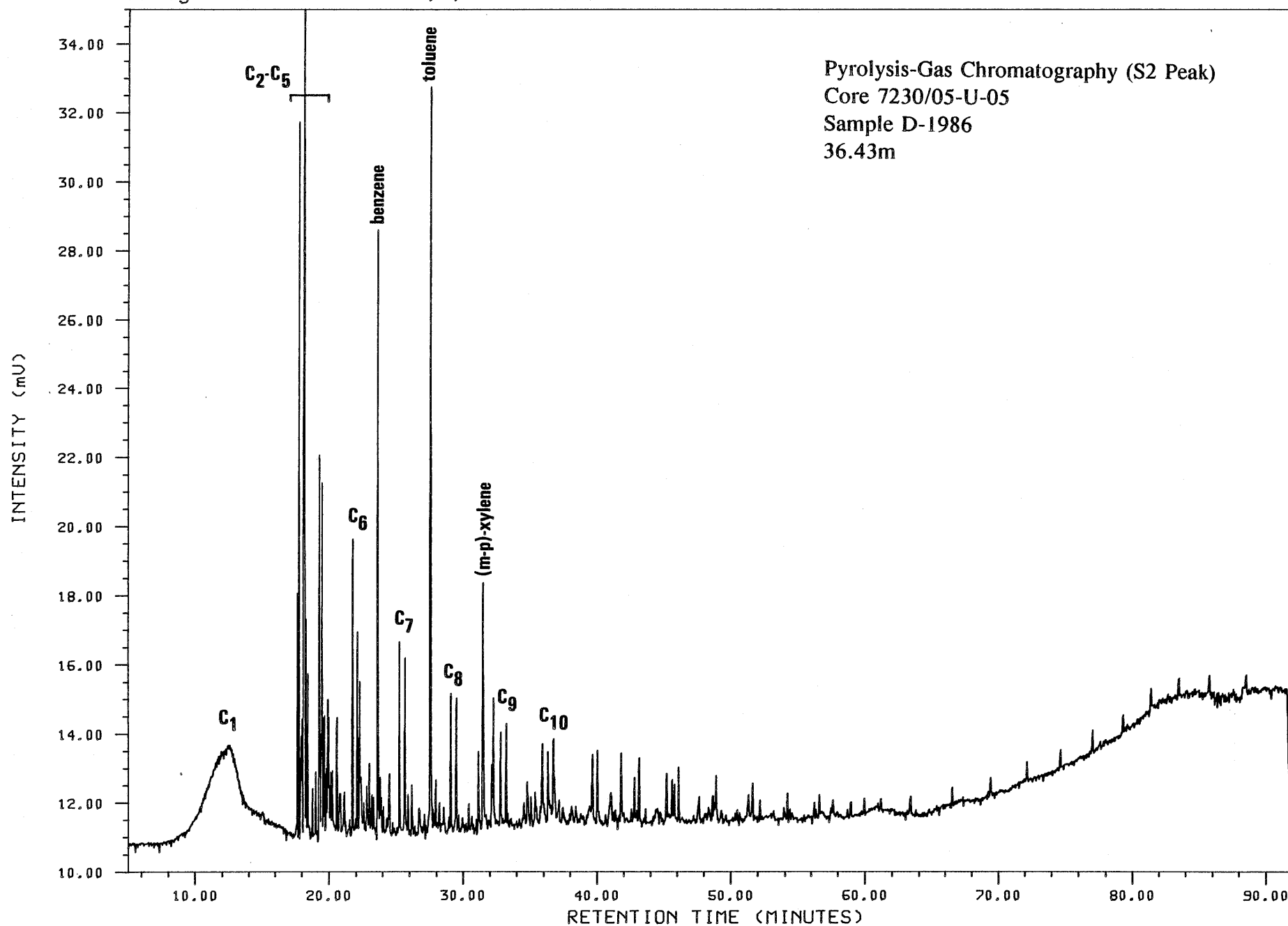
IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-330	43.82	-	-	0.05	-	0.45
D-338	45.77	0.03	9.20	-	-	0.36
D-342	49.92	-	72.00	-	-	0.25

- 1) Relative abundance of tricyclic terpanes (Q/E in m/z 191)
- 2) B/A in m/z 191
- 3) Relative abundance of unknown (X/E in m/z 191)
- 4) Relative abundance of bisnorhopane (Z/E in m/z 191)
- 5) Relative abundance of C₂₇ rearranged steranes (a/a+j in m/z 217)

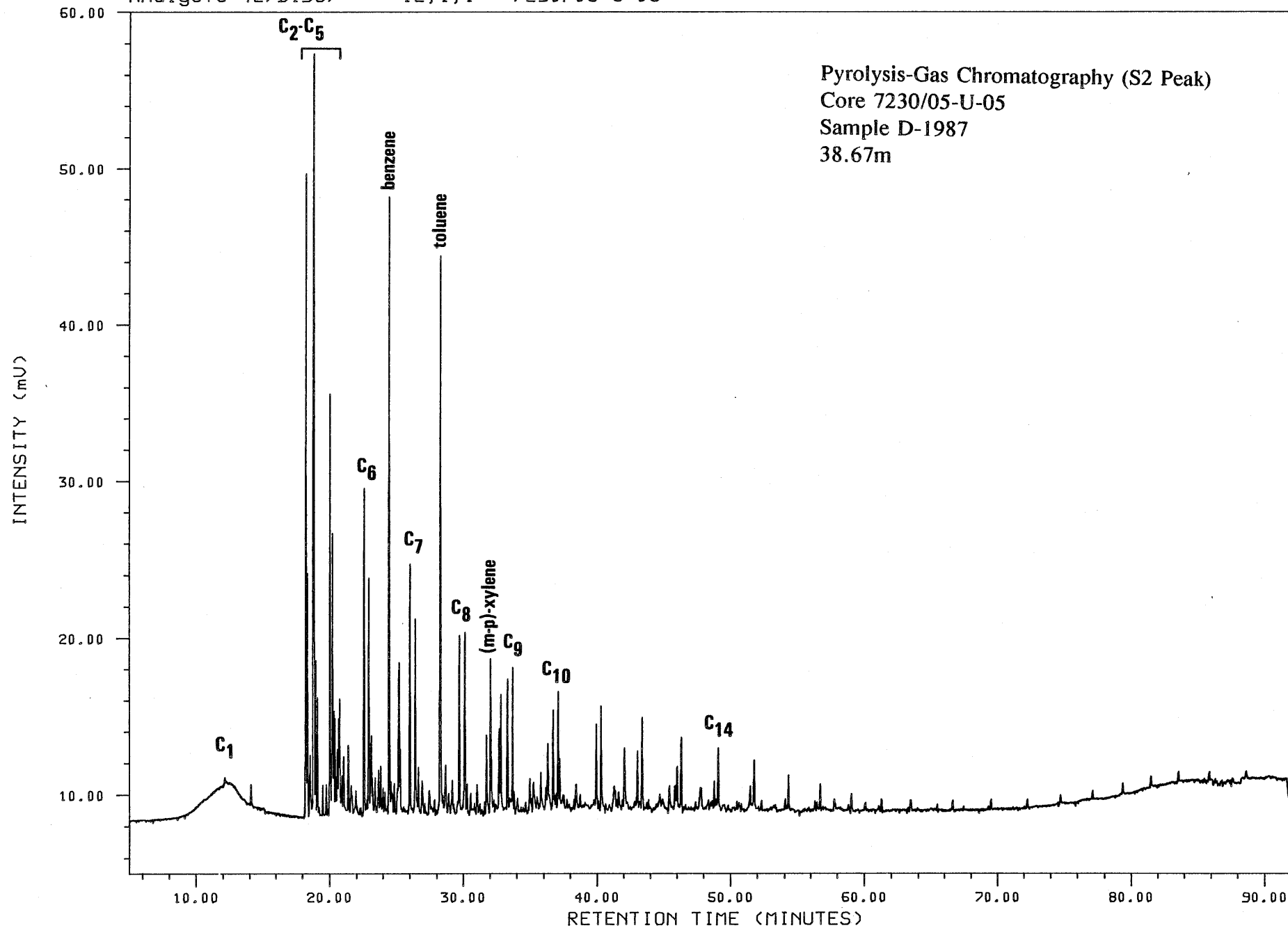
Figure A.II.5.1:

Pyrolysis-gas chromatograms (S2 peak)

Analysis 427D1986 12,1,1 7230/05-U-05



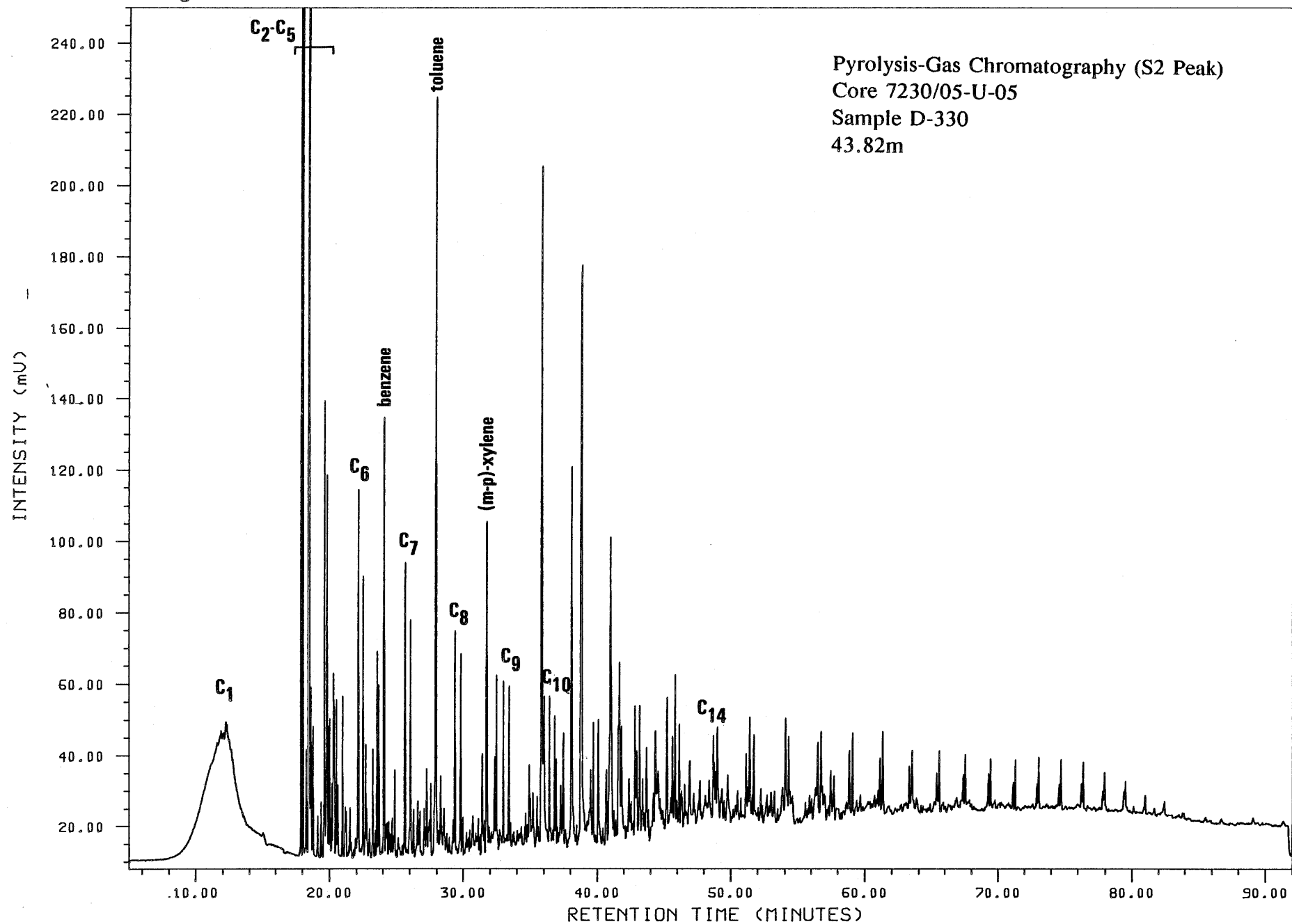
Analysis 427D1987 12,1,1 7230/05-U-05



Analysis 427D0330

12,1,1

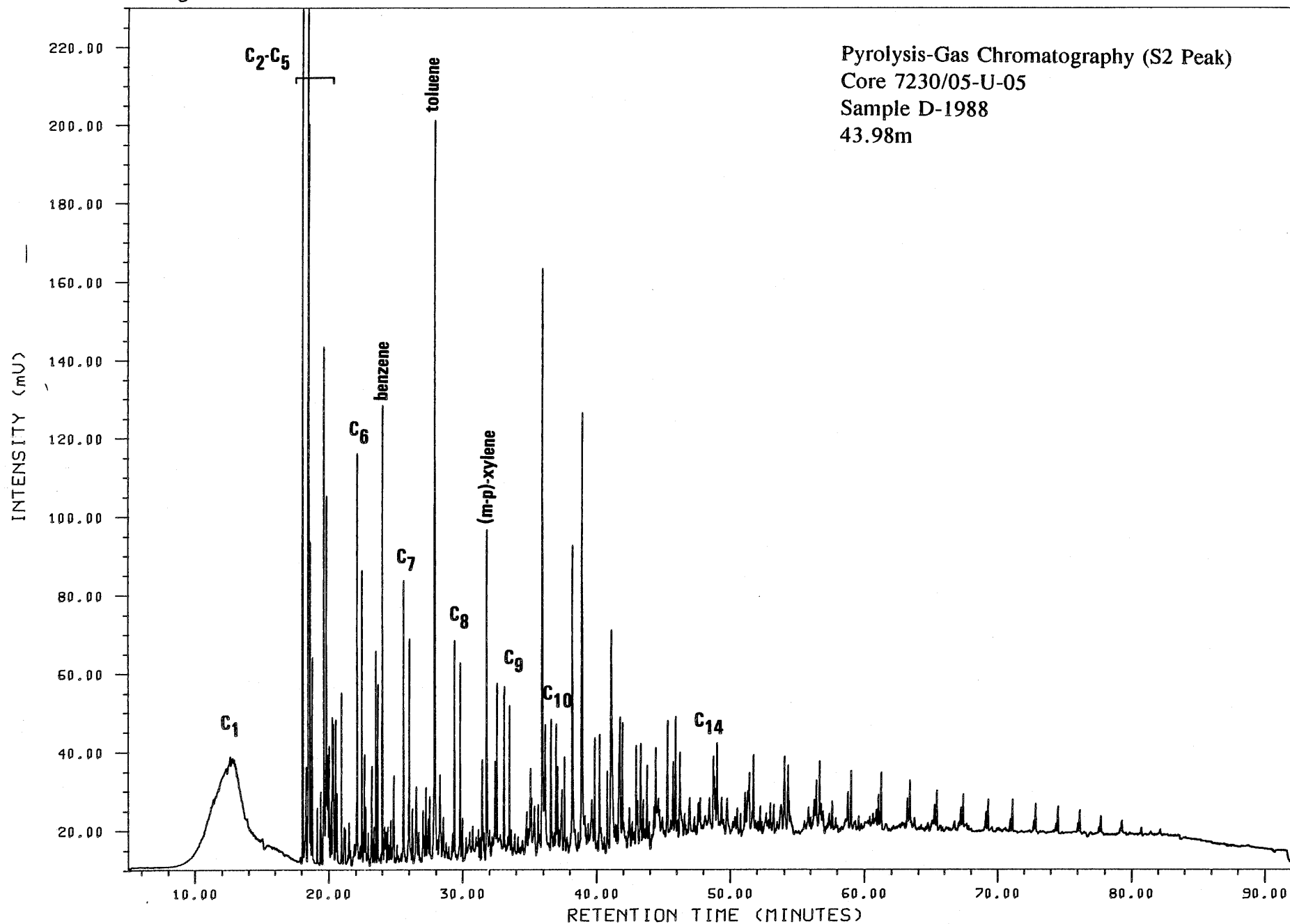
7230/05-U-05



Analysis 427D1988

12,1,1

7230/05-U-05



Analysis 427D1989

12,1,1

7230/05-U-05

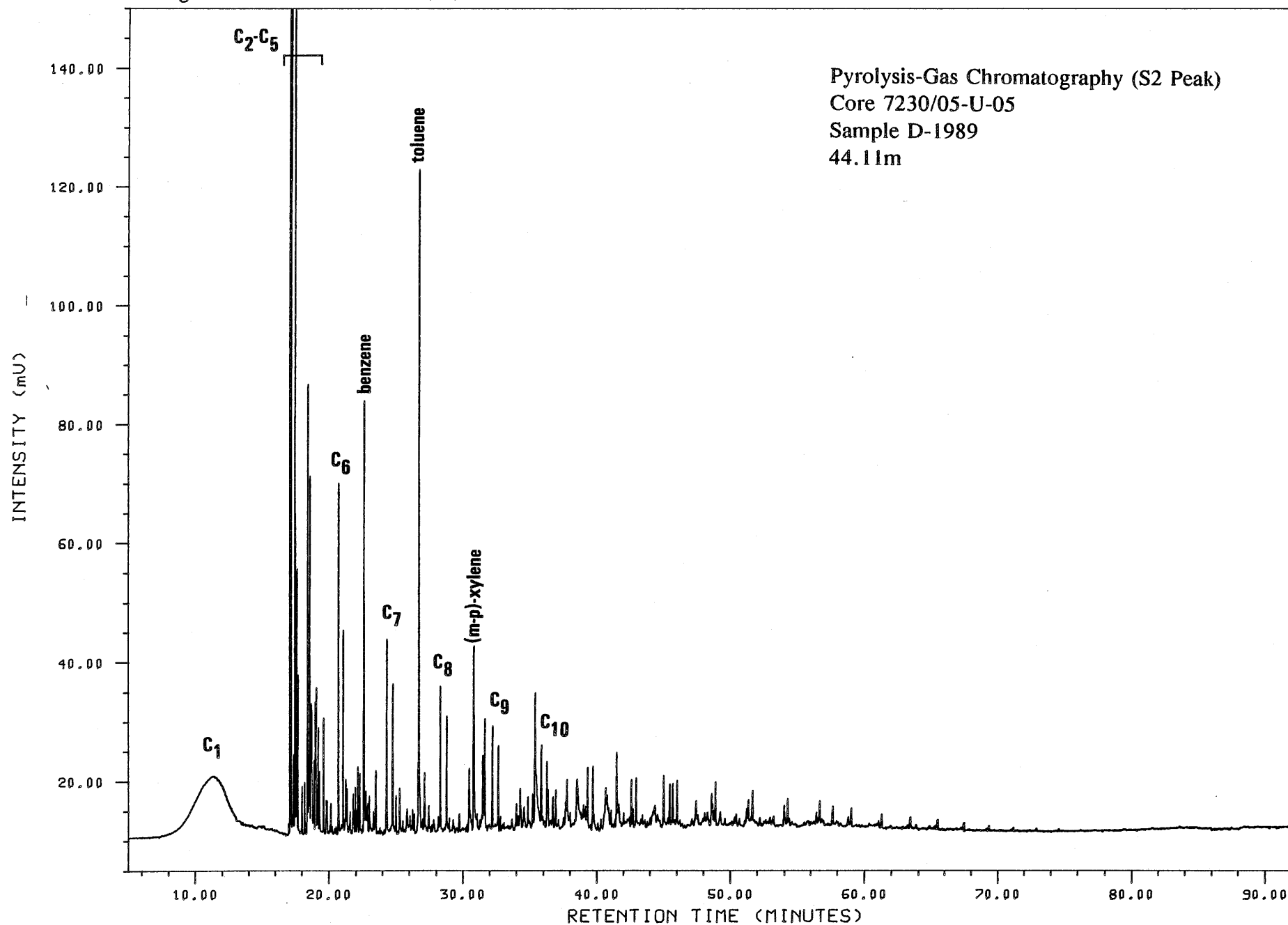
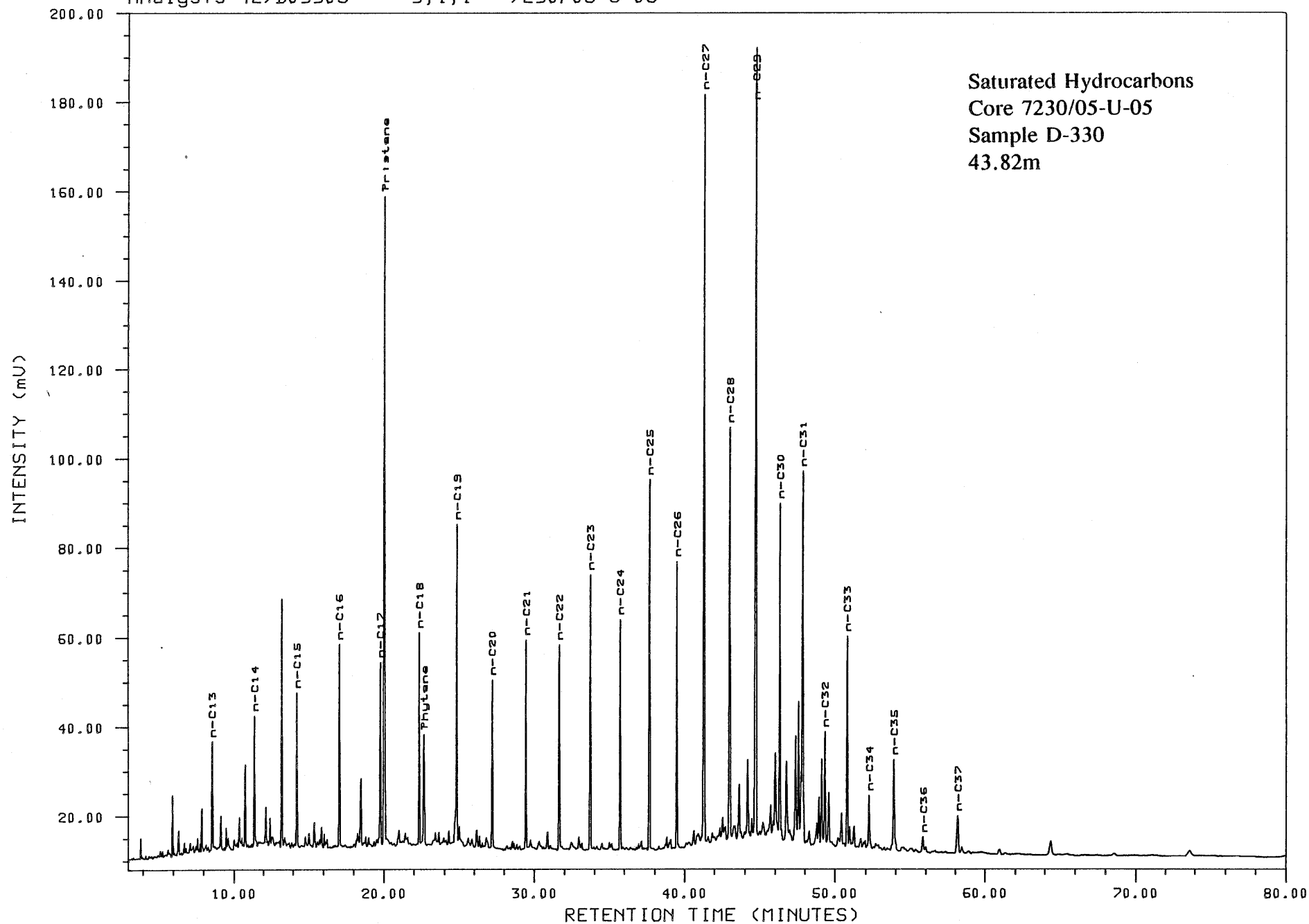


Figure A.II.5.2:

Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

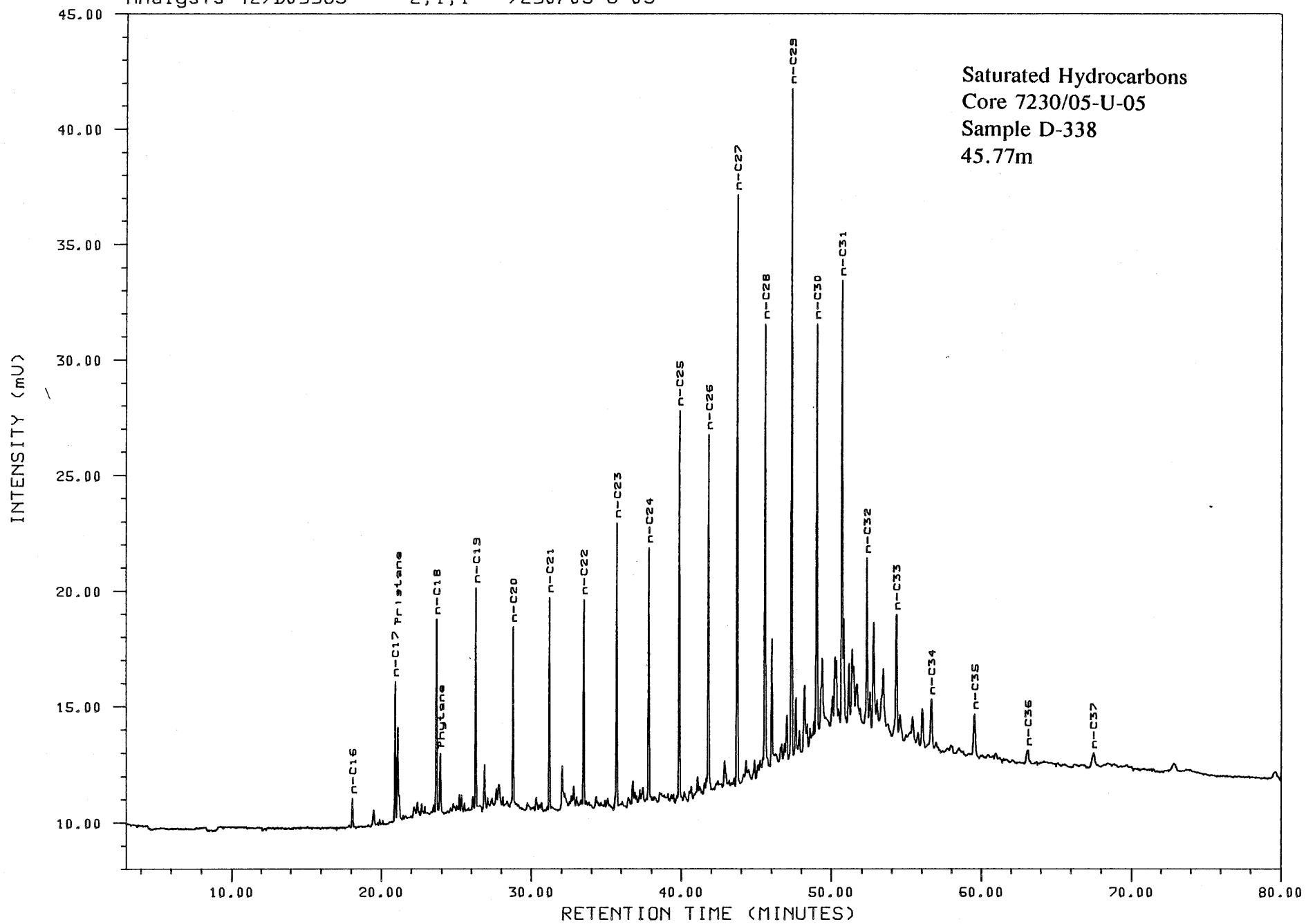
Analysis 427D0330S 3,1,1 7230/05-U-05



Analysis 427D0338S

2,1,1

7230/05-U-05



Analysis 427D0342S

2,1,1

7230/05-U-05

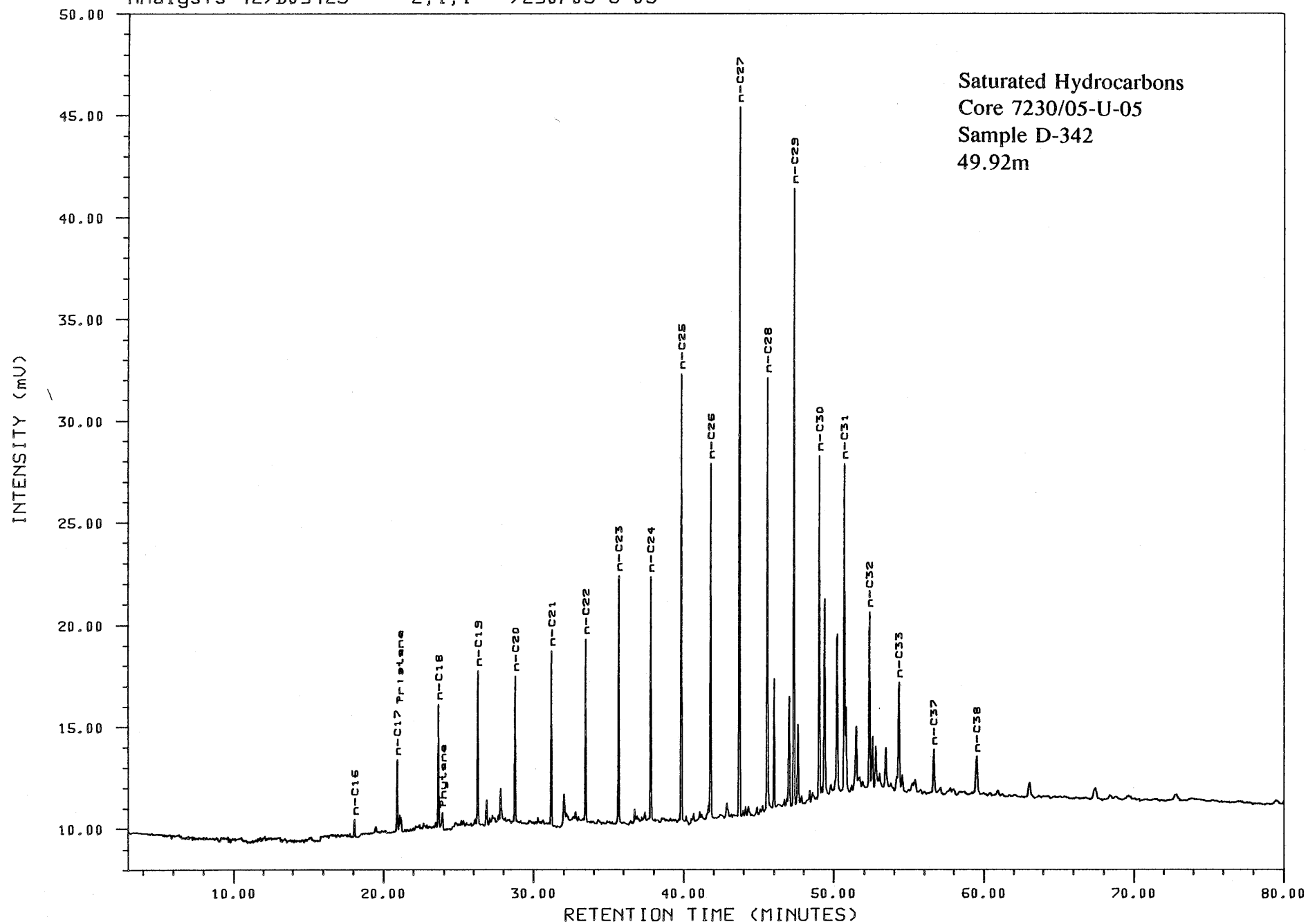


Figure A.II.5.3:

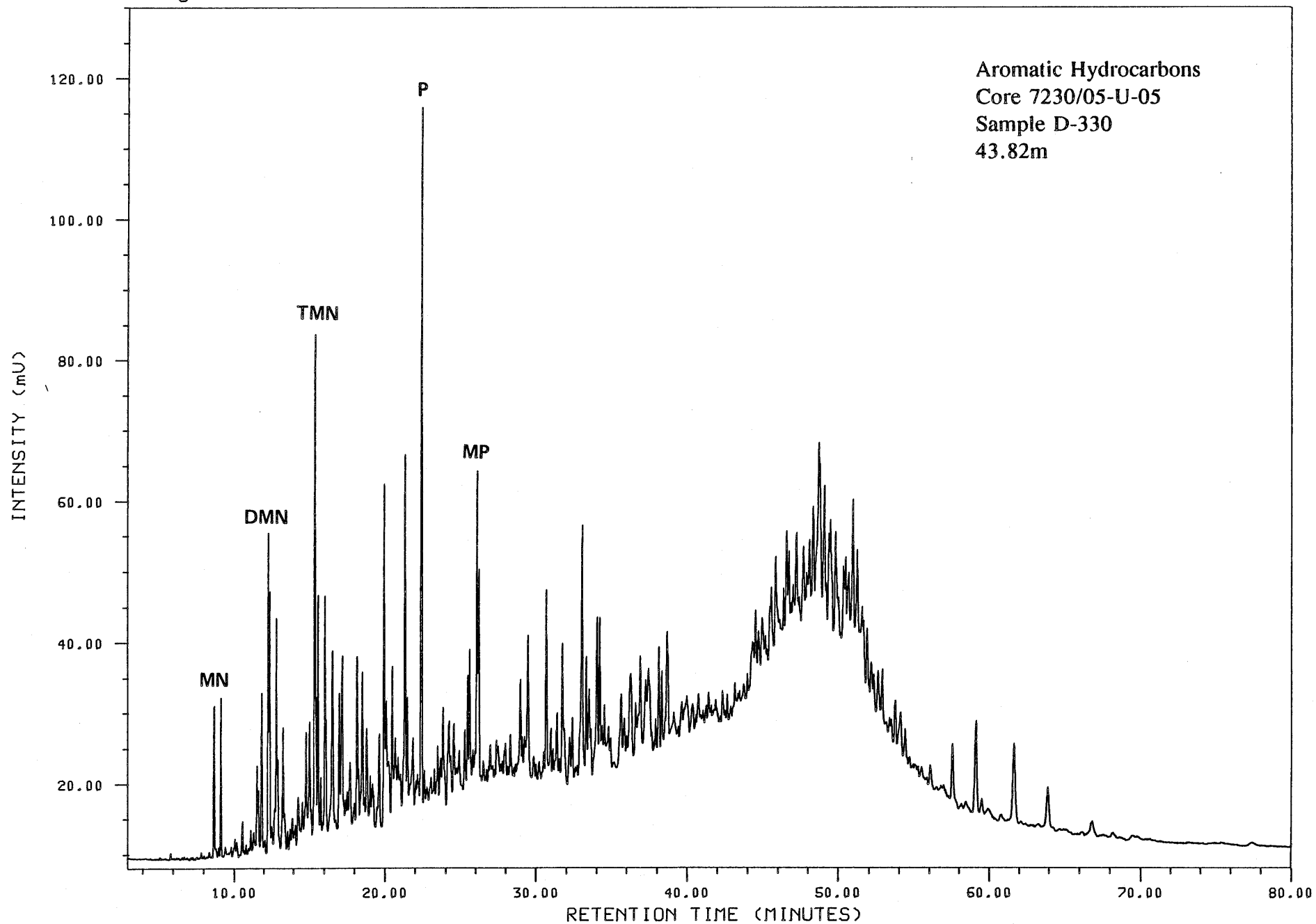
Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

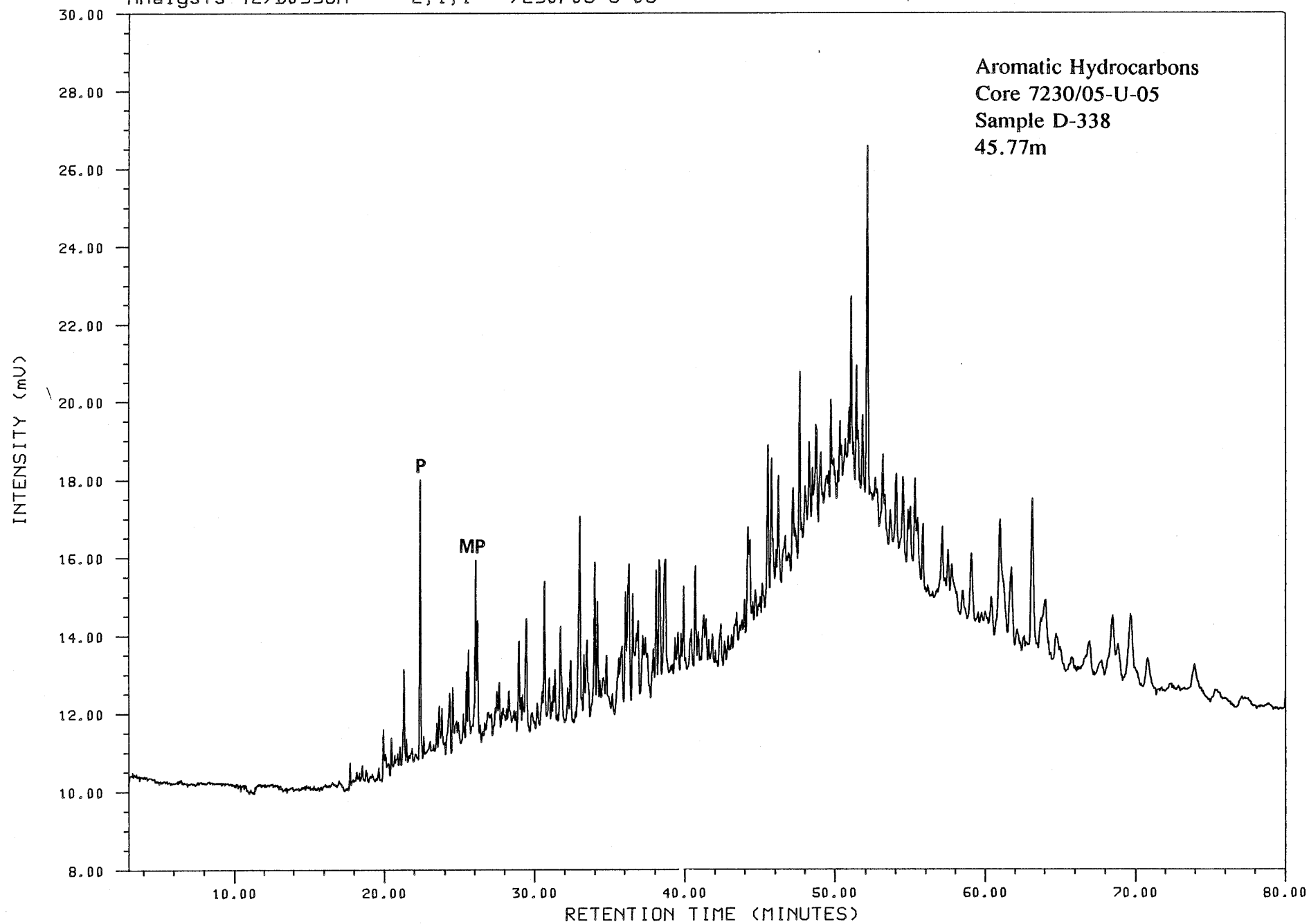
Analysis 427D0330A

2,1,1

7230/05-U-05



Analysis 427D0338A 2,1,1 7230/05-U-05



Analysis 427D0342A 2,1,1 7230/05-U-05

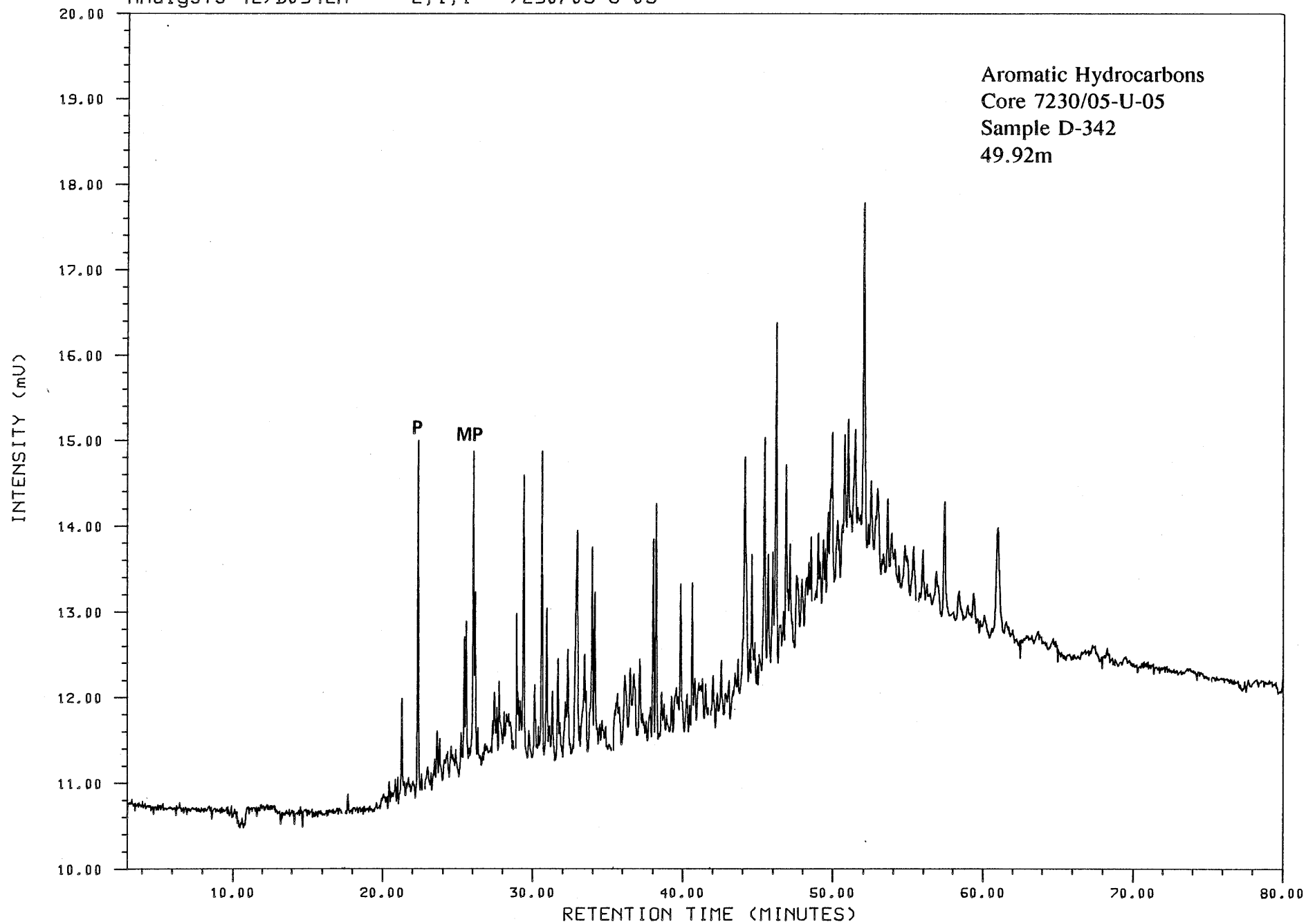
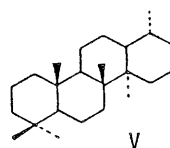
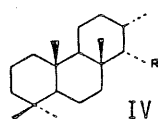
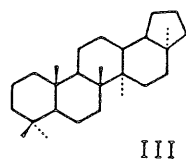
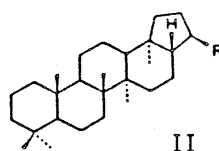
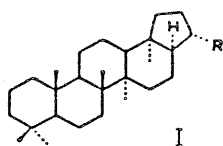


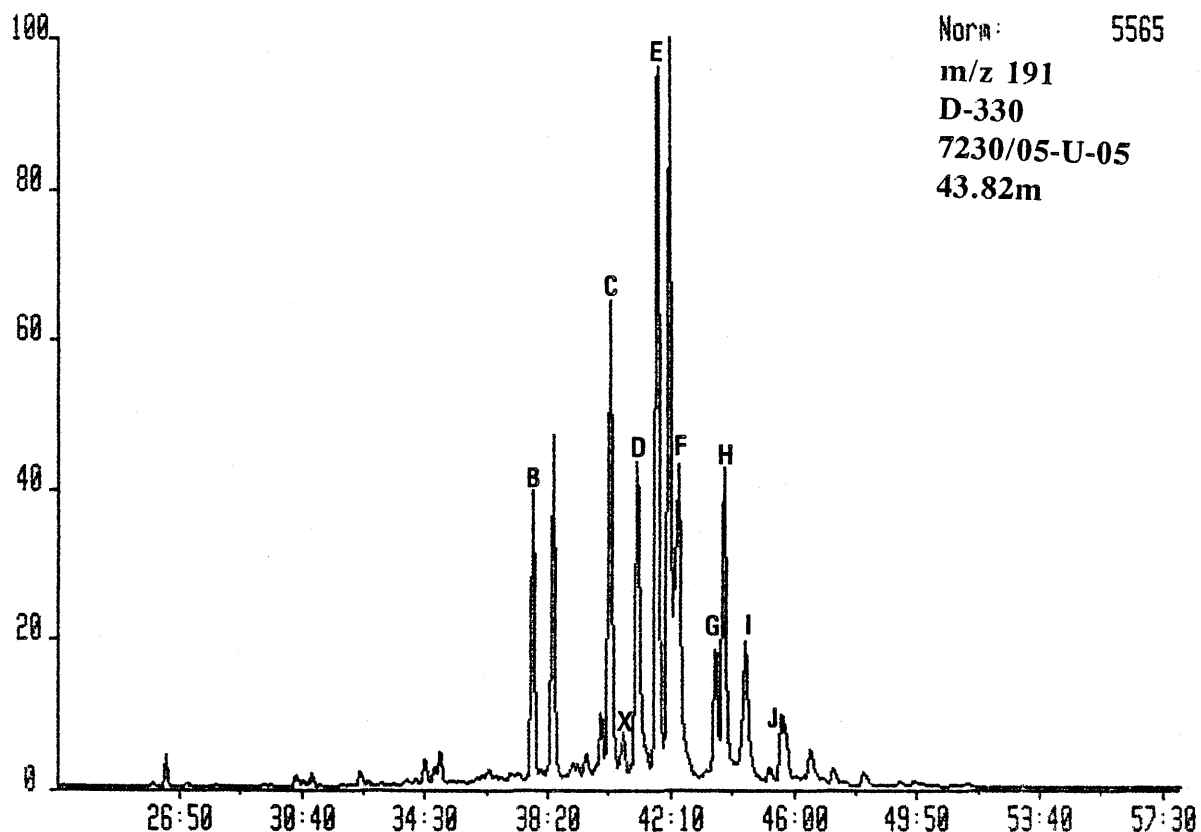
Figure A.II.5.4:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

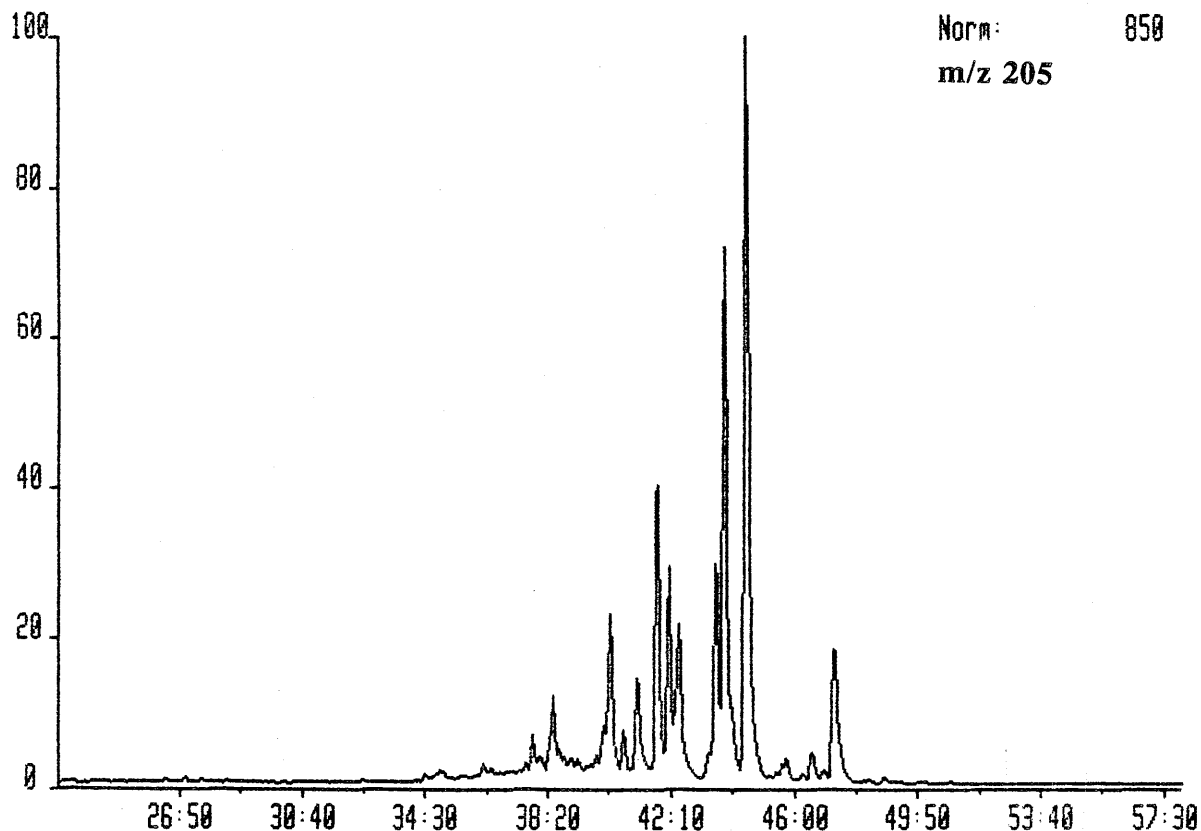
P	tricyclic terpane	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trishomohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trishomohopane	$C_{27}H_{46}$	(I, R=H)
Z	bishomohopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



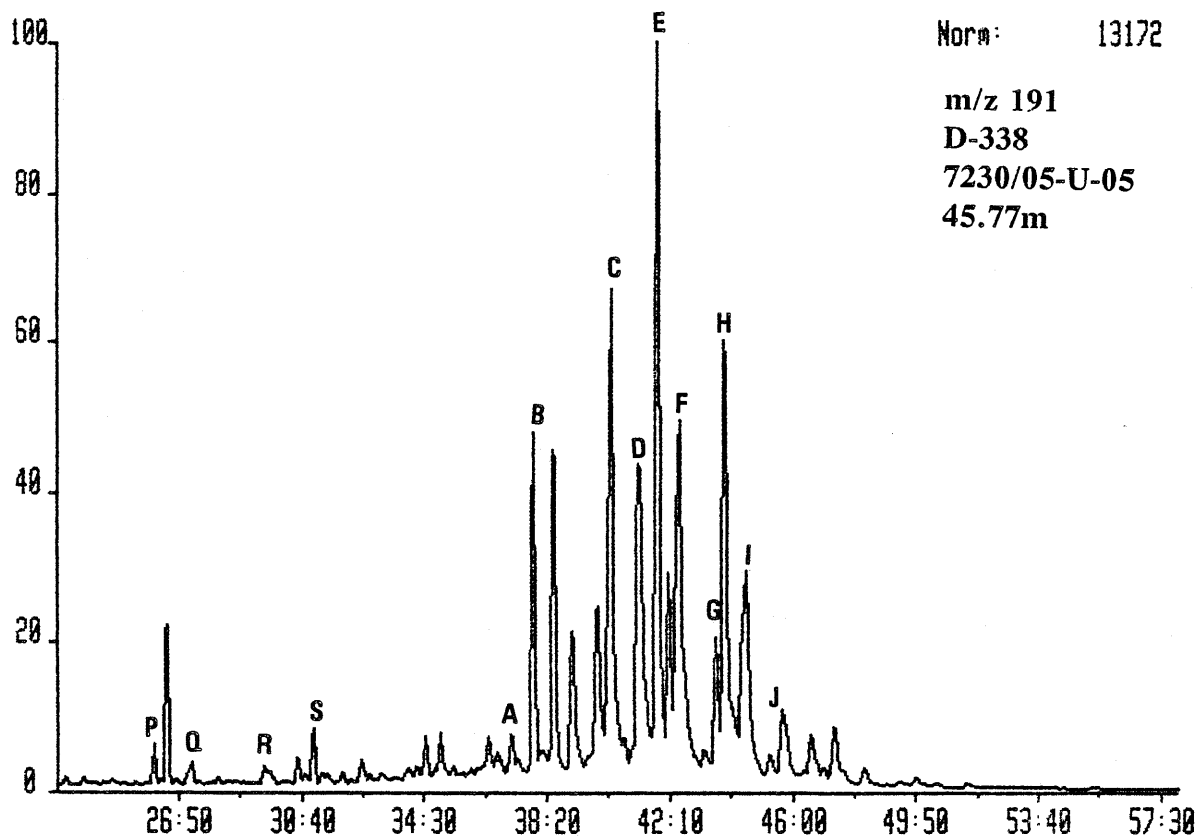
0330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



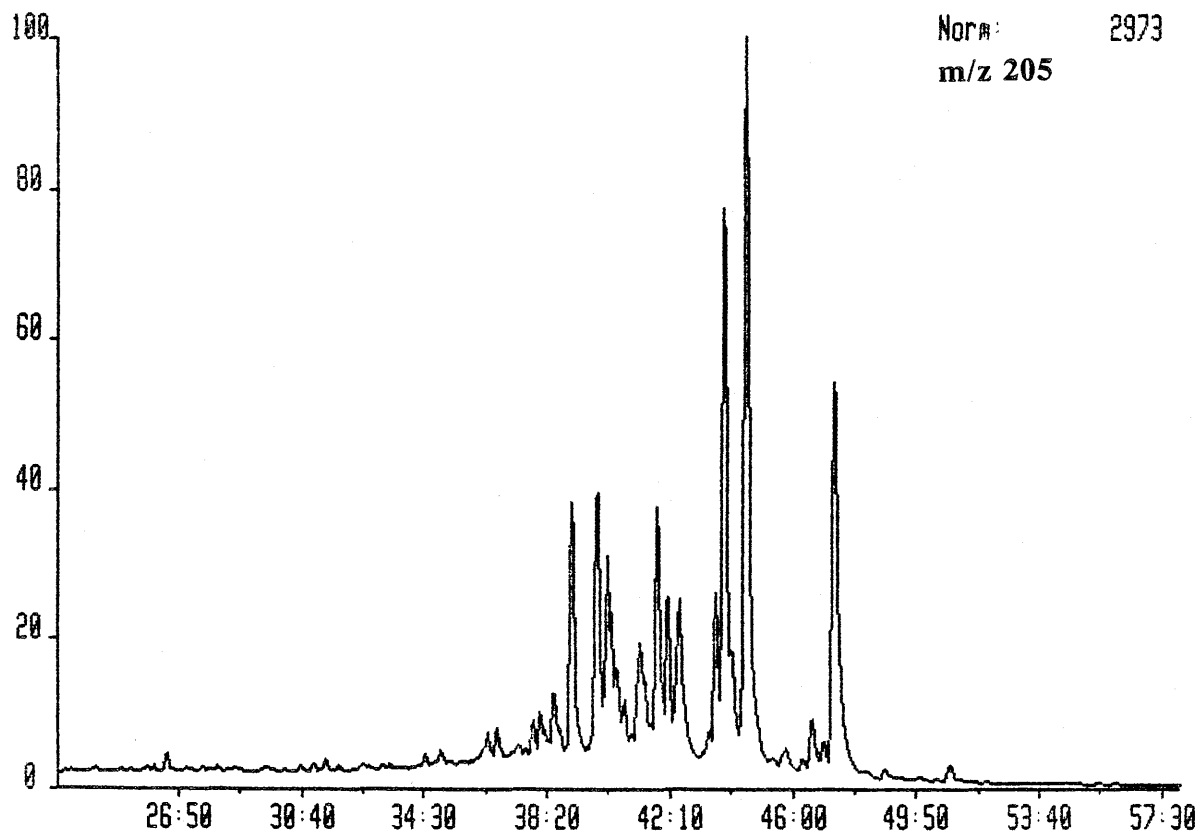
0330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



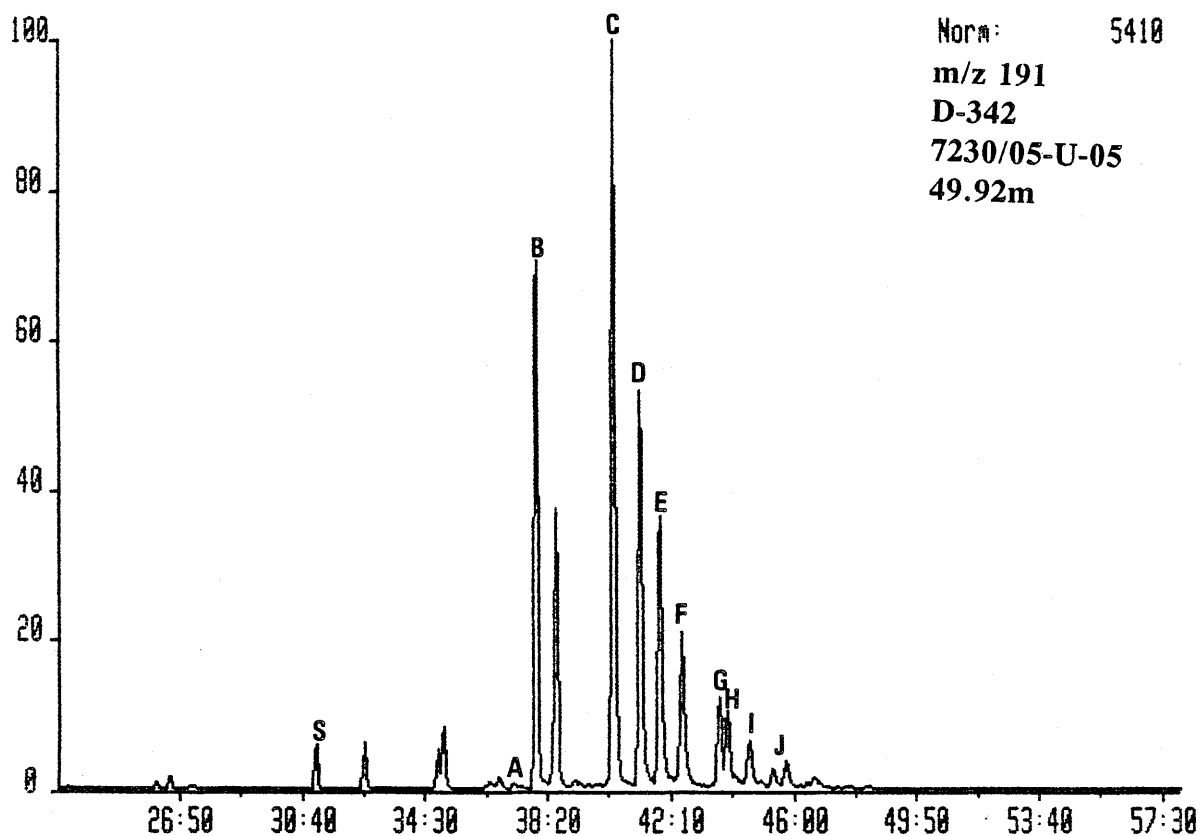
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



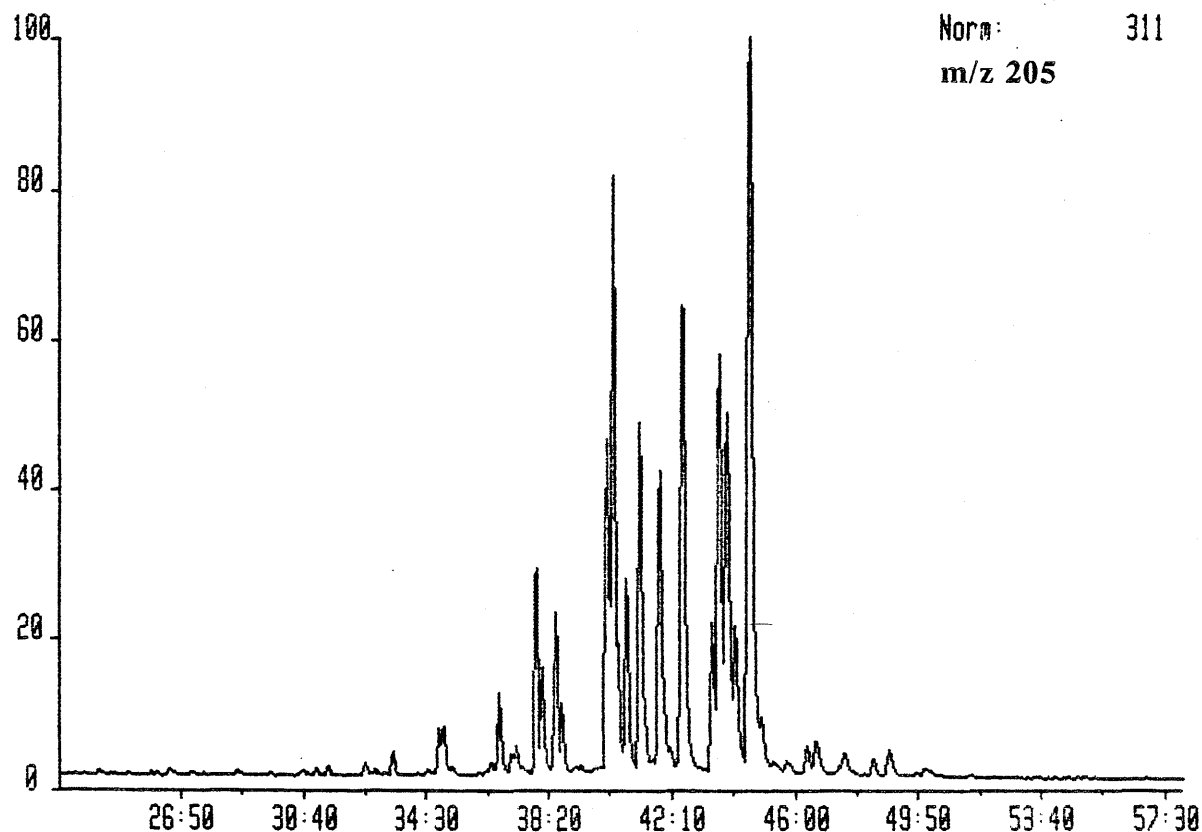
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



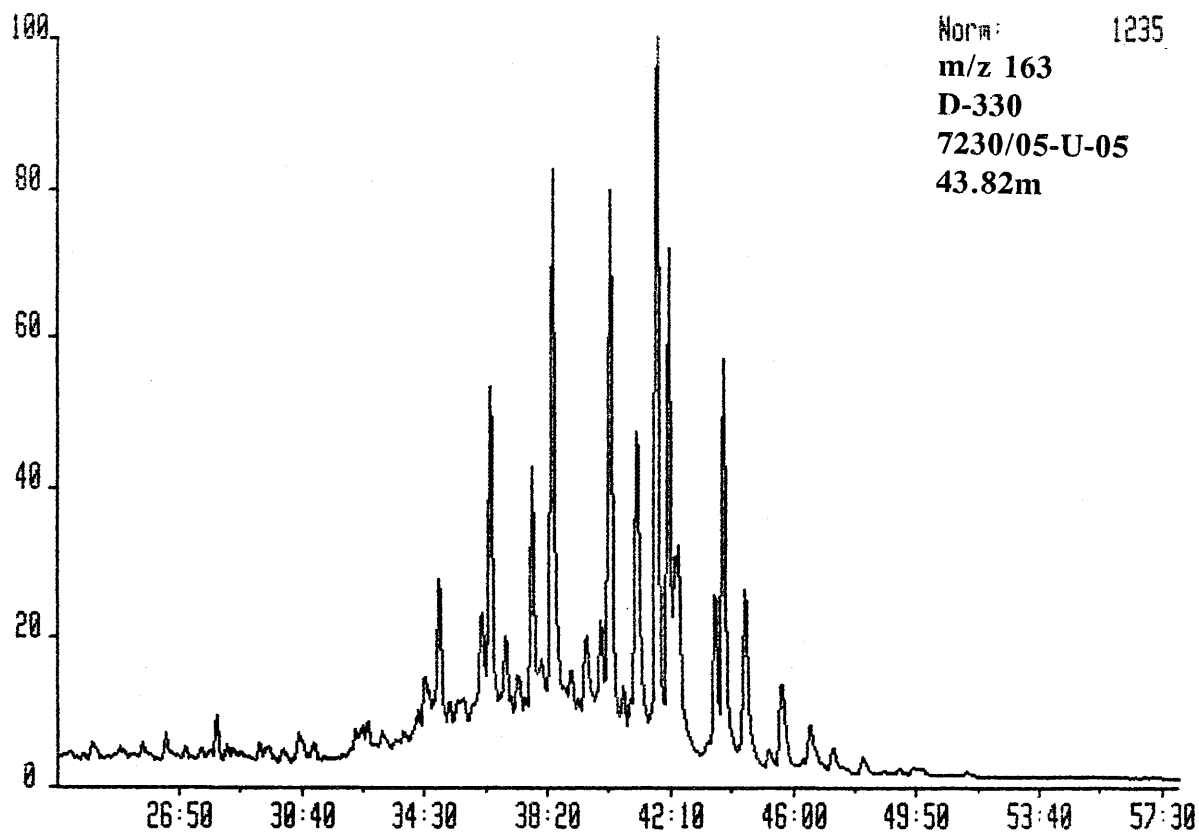
D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



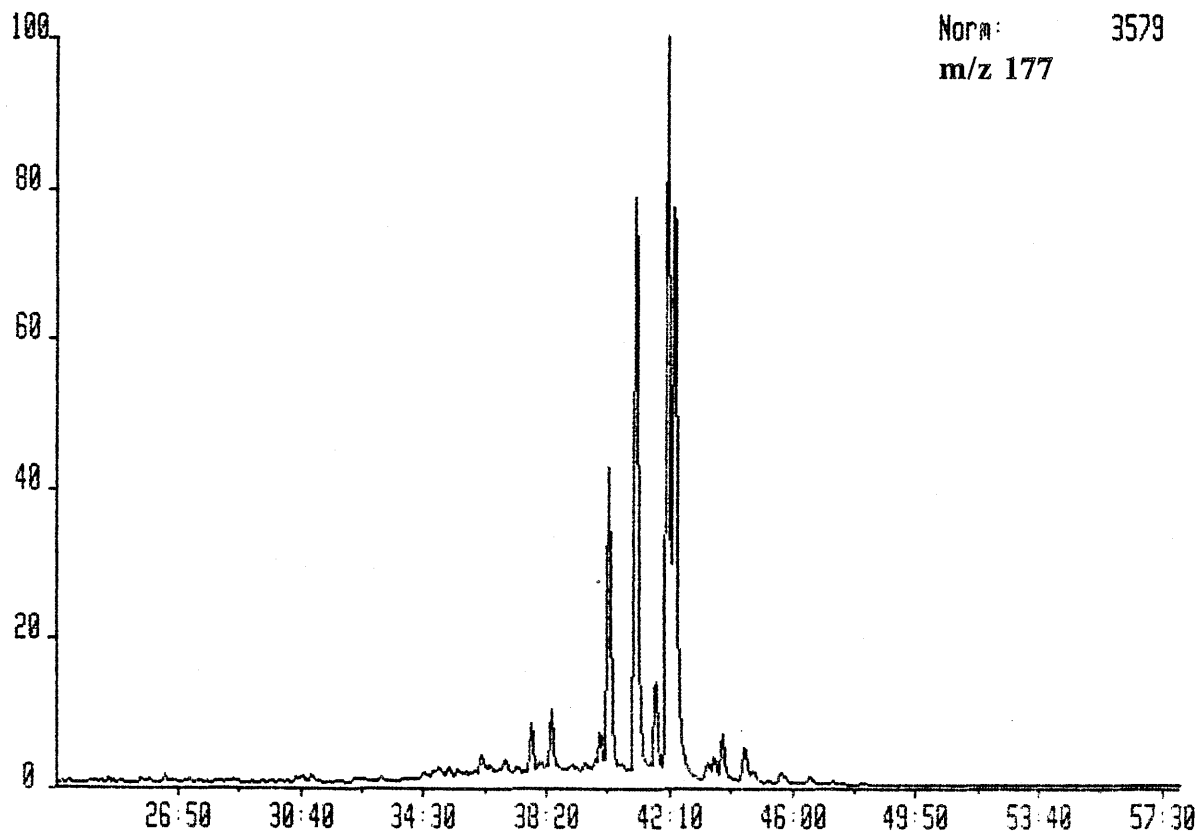
D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



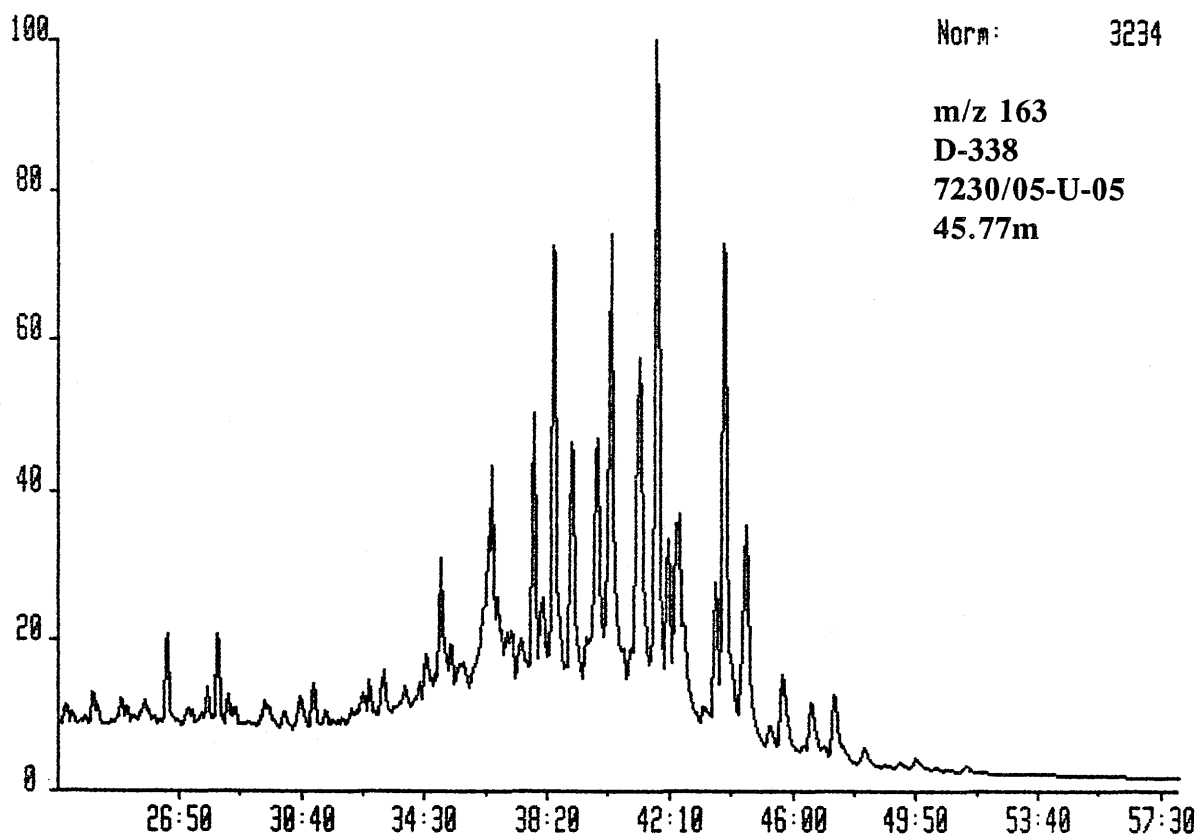
D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



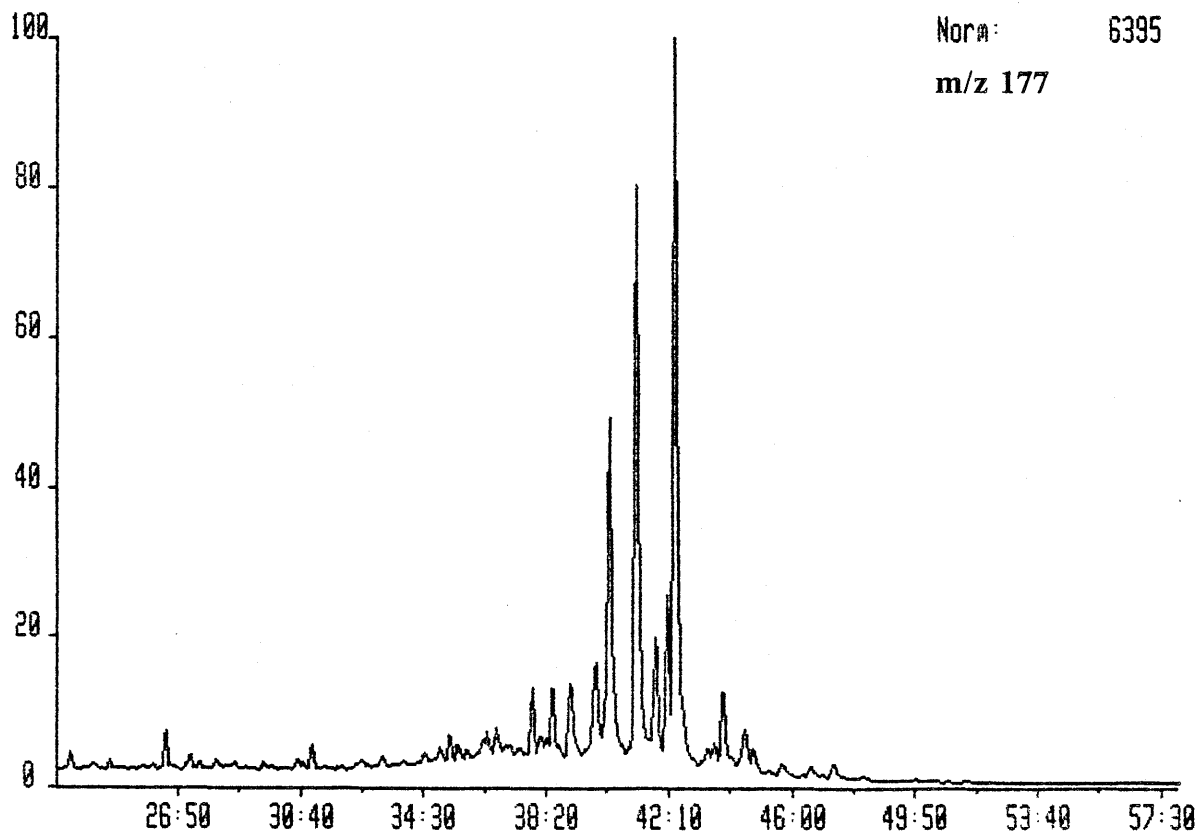
D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



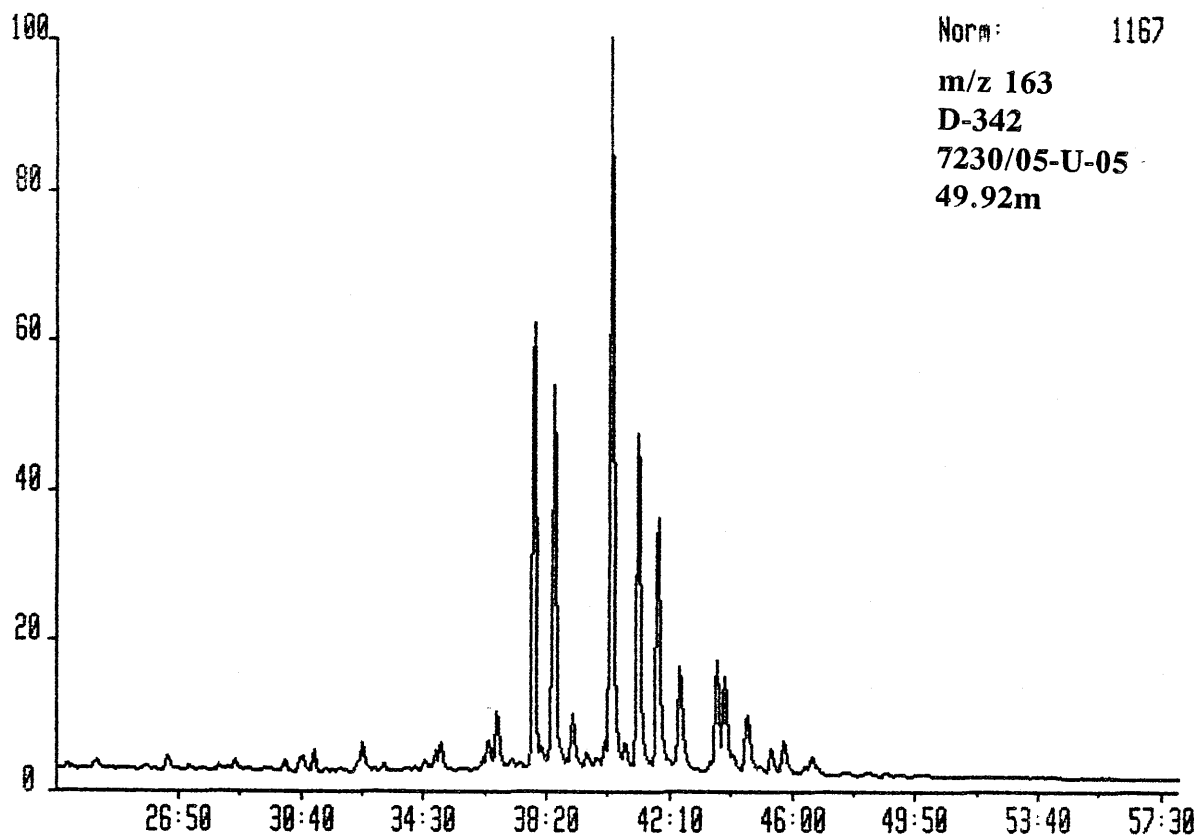
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

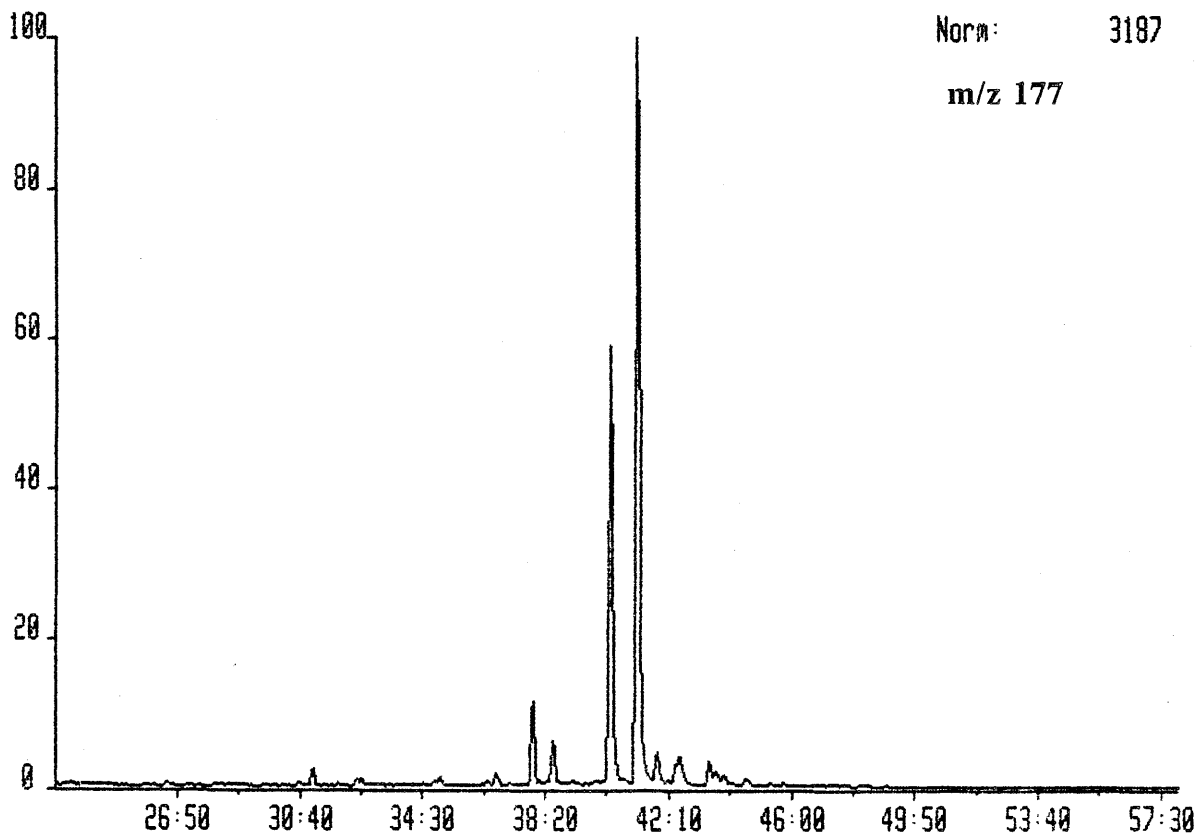
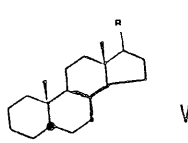
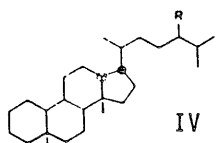
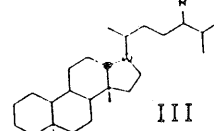
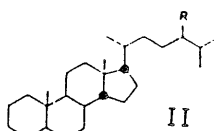
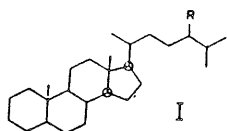


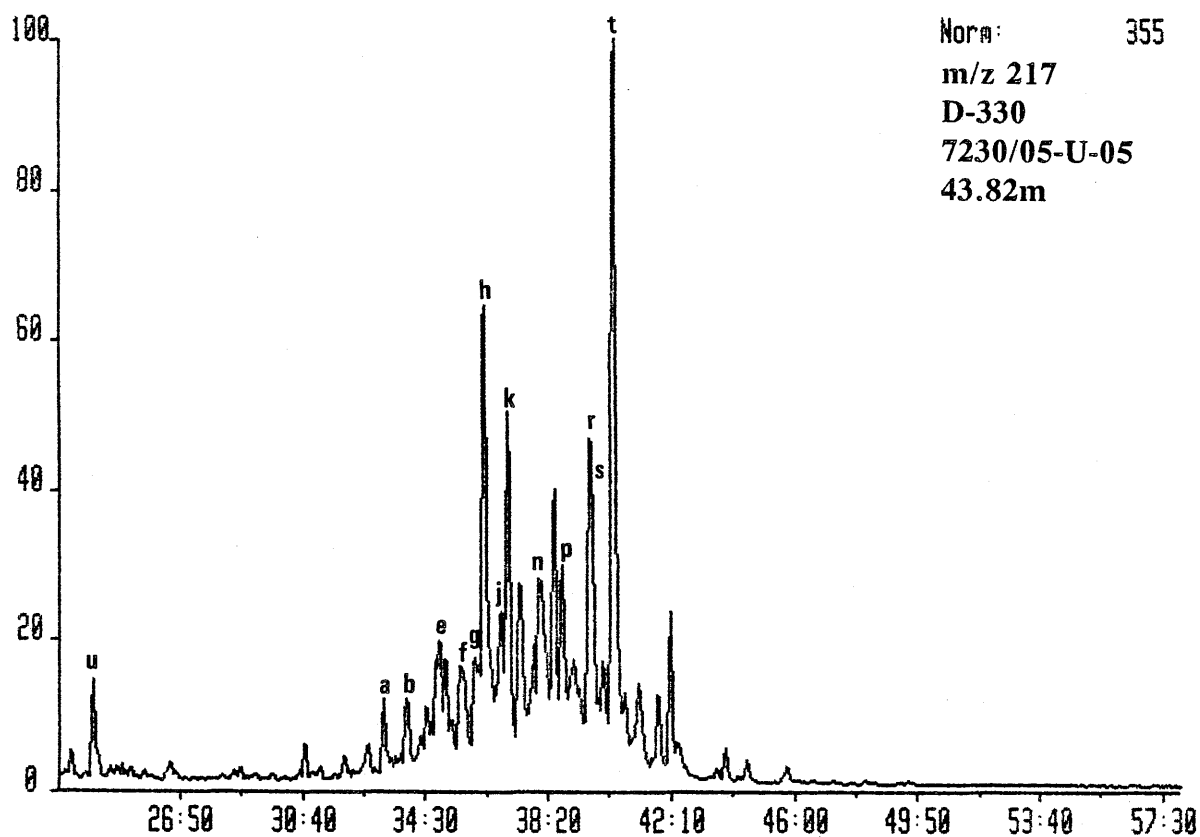
Figure A.II.5.5:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

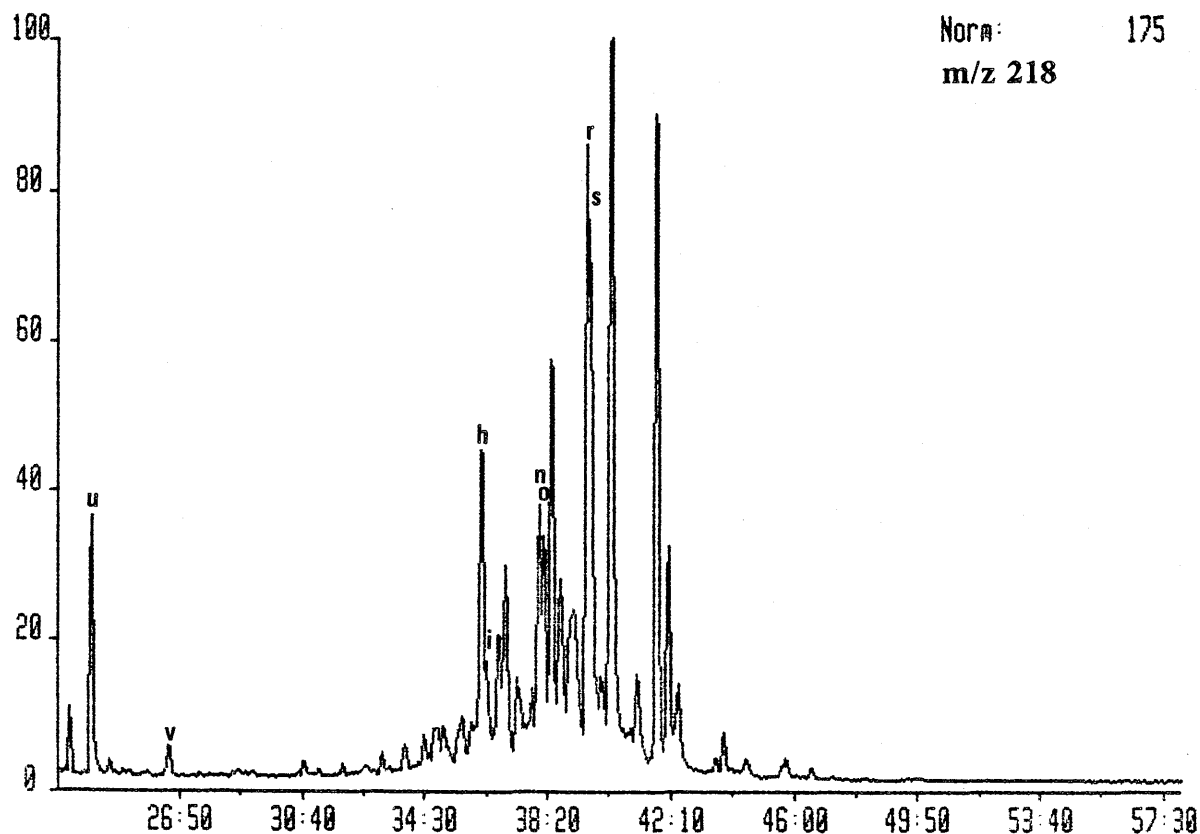
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)



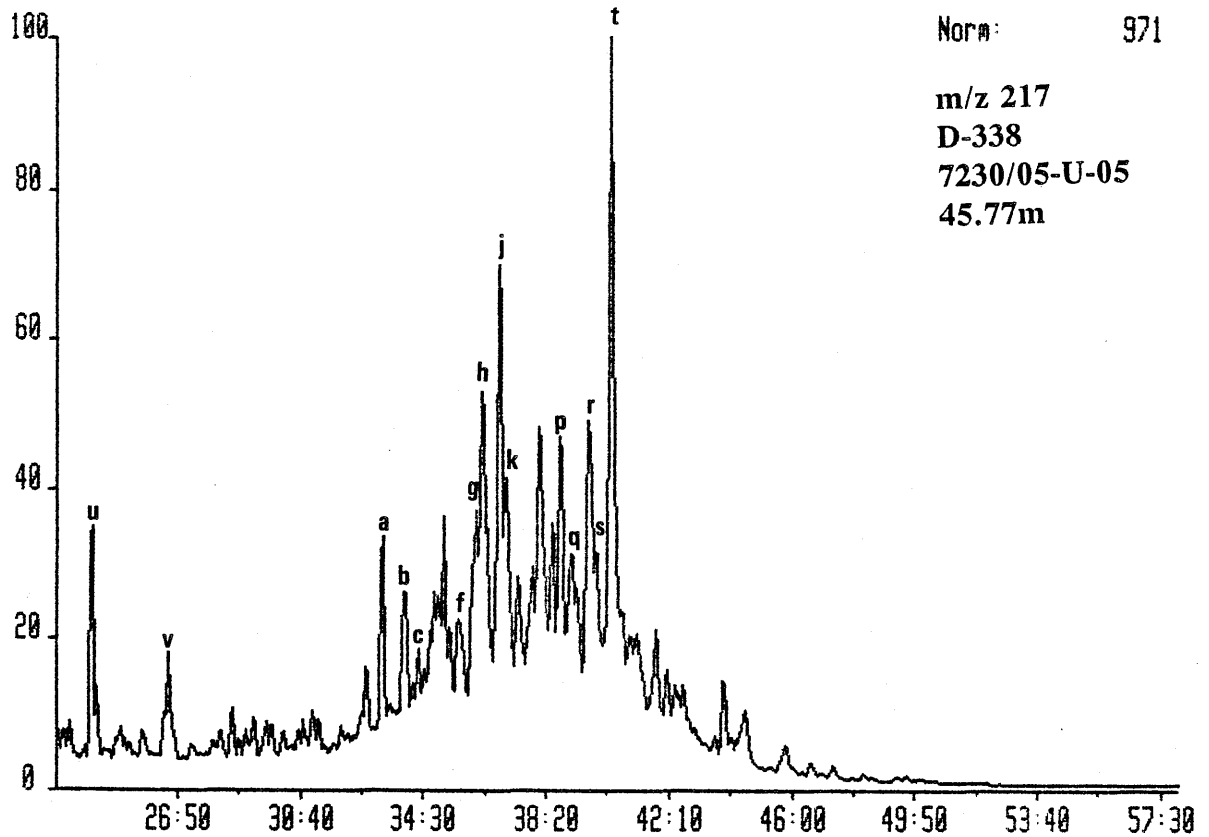
D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



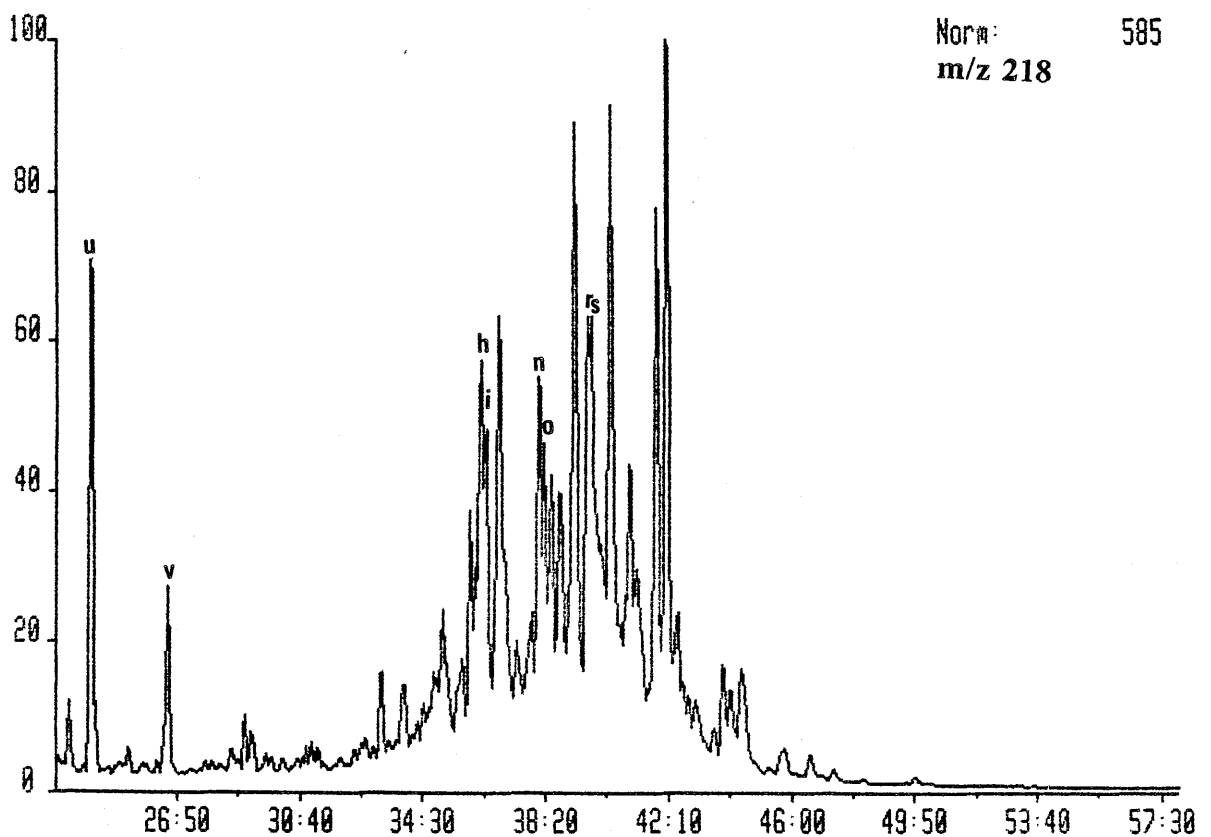
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



Norm: 971

m/z 217
D-338
7230/05-U-05
45.77m

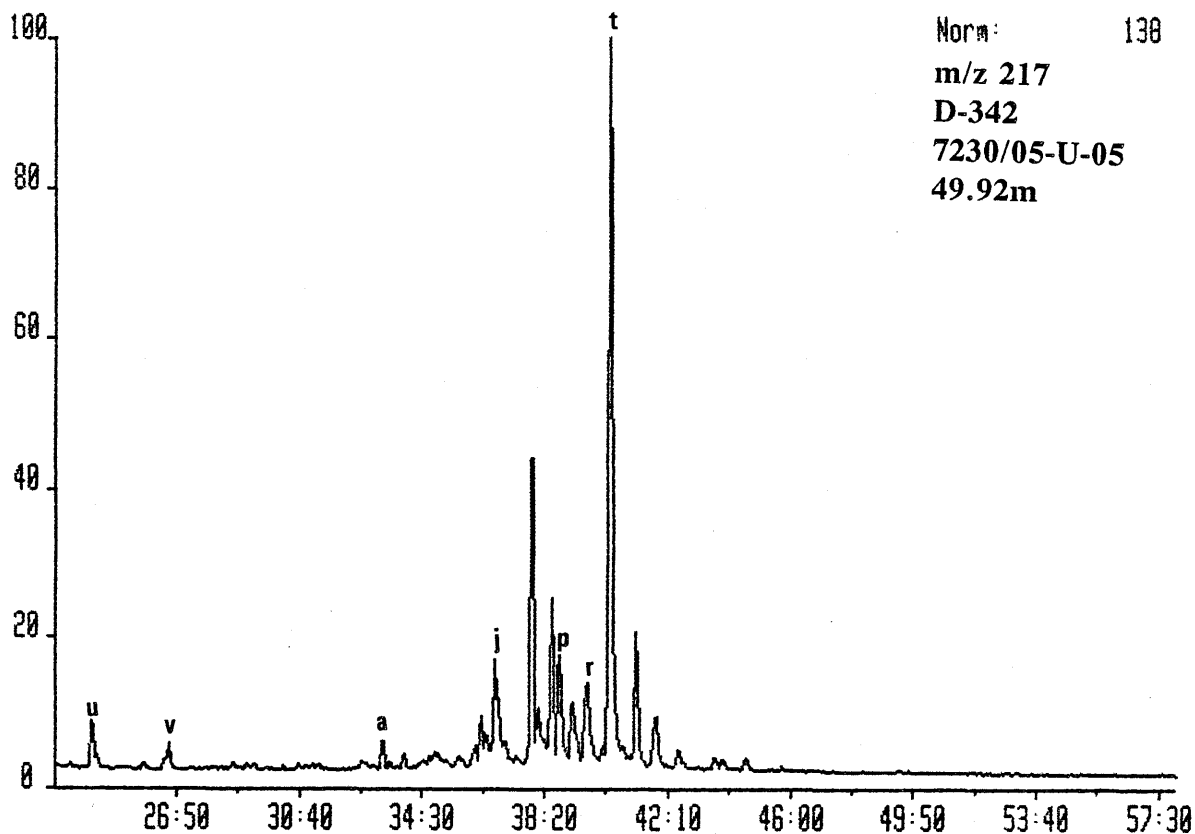
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



Norm: 585

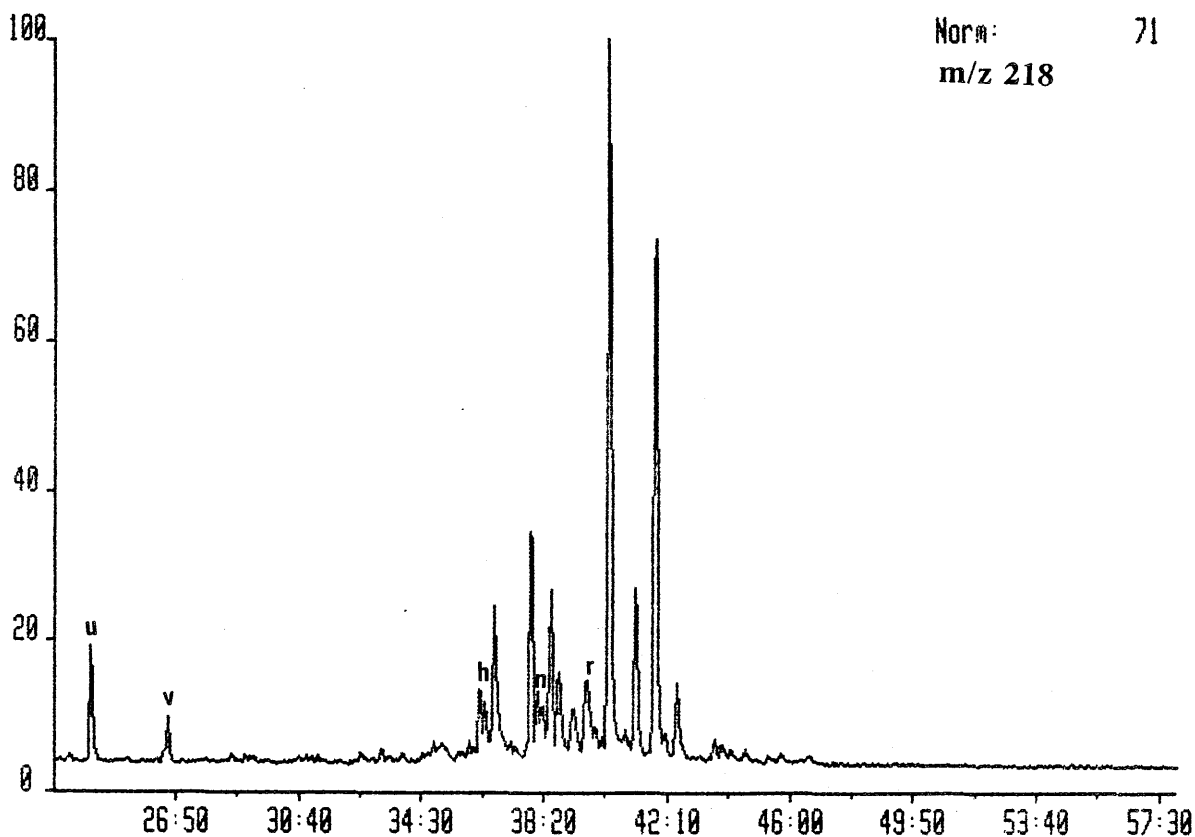
m/z 218

D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 217.1000
 Text:21.3427.23



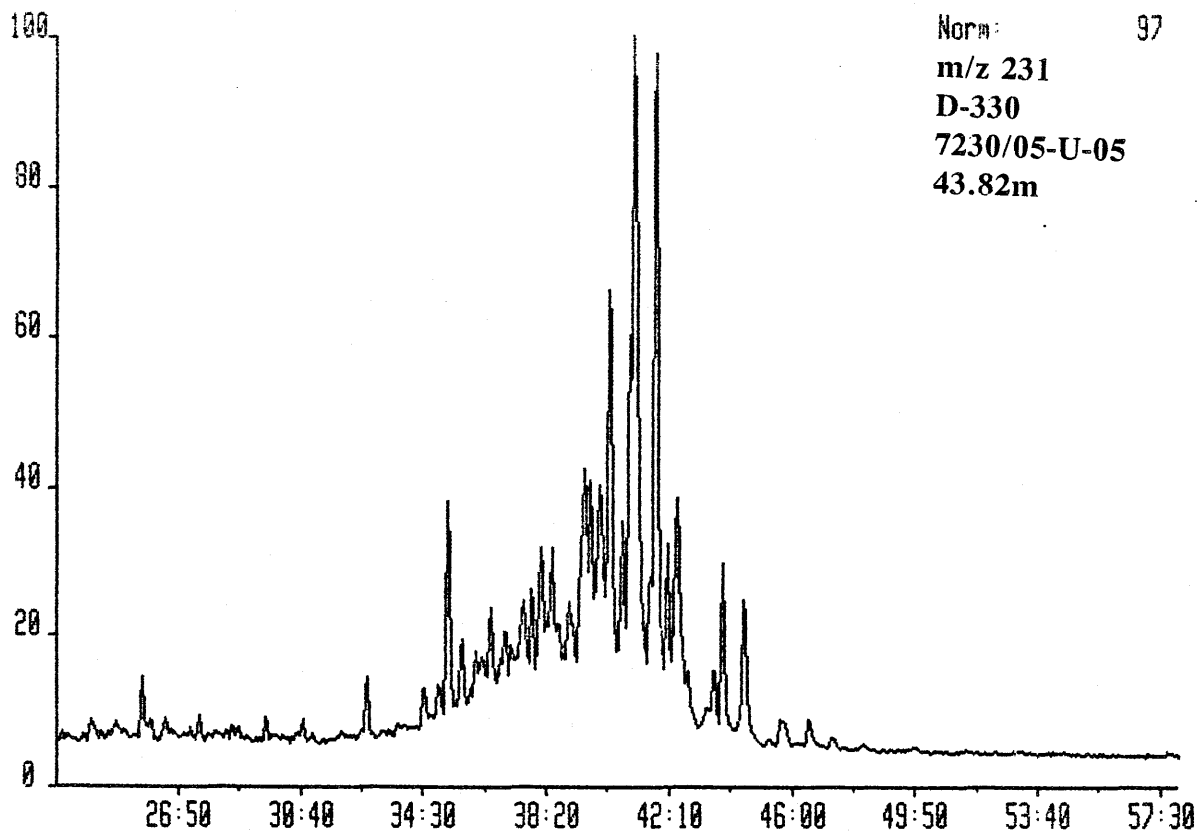
Norm: 130
 m/z 217
 D-342
 7230/05-U-05
 49.92m

D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
 Sample 1 Injection 1 Group 1 Mass 218.1000
 Text:21.3427.23

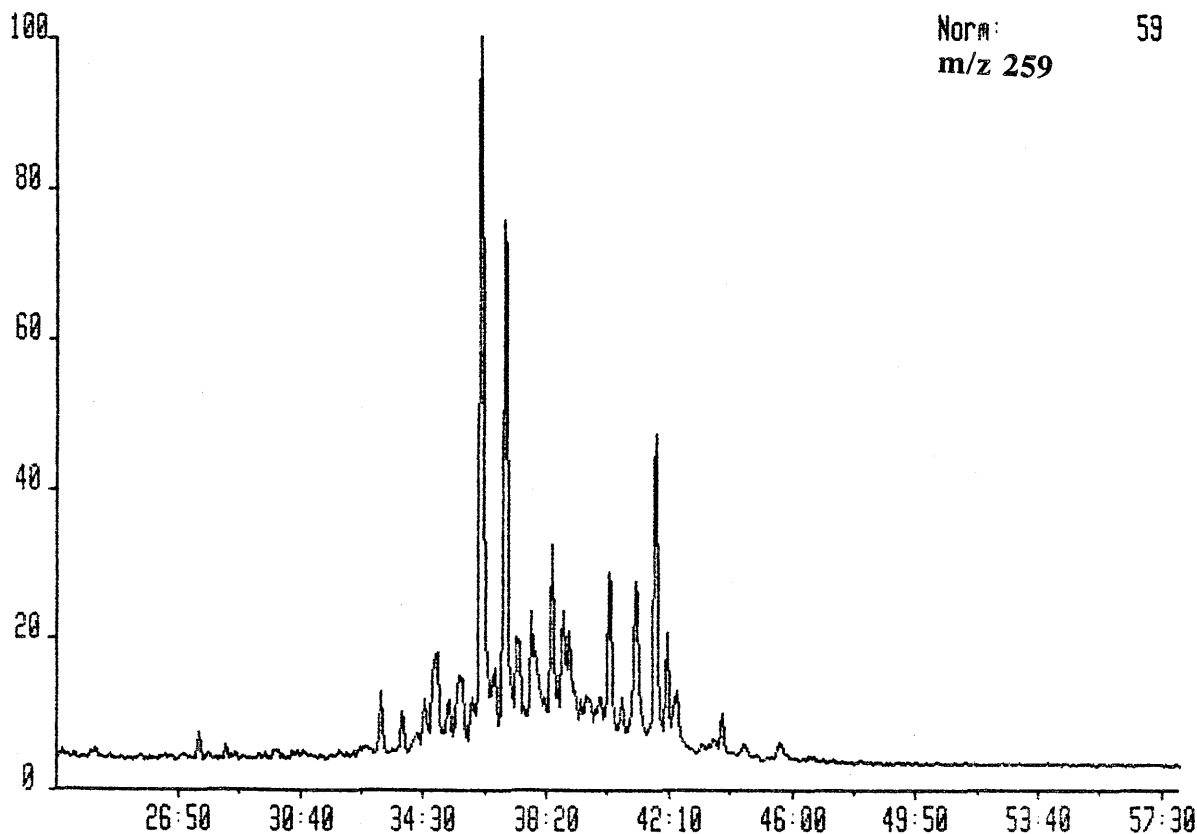


Norm: 71
 m/z 218

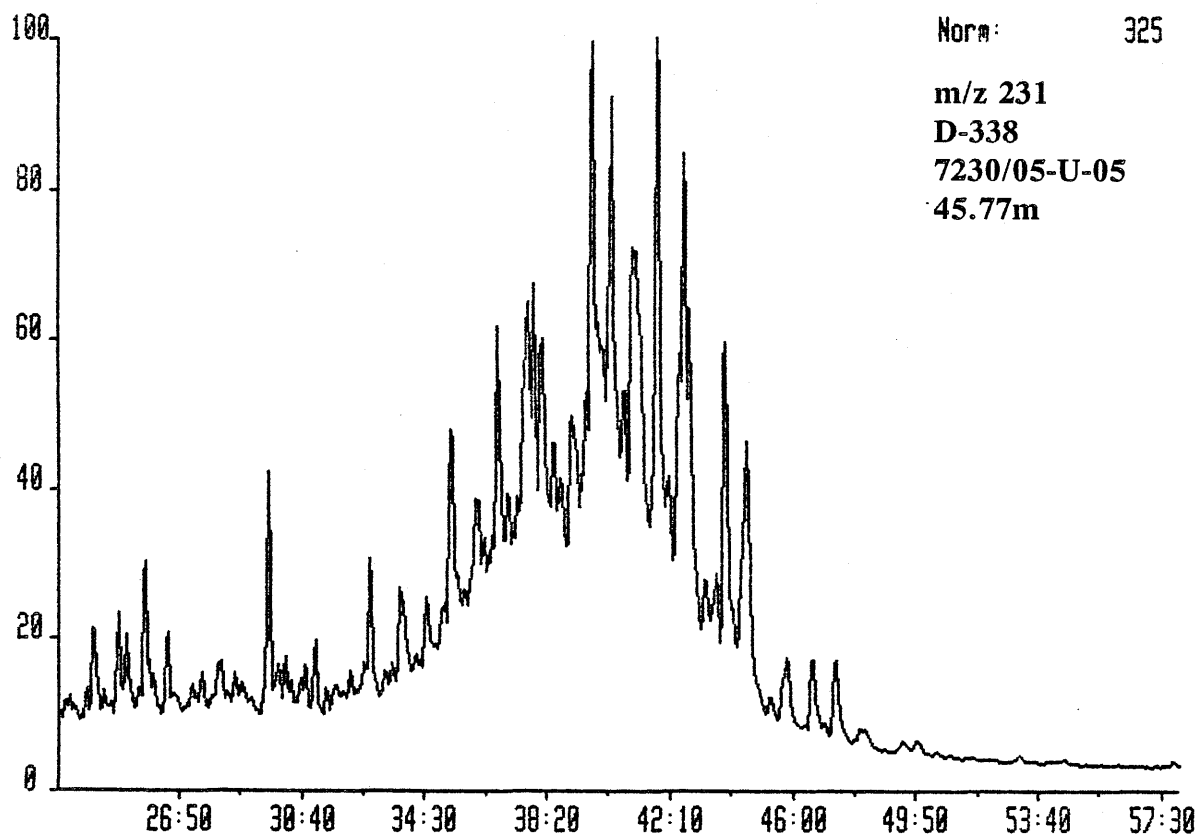
D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



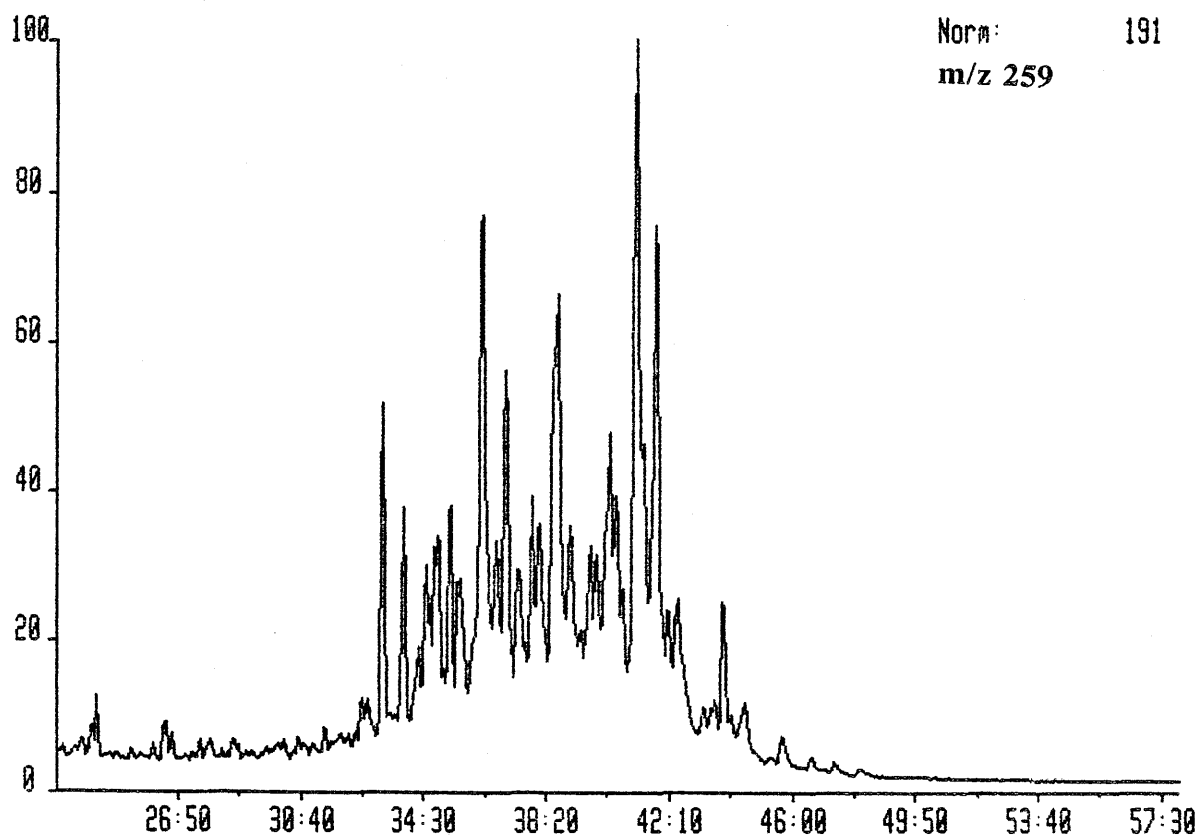
D330SAT1 26-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



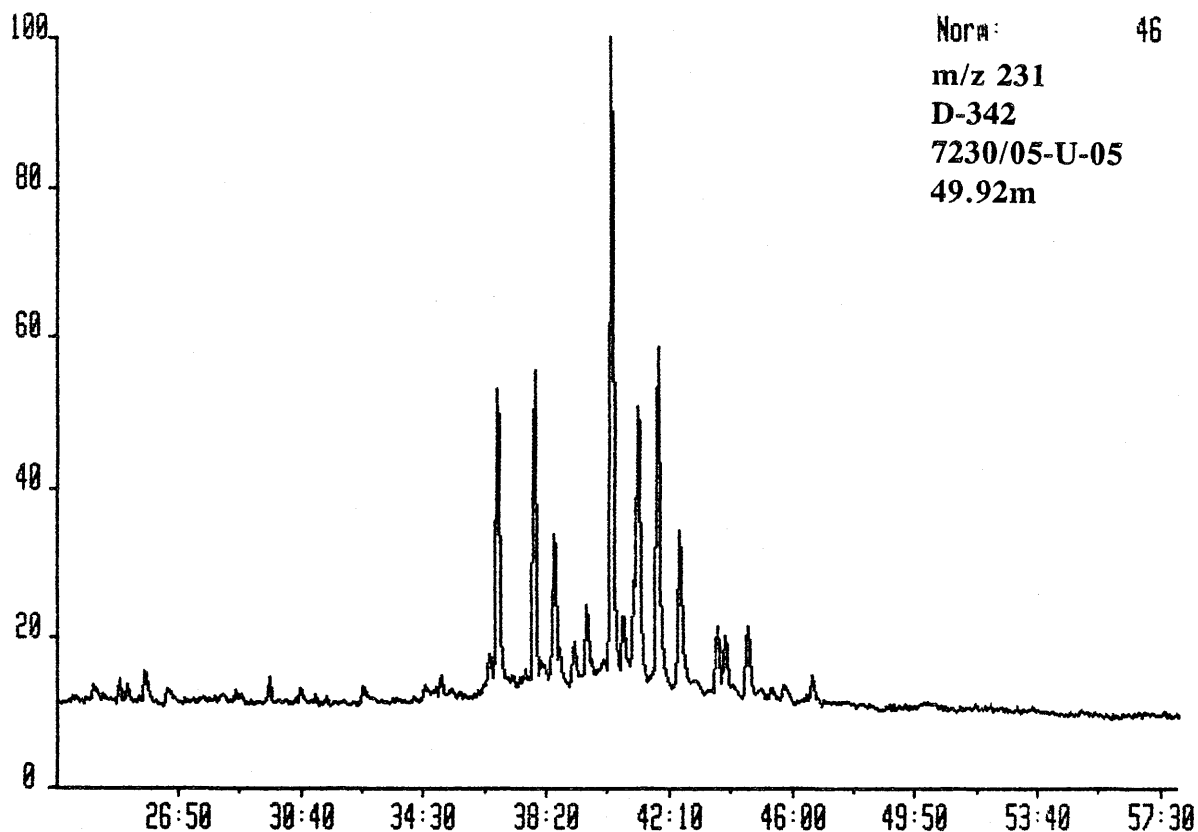
D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D338SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D342SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

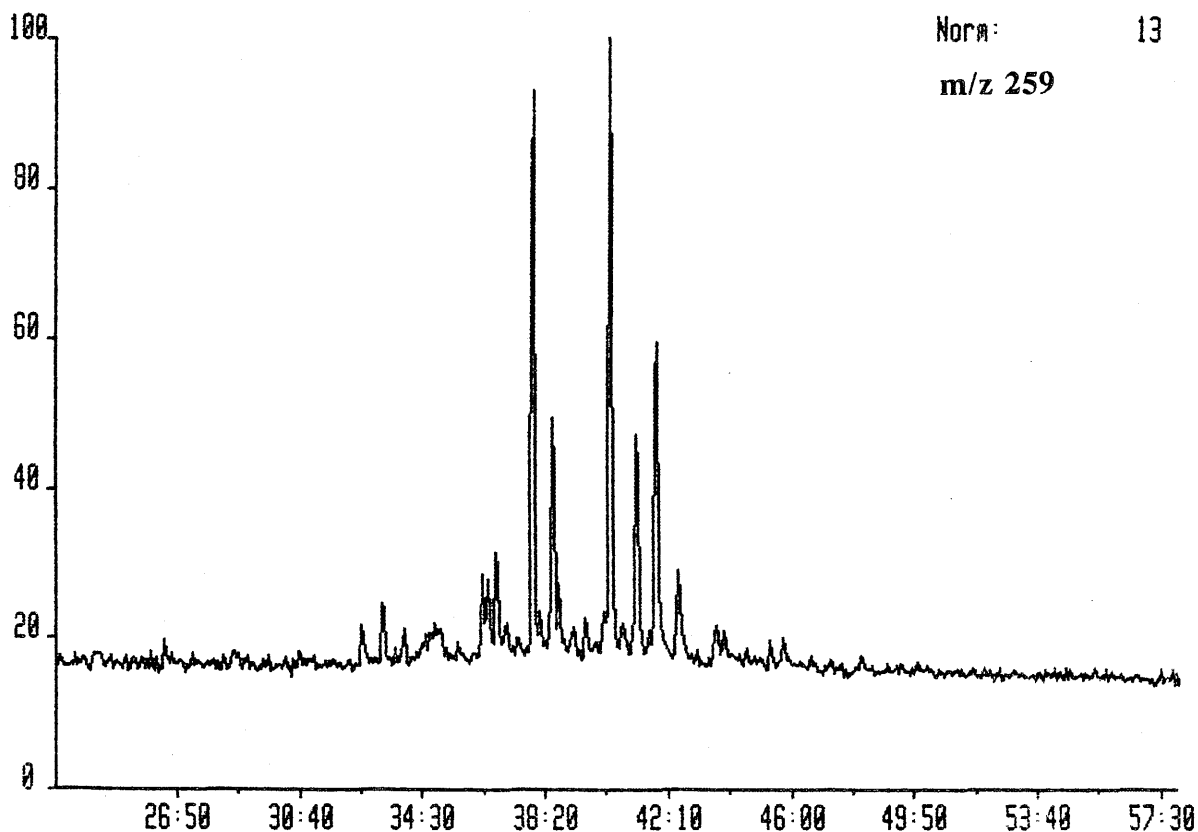


Figure A.II.5.6: Vitrinite reflectance histograms.

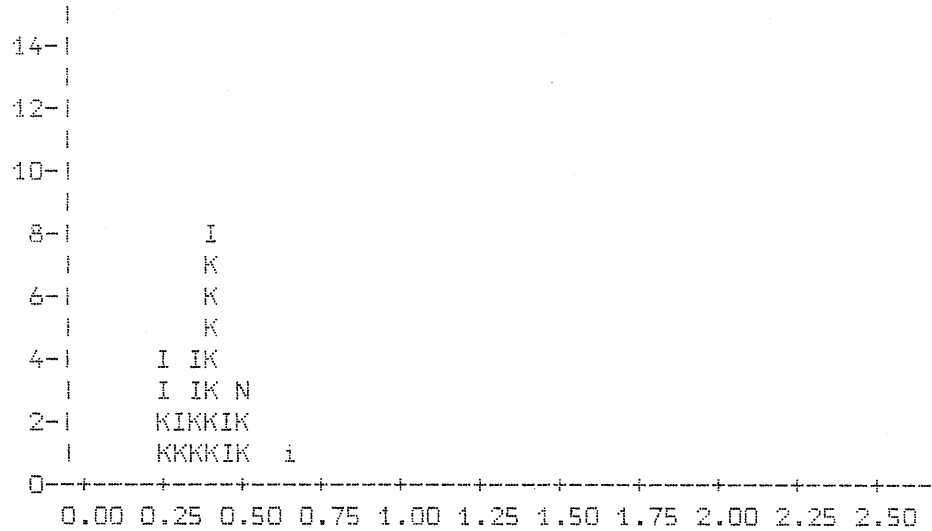
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
PP	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

IKU# D-1986 36.4M 7230/5-5



PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.25	0.51	ALL	23	0.39	0.07
N	0.67	0.68	ALL	1	0.67	0.00
			OVERALL	24	0.40	0.09

ORDERED VALUES FOLLOW:

```
0.25K 0.26I 0.28I 0.28K 0.32I 0.34K 0.35K 0.35K 0.36I 0.39I 0.40K
0.40K 0.40K 0.41K 0.42I 0.42K 0.42K 0.43K 0.45I 0.46I 0.50K 0.50K
0.50N 0.67i
```

IKU# D-1987 38.7M 7230/5-5

14-|

12-|

10-|

8-|

D

|

D

6-|

DNN

|

DND

4-|

DDD

|

DDD

2-|

DKDDD

|

DDKDDDDd

0-|

0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV

Y 0.27 0.53 ALL 25 0.38 0.07

N 0.58 0.64 ALL 2 0.61 0.04

OVERALL 27 0.40 0.09

ORDERED VALUES FOLLOW:

 0.27D 0.30D 0.30D 0.31D 0.32D 0.32D 0.33D 0.33D 0.34D 0.36N 0.36N
 0.36K 0.37K 0.38D 0.39D 0.40D 0.41D 0.41D 0.42N 0.44D 0.44D 0.46D
 0.46D 0.50D 0.52D 0.58d 0.63d

IKU# D-1988 44.0M 7230/5-5

14-1

12-1

10-1

8-1

6-1

DDD

Figure 1

DDD

4-1

DDDD

1

DDDDD

2-1

DDDKD d

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DDDKDDkd

□ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$ $\frac{1}{7}$ $\frac{1}{8}$ $\frac{1}{9}$ $\frac{1}{10}$ $\frac{1}{11}$ $\frac{1}{12}$ $\frac{1}{13}$ $\frac{1}{14}$ $\frac{1}{15}$ $\frac{1}{16}$ $\frac{1}{17}$ $\frac{1}{18}$ $\frac{1}{19}$ $\frac{1}{20}$ $\frac{1}{21}$ $\frac{1}{22}$ $\frac{1}{23}$ $\frac{1}{24}$ $\frac{1}{25}$ $\frac{1}{26}$ $\frac{1}{27}$ $\frac{1}{28}$ $\frac{1}{29}$ $\frac{1}{30}$ $\frac{1}{31}$ $\frac{1}{32}$ $\frac{1}{33}$ $\frac{1}{34}$ $\frac{1}{35}$ $\frac{1}{36}$ $\frac{1}{37}$ $\frac{1}{38}$ $\frac{1}{39}$ $\frac{1}{40}$ $\frac{1}{41}$ $\frac{1}{42}$ $\frac{1}{43}$ $\frac{1}{44}$ $\frac{1}{45}$ $\frac{1}{46}$ $\frac{1}{47}$ $\frac{1}{48}$ $\frac{1}{49}$ $\frac{1}{50}$ $\frac{1}{51}$ $\frac{1}{52}$ $\frac{1}{53}$ $\frac{1}{54}$ $\frac{1}{55}$ $\frac{1}{56}$ $\frac{1}{57}$ $\frac{1}{58}$ $\frac{1}{59}$ $\frac{1}{60}$ $\frac{1}{61}$ $\frac{1}{62}$ $\frac{1}{63}$ $\frac{1}{64}$ $\frac{1}{65}$ $\frac{1}{66}$ $\frac{1}{67}$ $\frac{1}{68}$ $\frac{1}{69}$ $\frac{1}{70}$ $\frac{1}{71}$ $\frac{1}{72}$ $\frac{1}{73}$ $\frac{1}{74}$ $\frac{1}{75}$ $\frac{1}{76}$ $\frac{1}{77}$ $\frac{1}{78}$ $\frac{1}{79}$ $\frac{1}{80}$ $\frac{1}{81}$ $\frac{1}{82}$ $\frac{1}{83}$ $\frac{1}{84}$ $\frac{1}{85}$ $\frac{1}{86}$ $\frac{1}{87}$ $\frac{1}{88}$ $\frac{1}{89}$ $\frac{1}{90}$ $\frac{1}{91}$ $\frac{1}{92}$ $\frac{1}{93}$ $\frac{1}{94}$ $\frac{1}{95}$ $\frac{1}{96}$ $\frac{1}{97}$ $\frac{1}{98}$ $\frac{1}{99}$ $\frac{1}{100}$

0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
----	-----	------	-----	------	------	------

Y 0.27 0.53 ALL 26 0.36 0.07

N 0.58 0.63 ALL 3 0.59 0.02

OVERALL 29 0.39 0.10

ORDERED VALUES FOLLOW:

0.270	0.280	0.280	0.280	0.290	0.290	0.310	0.310	0.330	0.330	0.330
0.330	0.350	0.380	0.380	0.390	0.390	0.390	0.400	0.41K	0.43K	0.440
0.450	0.450	0.470	0.520	0.58k	0.58d	0.62d				

A step plot showing the cumulative distribution of the number of runs (D, DD, DDD, DKK, DKKK) for a sample of size $n=10$. The x-axis represents the number of runs (0.00 to 2.50) and the y-axis represents the cumulative probability (0 to 14). The plot shows a step function with jumps at 0.25, 0.50, 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25, and 2.50.

Number of Runs	Count	Cumulative Count
0	1	1
1	2	3
2	3	6
3	4	10
4	2	12
5	1	13

```

PP LOW HIGH LIT #VAL MEAN STDV
Y 0.27 0.54 ALL 27 0.35 0.08
OVERALL 27 0.35 0.08

```

ORDERED VALUES FOLLOW:

0.27D	0.27K	0.28D	0.28D	0.29D	0.29D	0.29D	0.30K	0.31D	0.32D	0.32D
0.33K	0.33D	0.33K	0.33K	0.33D	0.35K	0.35D	0.36K	0.36D	0.37K	0.43D
0.45D	0.45D	0.50D	0.52K	0.53D						

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I	I
I											(%)	nC4	I	I
I	D 0486	26.61	169	2					171	2	1.22	*****	I	I
I	D 0490	29.66	221	2					223	2	1.04	*****	I	I
I	D 0497	35.76	103	1					104	1	1.26	*****	I	I
I	D 0501	38.86	256	3					260	3	1.21	*****	I	I
I	D 0505	41.90	5121	23					5144	23	0.44	*****	I	I
I	D 0509	44.93	4221	422					4642	422	9.08	*****	I	I
I	D 0513	46.84	27202	3314	48				30565	3362	11.00	*****	I	I
I	D 0517	48.46	11635	836					12471	836	6.70	*****	I	I
I	D 0521	51.47	10501	24					10525	24	0.22	*****	I	I
I	D 0525	54.50	7101	456					7557	456	6.03	*****	I	I
I	D 0529	57.58	7250	1790	689	76	42	17	9847	2597	26.37	1.81	I	I
I	D 0533	60.61	10693	1546	339	31	19	7	12629	1935	15.33	1.64	I	I
I	D 0537	62.71	38049	3145	859	78	45	20	42176	4127	9.79	1.73	I	I
I	D 0603	63.71	9650	1538	330	27	16		11561	1911	16.53	1.64	I	I
I	D 0606	65.80	16068	2298	473	40	21	6	18901	2832	14.99	1.94	I	I
I	D 0608	66.42	12592	2900	758	66	36	9	16353	3761	23.00	1.82	I	I
I	D 0609	69.62	2496	1272	690	97	56	24	4611	2115	45.87	1.73	I	I
I	D 0617	72.17	8815	1726	430	37	23	8	11030	2215	20.09	1.63	I	I
I	D 0619	72.65	6656	2475	658	52	31		9871	3215	32.57	1.68	I	I
I	D 0622	75.79	4923	142	28	4			5096	173	3.40	*****	I	I
I	D 0626	78.82	3451	2830	1276	134	78	34	7769	4317	55.57	1.72	I	I

Table A.II.6.1b

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I													I
I	D 0486	26.61	413	19	19				451	38	8.51	*****	I
I	D 0490	29.66	256	20	26	7			310	53	17.22	*****	I
I	D 0497	35.76	283	24	31	11			349	66	18.82	*****	I
I	D 0501	38.86	403	31	44				478	75	15.71	*****	I
I	D 0505	41.90	371	42	49	82		26	544	173	31.84	*****	I
I	D 0509	44.93	569	257	243	24	25	106	1117	549	49.11	0.95	I
I	D 0513	46.84	1777	5435	6249	1040	525	323	15025	13248	88.18	1.98	I
I	D 0517	48.46	587	179	457	83	69	105	1375	788	57.29	1.19	I
I	D 0521	51.47	3279	70	81	161		72	3592	312	8.70	*****	I
I	D 0525	54.50	7265	2327	2236	242	196	160	12266	5001	40.77	1.24	I
I	D 0529	57.58	332	239	602	94	89	69	1355	1023	75.50	1.06	I
I	D 0533	60.61	654	521	654	87	73	79	1990	1336	67.13	1.18	I
I	D 0537	62.71	420	244	748	126	106	122	1645	1224	74.44	1.18	I
I	D 0603	63.71	882	978	1381	193	153	148	3587	2706	75.42	1.26	I
I	D 0606	65.80	627	1349	1500	212	160	167	3848	3221	83.71	1.33	I
I	D 0608	66.42	317	623	1346	218	162	156	2667	2350	88.11	1.34	I
I	D 0609	69.62	200	102	295	80	80	114	757	557	73.61	1.00	I
I	D 0617	72.17	3457	671	592	94	71	92	4885	1428	29.23	1.31	I
I	D 0619	72.65	573	1880	2163	257	197	155	5070	4497	88.70	1.30	I
I	D 0622	75.79	13099	526	373	31	50	119	14079	980	6.96	0.63	I
I	D 0626	78.82	308	557	1744	304	224	209	3138	2830	90.20	1.36	I

Table A.II.6.1c

CORE 7230/05-U-04

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I										SUM	SUM	WET-	iC4	I
I		IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I		no.	m									(%)	nC4	I
I														I
I	D	0486	26.61	582	21	19				623	40	6.50	*****	I
I	D	0490	29.66	477	22	26	7			533	56	10.44	*****	I
I	D	0497	35.76	386	25	31	11			453	67	14.78	*****	I
I	D	0501	38.86	659	35	44				737	78	10.61	*****	I
I	D	0505	41.90	5492	64	49	82		26	5687	196	3.44	*****	I
I	D	0509	44.93	4789	679	243	24	25	106	5760	970	16.85	0.95	I
I	D	0513	46.84	28979	8749	6297	1040	525	323	45589	16610	36.44	1.98	I
I	D	0517	48.46	12222	1015	457	83	69	105	13846	1623	11.72	1.19	I
I	D	0521	51.47	13781	94	81	161		72	14117	336	2.38	*****	I
I	D	0525	54.50	14367	2783	2236	242	196	160	19823	5457	27.53	1.24	I
I	D	0529	57.58	7582	2029	1291	170	130	87	11202	3620	32.32	1.30	I
I	D	0533	60.61	11347	2068	993	118	92	86	14618	3271	22.38	1.28	I
I	D	0537	62.71	38469	3389	1607	204	152	142	43821	5352	12.21	1.35	I
I	D	0603	63.71	10532	2516	1711	220	170	148	15149	4617	30.48	1.29	I
I	D	0606	65.80	16695	3647	1973	253	180	173	22748	6053	26.61	1.40	I
I	D	0608	66.42	12909	3524	2105	284	199	164	19020	6111	32.13	1.43	I
I	D	0609	69.62	2696	1374	984	178	137	137	5368	2673	49.78	1.30	I
I	D	0617	72.17	12272	2397	1021	131	94	100	15915	3643	22.89	1.39	I
I	D	0619	72.65	7229	4355	2821	309	228	155	14941	7712	51.61	1.36	I
I	D	0622	75.79	18022	668	401	35	50	119	19175	1153	6.01	0.70	I
I	D	0626	78.82	3759	3387	3020	438	302	244	10906	7147	65.53	1.45	I

Table A.II.6.2

Core 7230/05-U-04

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)	I
I			:										I
I	D 487	24.40	:	0.11	0.61	1.33	1.14	54	117	0.72	0.15	433	I
I	D 489	25.49	:	0.05	0.26	0.53	0.78	33	68	0.31	0.16	434	I
I	D 2005	27.03	:	0.07	0.09	0.15	0.53	17	28	0.16	0.44	451	I
I	D 491	27.27	:	0.06	0.06	0.04	0.38	16	11	0.12	0.50	471	I
I	D 493	28.04	:	****	****	****	0.77	*****	****	*****	*****	***	I
I	D 492	29	:	0.04	0.43	0.44	1.04	41	42	0.47	0.09	437	I
I	D 2006	30.02	:	0.21	10.33	0.92	3.29	314	28	10.54	0.02	437	I
I	D 496	31.56	:	0.06	0.36	0.50	1.10	33	45	0.42	0.14	432	I
I	D 499	33.90	:	0.05	0.39	1.11	1.05	37	106	0.44	0.11	434	I
I	D 500	34.85	:	0.06	0.31	0.19	1.10	28	17	0.37	0.16	431	I
I	D 502	36.65	:	0.08	0.33	0.87	1.14	29	76	0.41	0.20	432	I
I	D 504	37.05	:	****	****	****	0.99	*****	****	*****	*****	***	I
I	D 503	38.25	:	0.06	0.36	0.94	1.20	30	78	0.42	0.14	436	I
I	D 506	39.67	:	****	****	****	0.96	*****	****	*****	*****	***	I
I	D 507	40.62	:	0.05	0.49	0.89	1.26	39	71	0.54	0.09	426	I
I	D 508	41.37	:	****	****	****	0.90	*****	****	*****	*****	***	I
I	D 510	42.40	:	0.07	0.74	0.65	1.39	53	47	0.81	0.09	435	I
I	D 511	43.50	:	****	****	****	1.03	*****	****	*****	*****	***	I
I	D 514	45.63	:	0.05	0.24	0.48	0.73	33	66	0.29	0.17	433	I
I	D 515	46.08	:	****	****	****	0.27	*****	****	*****	*****	***	I
I	D 516	46.78	:	0.51	18.84	2.16	3.16	596	68	19.35	0.03	437	I
I	D 519	47.44	:	0.23	0.23	0.71	0.45	51	158	0.46	0.50	548	I
I			:										I

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Table A.II.6.2 (continued)

Core 7230/05-U-04

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	I
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)
I			:									
I	D 520	48.34	:	****	****	****	0.80	*****	****	*****	*****	***
I	D 522	49.31	:	0.03	0.11	0.62	0.60	18	103	0.14	0.21	424
I	D 522	49.31	:	0.09	1.15	1.08	1.61	71	67	1.24	0.07	434
I	D 523	50.11	:	0.09	0.19	0.43	0.90	21	48	0.28	0.32	436
I	D 526	51.94	:	0.05	0.06	0.07	0.67	9	10	0.11	0.45	449
I	D 527	53.29	:	****	****	****	1.41	*****	****	*****	*****	***
I	D 528	54.29	:	0.12	0.28	0.54	1.10	25	49	0.40	0.30	435
I	D 531	56.11	:	0.07	0.47	0.58	1.28	37	45	0.54	0.13	433
I	D 532	57.51	:	****	****	****	1.04	*****	****	*****	*****	***
I	D 534	58.38	:	0.06	0.51	0.78	1.02	50	76	0.57	0.11	436
I	D 535	59.88	:	****	****	****	1.43	*****	****	*****	*****	***
I	D 538	61.81	:	0.07	0.48	0.53	1.20	40	44	0.55	0.13	430
I	D 601	62.71	:	****	****	****	0.94	*****	****	*****	*****	***
I	D 602	63.35	:	0.05	0.61	3.13	1.12	54	279	0.66	0.08	435
I	D 605	65.31	:	0.16	0.86	3.73	1.37	63	272	1.02	0.16	434
I	D 611	67.94	:	0.05	0.28	0.61	0.81	35	75	0.33	0.15	437
I	D 612	68.34	:	****	****	****	1.24	*****	****	*****	*****	***
I	D 613	69.81	:	0.10	0.60	1.62	1.18	51	137	0.70	0.14	432
I	D 618	70.52	:	****	****	****	2.16	*****	****	*****	*****	***
I	D 623	73.37	:	0.15	0.69	2.94	1.25	55	235	0.84	0.18	438
I	D 624	74.44	:	****	****	****	0.80	*****	****	*****	*****	***
I	D 629	76.54	:	0.09	0.69	1.59	1.26	55	126	0.78	0.12	435

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Table A.II.6.2 (continued)

Core 7230/05-U-04

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	
I			:								-----	
I		m	:	(mg/g ROCK)	(%)			(mg/g TOC)		S1+S2	S1+S2	(C)
I	D 628	77.19	:	0.10	1.81	2.41	1.71	106	141	1.91	0.05	436

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Table A.II.6.3

Core number: 7230/05-U-04
Reference number: 21.3427.23
(1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-2005	-----	27.03	0.39 (18) 0.56 (2) 0.84 (1)	F R R	0.08 0.01 0.00	3-5
D-2006	-----	30.02	0.39 (13) 0.77 (2)	F R	0.08 0.03	2-3

REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.6.4

Well no.: 7230/05-U-04

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 487	24.40	Am: 25-30% Lm: 20-25% W+C: 50%	F-M-L	Good-Fair	3.0 - 4.0	Organic residue rich in brown, structured, woody phytoclasts; dark brown/black, woody/coaly, angular and elongated fragments; together with cuticle sheets and common palynomorphs.
D 2005	27.03	Am: 40% Lm: <5% W: <5% C: 55-60%	F-M-L	Poor	N.D.P.	Organic residue dominated by finely dispersed, amorphous matter and black, angular coaly fragments.
D 2006	30.02	Am: >90% Lm: <5% W: <5% C: <5%	F-M-L	Poor	N.D.P.	Organic residue totally dominated by light brown, amorphous material, both as finely dispersed and larger granular clasts specked with small coaly fragments and abundant pyrite.
D 510	42.40	Am: 30-35% Lm: 15-20% W+C: 50%	F-M-L	Poor	3.5 - 4.5	Comparable to sample D 487, but the liptinitic material and woody phytoclasts are mostly degraded and poorly preserved.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.6.4
Well no.: 7230/05-U-04

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 522b	49.31	Am: 35-40% Lm: 20-25% W+C: 40%	F-M-L	Good-Fair	3.0 - 4.0	Comparable to sample D 487, but with a somewhat increased proportion of finely dispersed, amorphous material.
D 531	56.11	Am: 60-70% Lm: 5-10% W: 5% C: 15%	F-M-L	Fair-Good	3.0 - 4.5	Organic residue dominated by greyish, amorphous matter, but with significant proportions of liptinitic material (mainly palynomorphs) and black, angular, coaly fragments.
D 605	65.31	Am: 60-70% Lm: 5-10% W: 5% C: 15%	F-M-L	Fair-Good	4.0 - 4.5	Organic residue dominated by finely dispersed, greyish amorphous matter; with significant amounts of liptinitic material and black, angular coaly fragments.
D 628	77.19	Am: 60-70% Lm: 5-10% W: 5% C: 15%	F-M-L	Fair-Good	3.5 - 4.5	Comparable to sample D 605.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.6.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7230/05-U-04

I			:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:		:		I
I		(m)	:	(mg)	:	(mg)	I
I	=====						I
I			:		:		I
I	D 2006	30.02	:	0.3	:	1.7	I
I			:		:		I
I	D 516	46.78	:	27.9	:	9.6	I
I			:		:		I
I	D 513	46.84	:	1.0	:	1.4	I
I			:		:		I
I	D 519	47.44	:	0.8	:	1.0	I
I			:		:		I
I	D 606	65.80	:	0.7	:	1.4	I
I			:		:		I
I	D 626	78.82	:	0.3	:	1.4	I
I			:		:		I
I	=====						I

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Table A.II.6.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

I	I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	: Rock	EOM	Sat.	Aro.	HC	Non HC	TOC	I
I			: Extr.							I
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	I
I			:							I
I	D 2006	30.02	: 6.1	4.8	1.6	0.8	2.4	2.4	3.29	I
I			:							I
I	D 0516	46.78	: 4.6	9.1	1.3	0.8	2.1	7.0	3.16	I
I			:							I
I	D 0513	46.84	: 13.0	3.0	1.0	1.0	1.9	1.1	2.55	I
I			:							I
I	D 0519	47.44	: 13.3	1.8	0.6	0.4	1.0	0.8	0.45	I
I			:							I
I	D 0606	65.80	: 12.4	2.3	0.7	1.1	1.8	0.5	1.24	I
I			:							I
I	D 0626	78.82	: 12.2	1.8	0.2	0.7	0.9	0.9	1.61	I
I			:							I

Table A.II.6.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC	I
I		(m)	:						I
I			:						I
I	D 2006	30.02	:	783	261	131	392	392	I
I	D 0516	46.78	:	1965	281	173	454	1512	I
I	D 0513	46.84	:	231	74	74	148	83	I
I	D 0519	47.44	:	135	45	27	72	63	I
I	D 0606	65.80	:	186	58	87	145	40	I
I	D 0626	78.82	:	148	16	57	74	74	I
I			:						I

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Table A.II.6.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 2006	30.02	23.8	7.9	4.0	11.9	11.9
D 0516	46.78	62.2	8.9	5.5	14.4	47.8
D 0513	46.84	9.1	2.9	2.9	5.8	3.3
D 0519	47.44	30.1	10.0	6.0	16.0	14.0
D 0606	65.80	15.0	4.7	7.0	11.7	3.3
D 0626	78.82	9.2	1.0	3.6	4.6	4.6

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I			:							I
I	D 2006	30.02	:	33.3	16.7	50.0	200.0	50.0	100.0	I
I			:							I
I	D 0516	46.78	:	14.3	8.8	23.1	162.5	76.9	30.0	I
I			:							I
I	D 0513	46.84	:	32.0	32.0	64.0	100.0	36.0	177.8	I
I			:							I
I	D 0519	47.44	:	33.3	20.0	53.3	166.7	46.7	114.3	I
I			:							I
I	D 0606	65.80	:	31.3	47.0	78.3	66.7	21.7	360.0	I
I			:							I
I	D 0626	78.82	:	11.1	38.9	50.0	28.6	50.0	100.0	I
I			:							I

Table A.II.6.10

Core 7230/05-U-04

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I IKU No.	:	-----	A=	B=	-----	---	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I	:	-----	-----	-----	-----	---	-----	---	---	I
I D 2006	30.02	:	1.6	1.2	0.8	1.5	0.8	1.7	1.6	I
I	:									I
I D 0516	46.78	:	1.5	0.7	0.5	1.3	0.7	1.9	1.9	I
I	:									I
I D 0513	46.84	:	1.2	1.0	0.6	1.6	0.4	1.9	2.0	I
I	:									I
I D 0519	47.44	:	1.2	1.0	0.4	2.3	0.2	1.2	1.2	I
I	:									I
I D 0606	65.80	:	1.3	1.1	0.7	1.6	0.2	1.9	2.2	I
I	:									I
I D 0626	78.82	:	1.3	0.8	0.4	1.7	0.1	1.4	1.5	I
I	:									I

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Table A.II.6.11a:

Molecular ratios from sterane and terpane mass chromatograms.
Maturity ratios.

Core 7230/05-U-04

IKU code	Depth	$\alpha\beta/\alpha\beta+\beta\alpha^1)$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-516	46.76	0.71	13.3	47.2	6.3
D-513	46.84	0.64	8.8	45.5	8.0
D-519	47.44	0.72	37.7	67.8	21.8
D-606	65.80	0.68	17.2	49.3	3.6
D-626	78.82	0.65	24.8	48.4	5.6

1) E/E+F in m/z 191

2) Average % distribution between first and second eluting isomers of extended hopanes (G-M in m/z 191)

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217

4) $q/q+t$ in m/z 217

Table A.II.6.11b:

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7230/05-U-04

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-2006	30.02	-	3.46	-	0.08	0.10
D-516	46.78	0.02	6.11	0.03	-	0.10
D-513	46.84	-	4.29	-	-	5.78
D-519	47.44	0.19	3.23	-	-	0.56
D-606	65.80	0.01	8.75	-	-	0.29
D-626	78.82	0.01	18.40	-	-	0.32

- 1) Relative abundance of tricyclic terpanes (Q/E in m/z 191)
- 2) B/A in m/z 191
- 3) Relative abundance of unknown (X/E in m/z 191)
- 4) Relative abundance of bisnorhopane (Z/E in m/z 191)
- 5) Relative abundance of C₂₇ rearranged steranes (a/a+j in m/z 217)

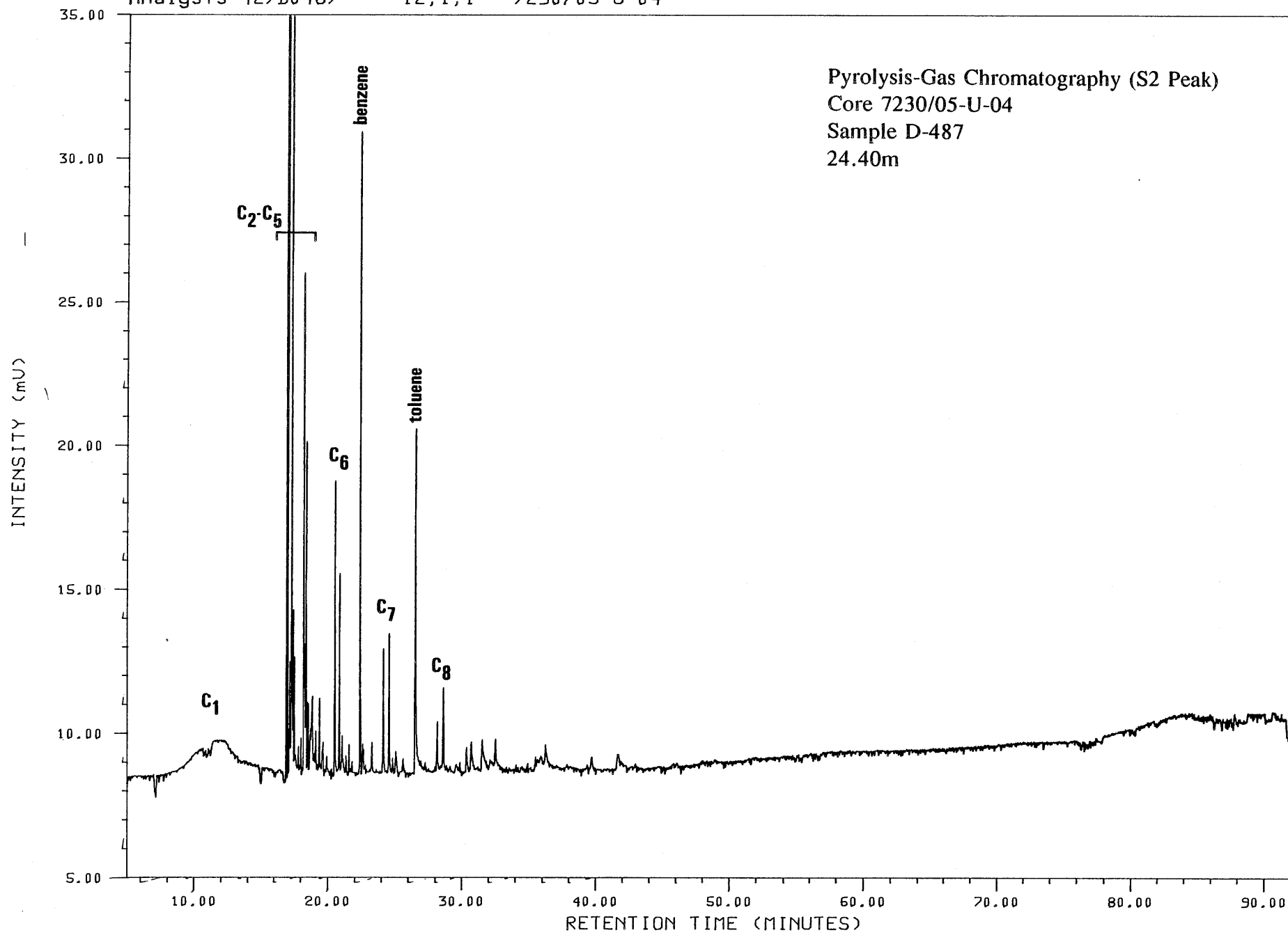
Figure A.II.6.1:

Pyrolysis-gas chromatograms (S2 peak)

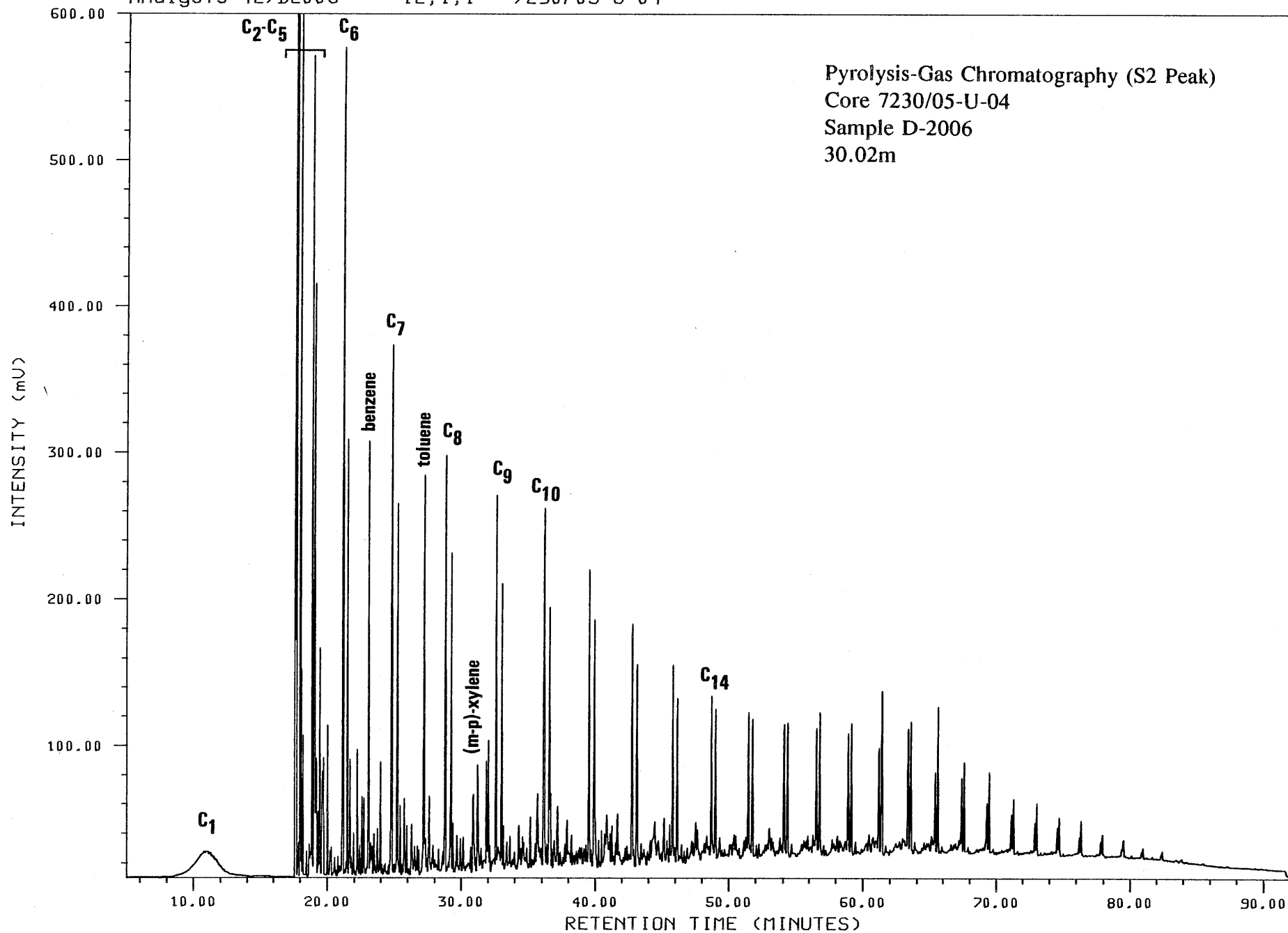
Analysis 427D0487

12,1,1

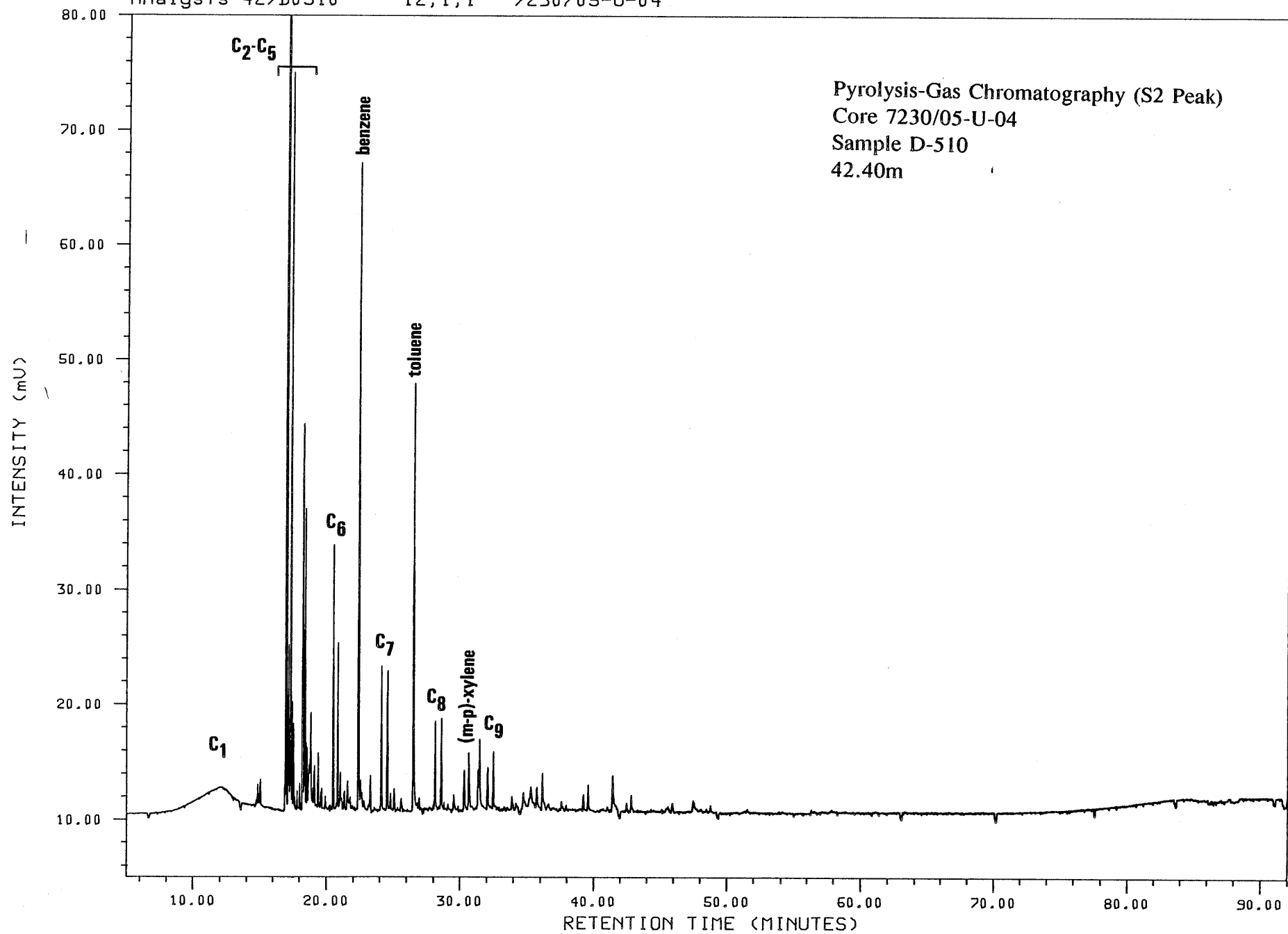
7230/05-U-04



Analysis 427D2006 12,1,1 7230/05-U-04



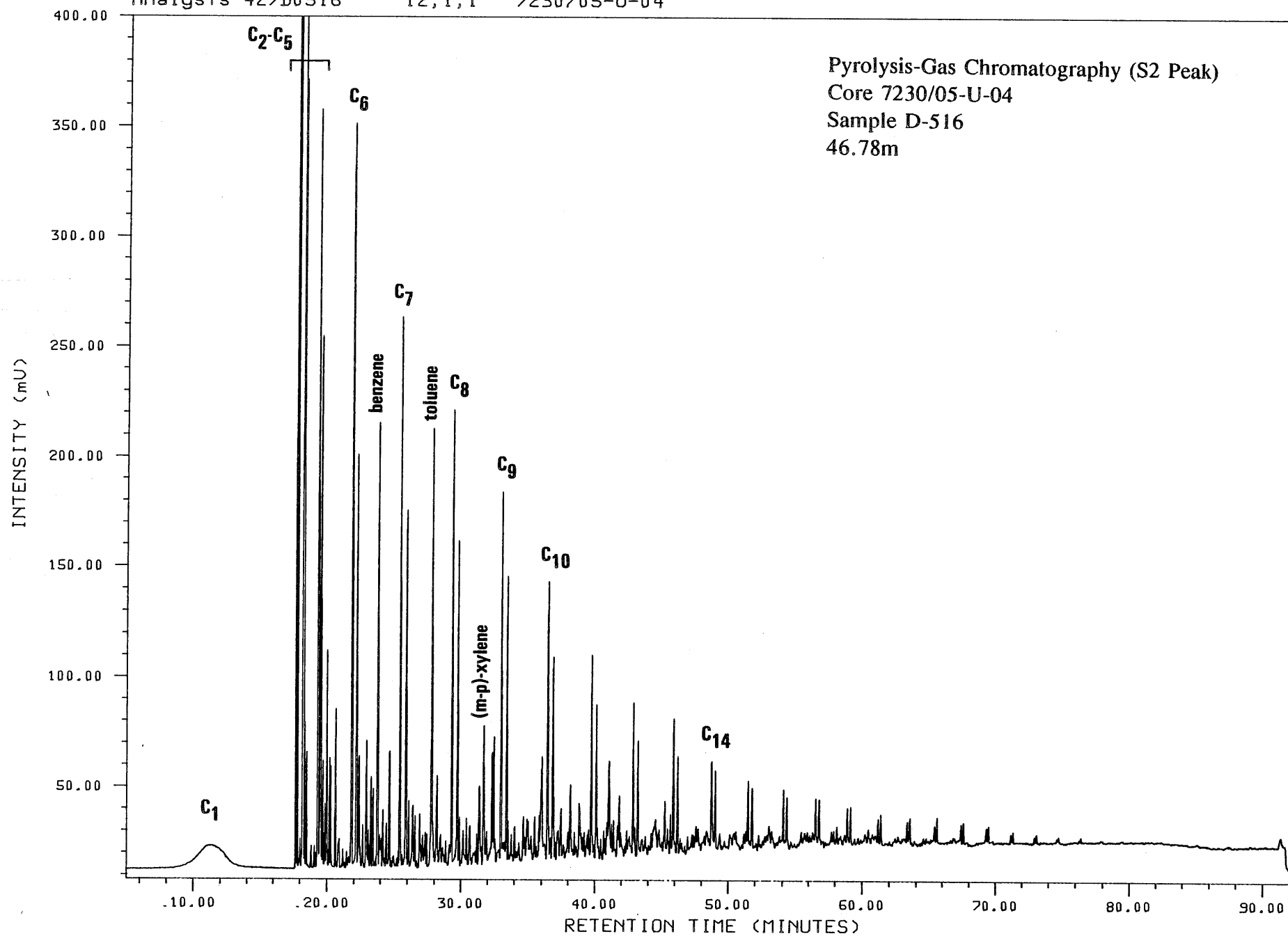
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Analysis 427D0516

12,1,1

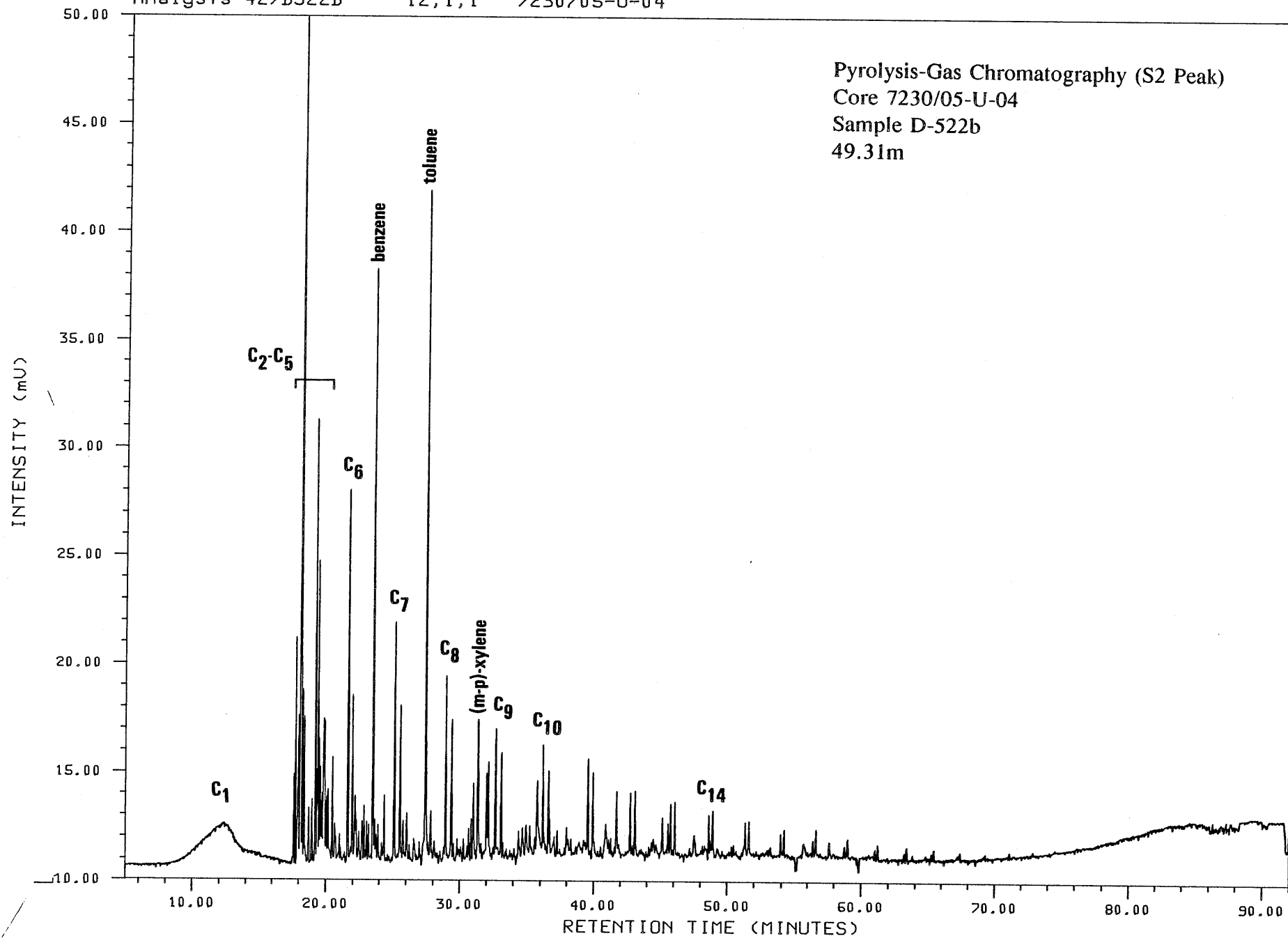
7230/05-U-04



Analysis 427D522B

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7230/05-U-04



Analysis 427D0531

12,1,1

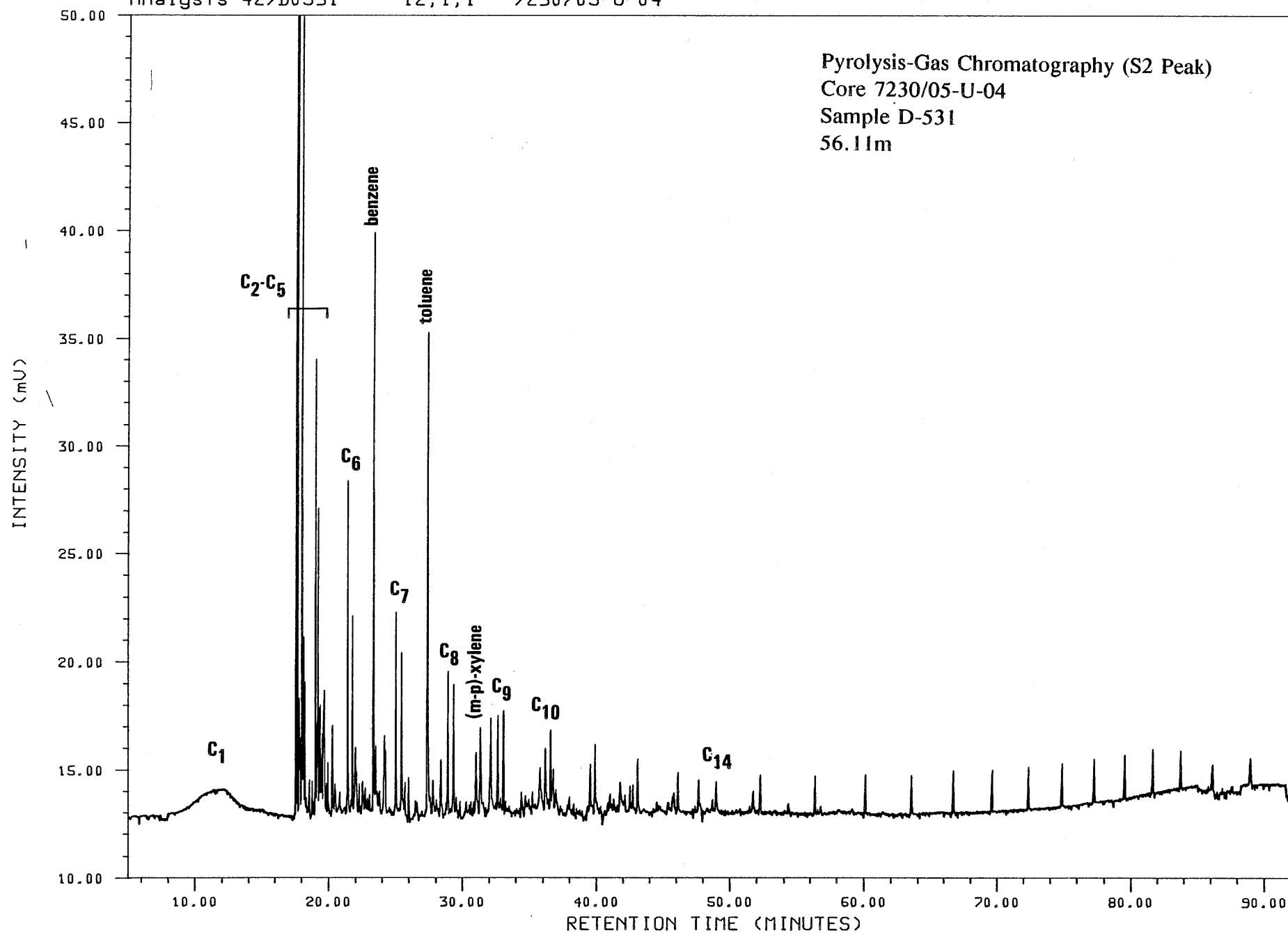
7230/05-U-04

Pyrolysis-Gas Chromatography (S2 Peak)

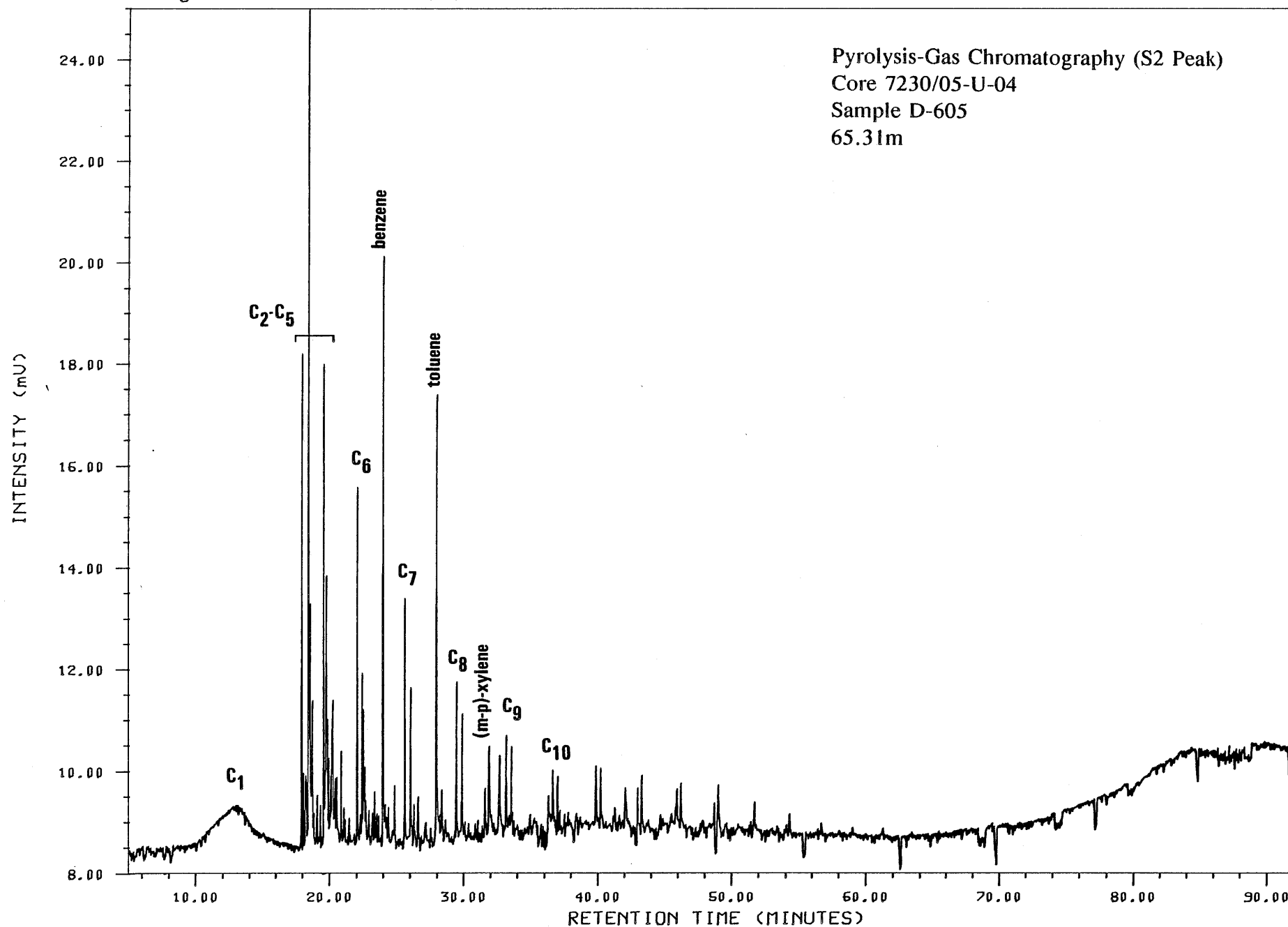
Core 7230/05-U-04

Sample D-531

56.11m



Analysis 427D0605 12,1,1 7230/05-U-04



Analysis 427D0628

12,1,1

7230/05-U-04

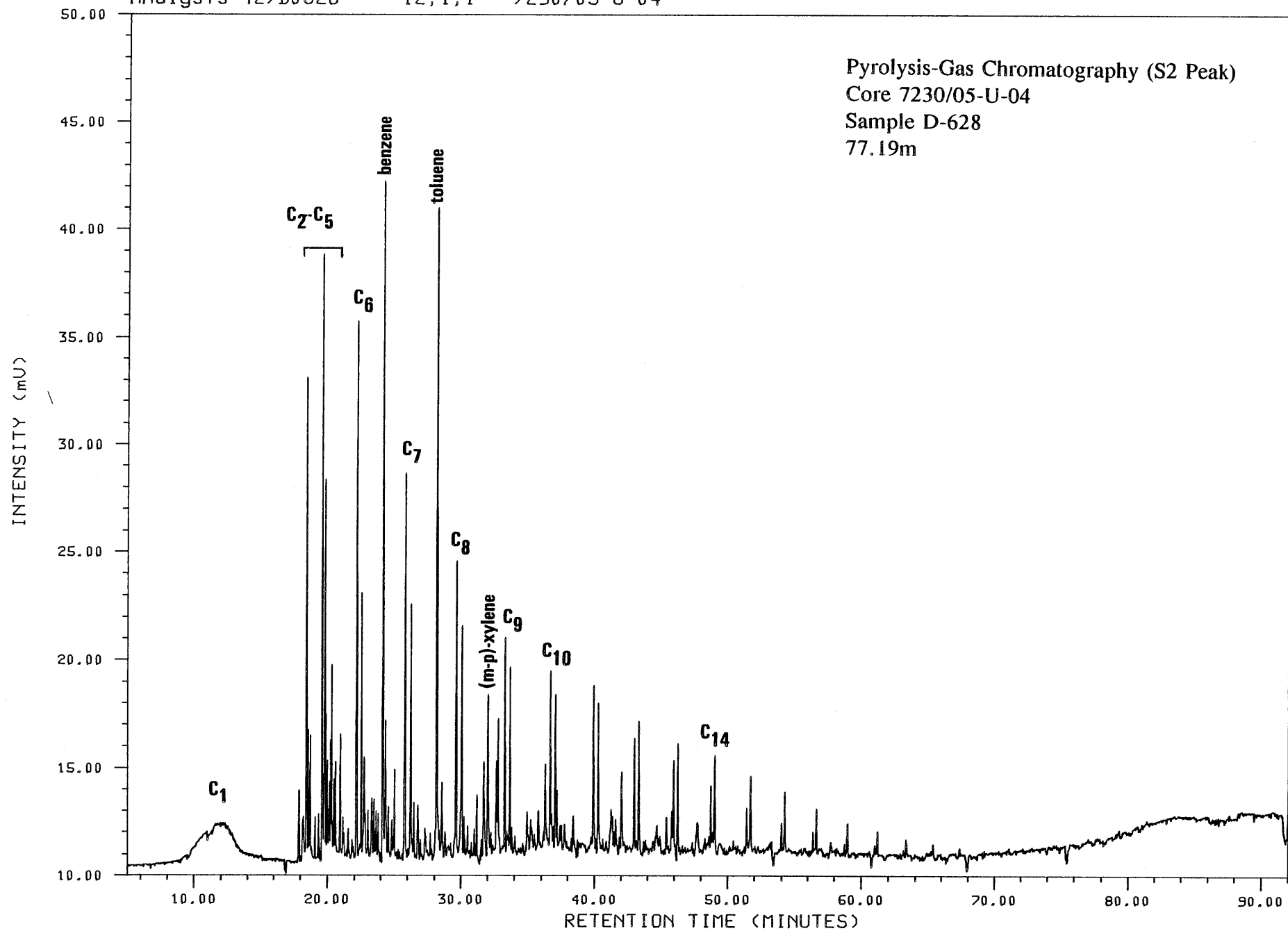


Figure A.II.6.2:

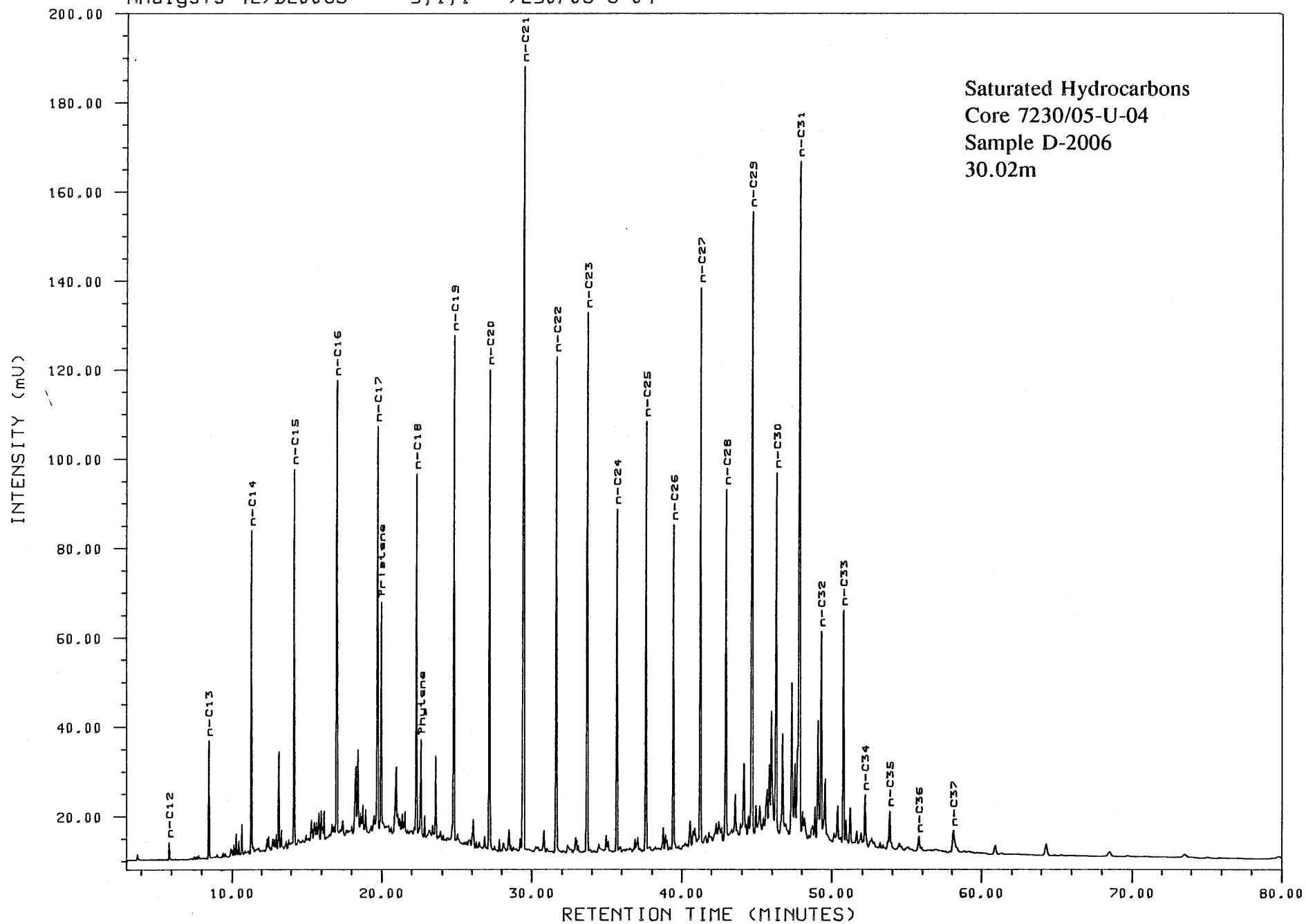
Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D2006S

3,1,1

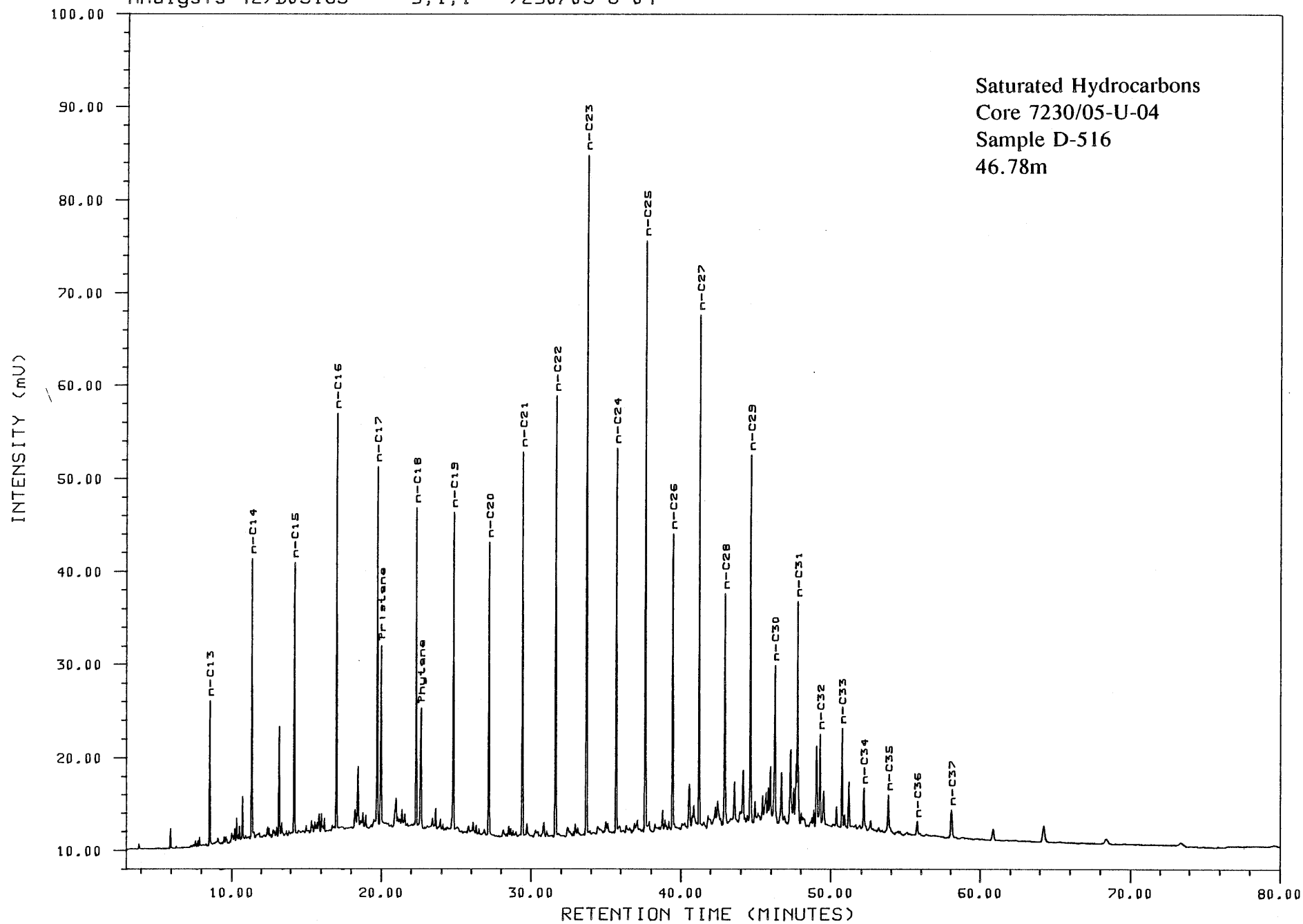
7230/05-U-04



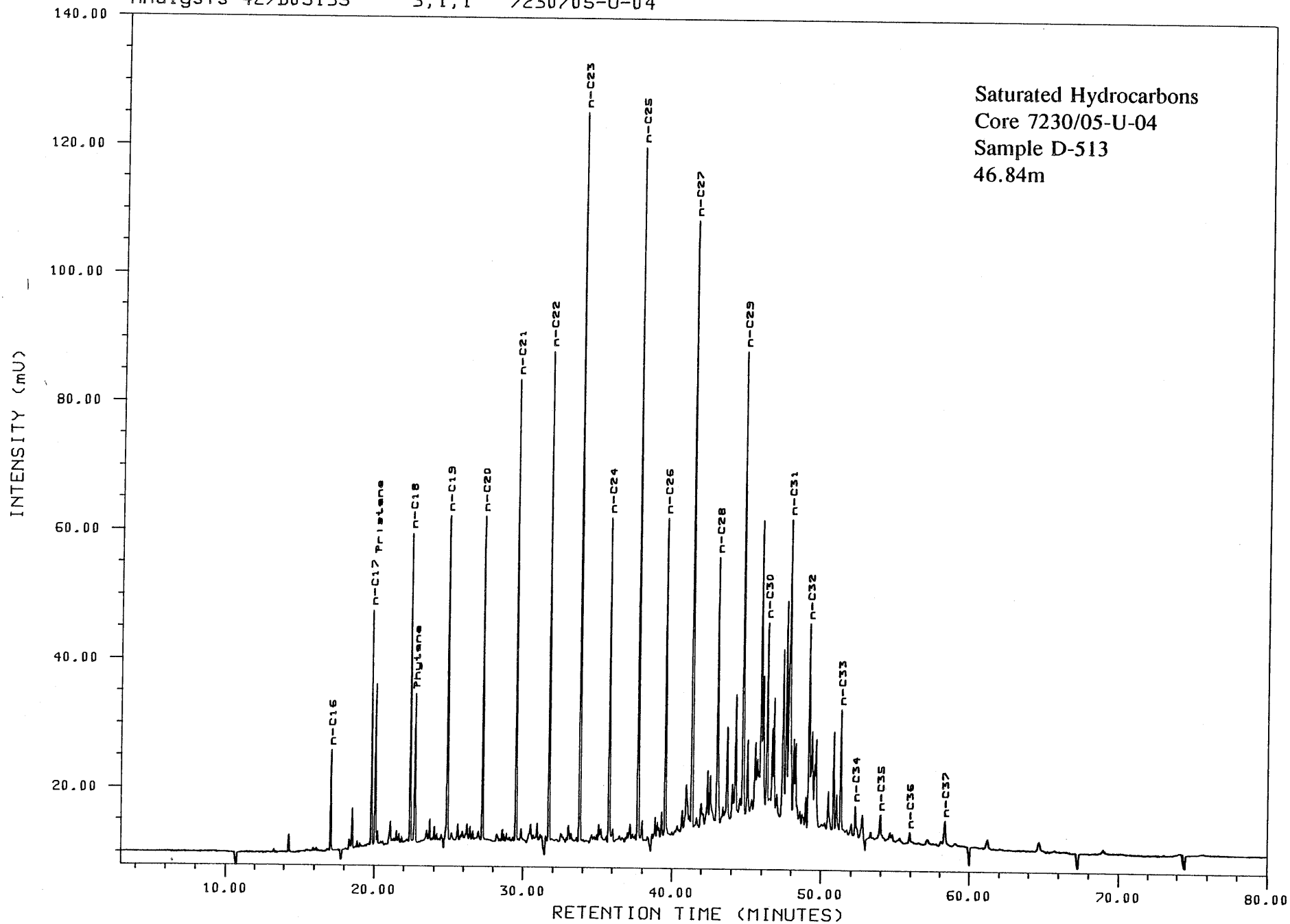
Analysis 427D0516S

3,1,1

7230/05-U-04



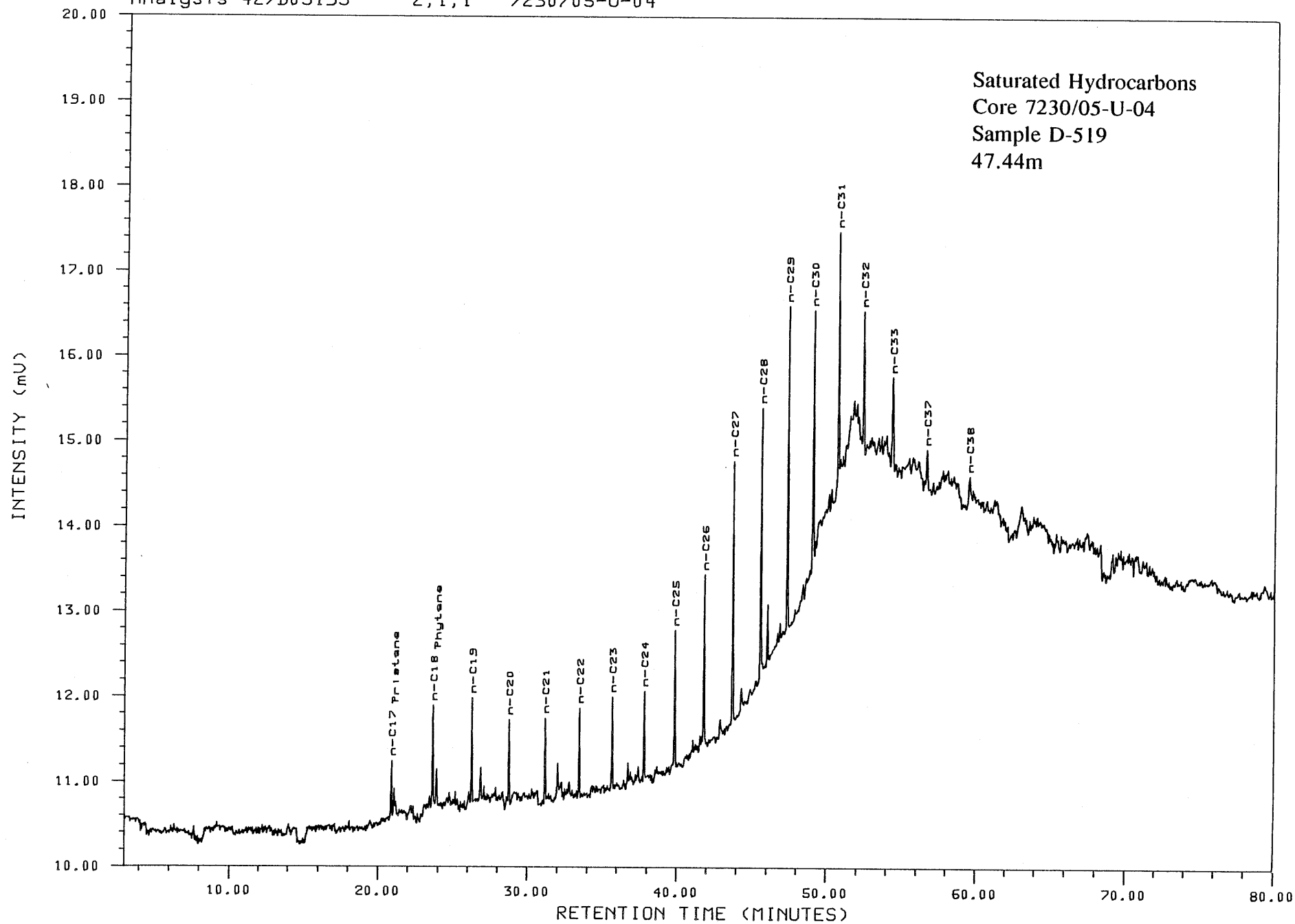
Analysis 427D0513S 3,1,1 7230/05-U-04



Analysis 427D0519S

2,1,1

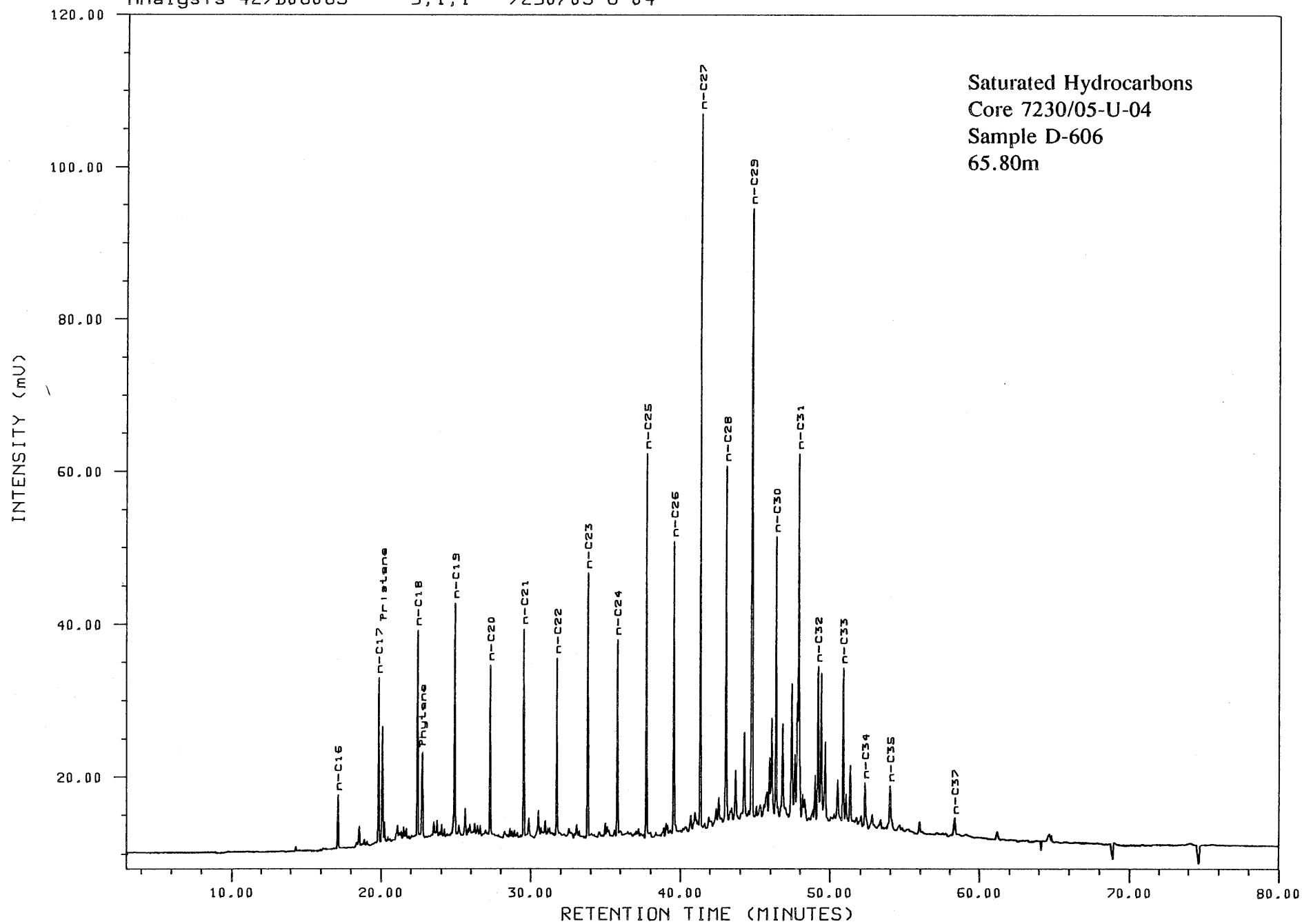
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Analysis 427D0606S

3,1,1

7230/05-U-04



Analysis 427D0626S

2,1,1

7230/05-U-04

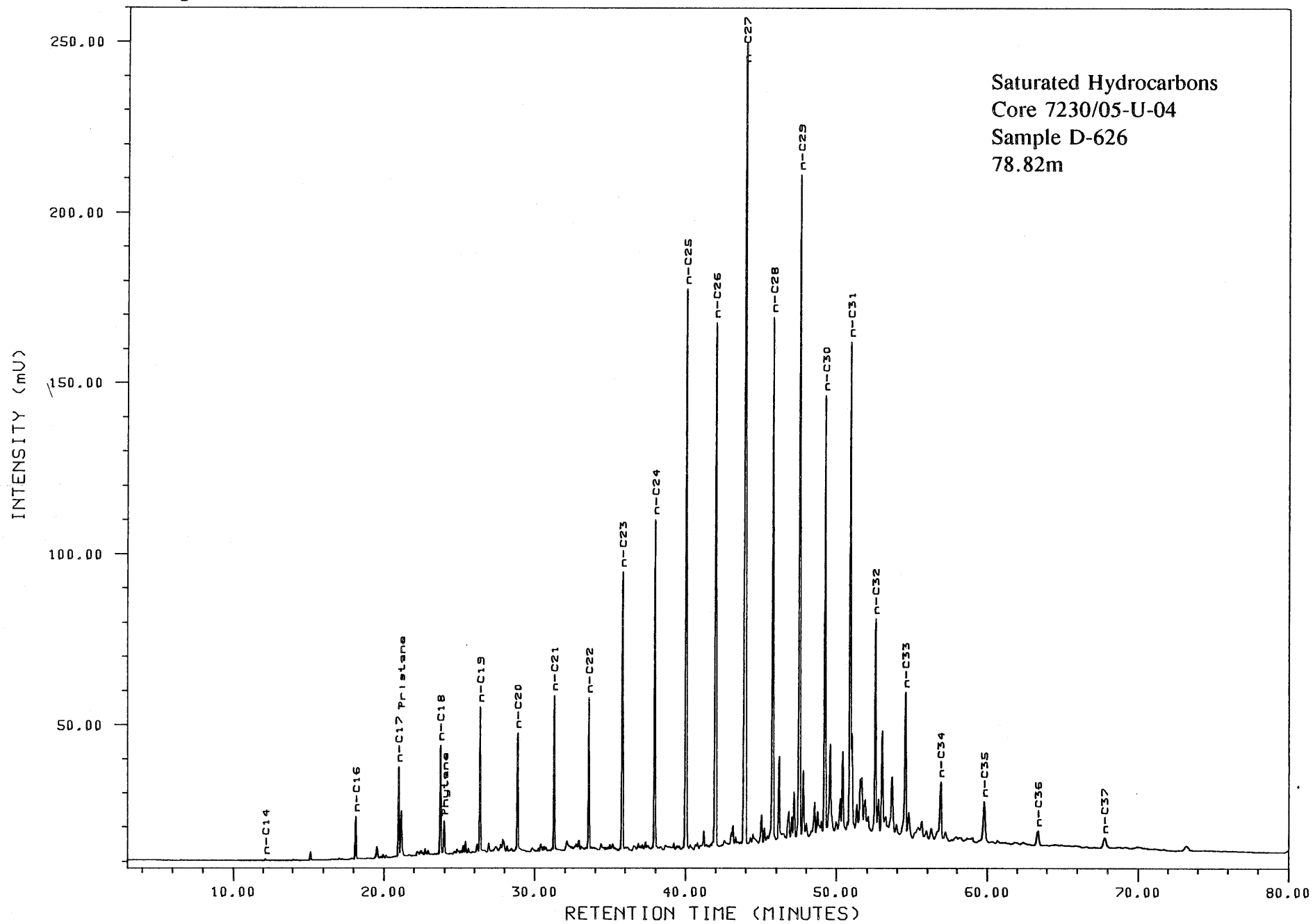
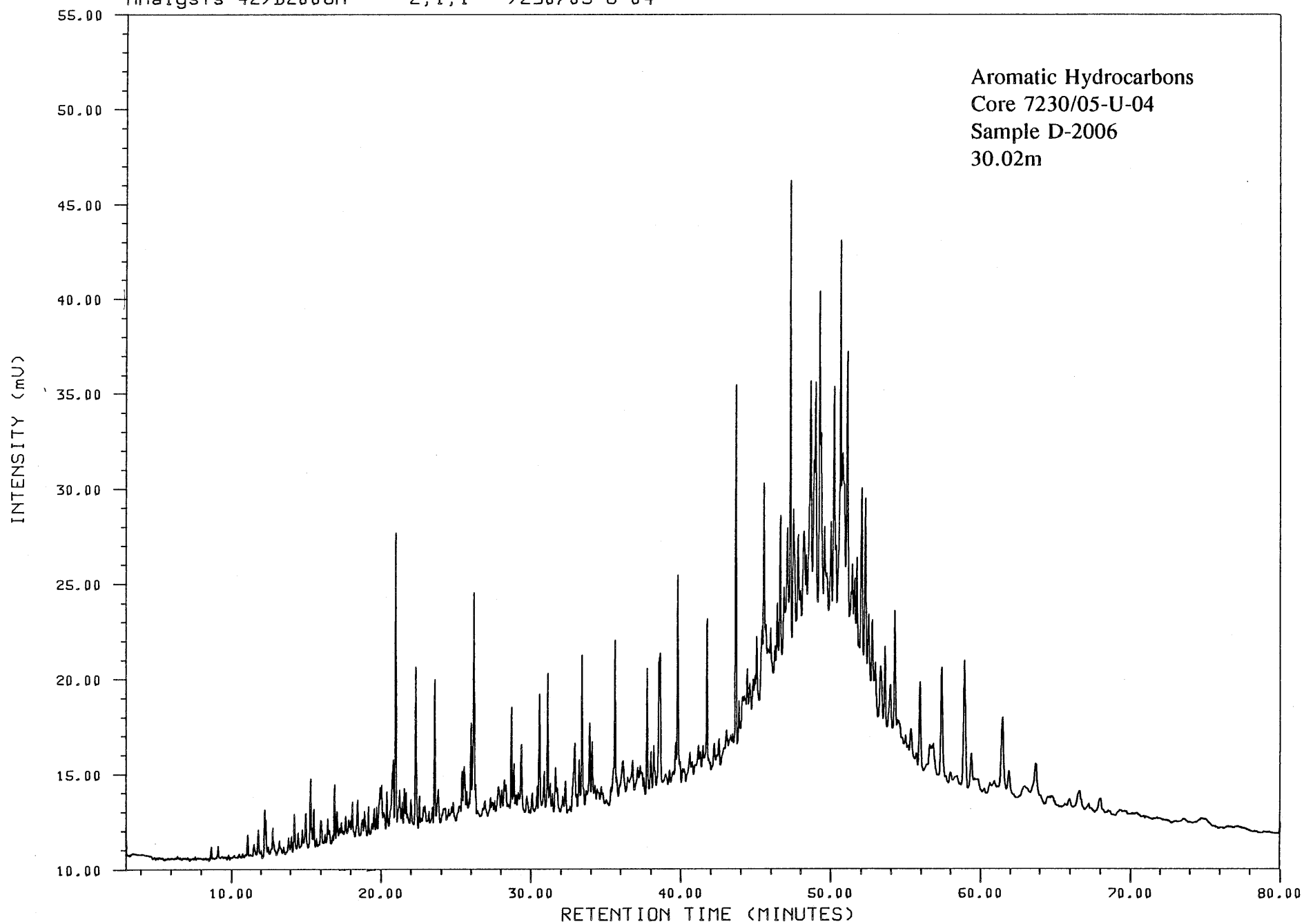


Figure A.II.6.3:

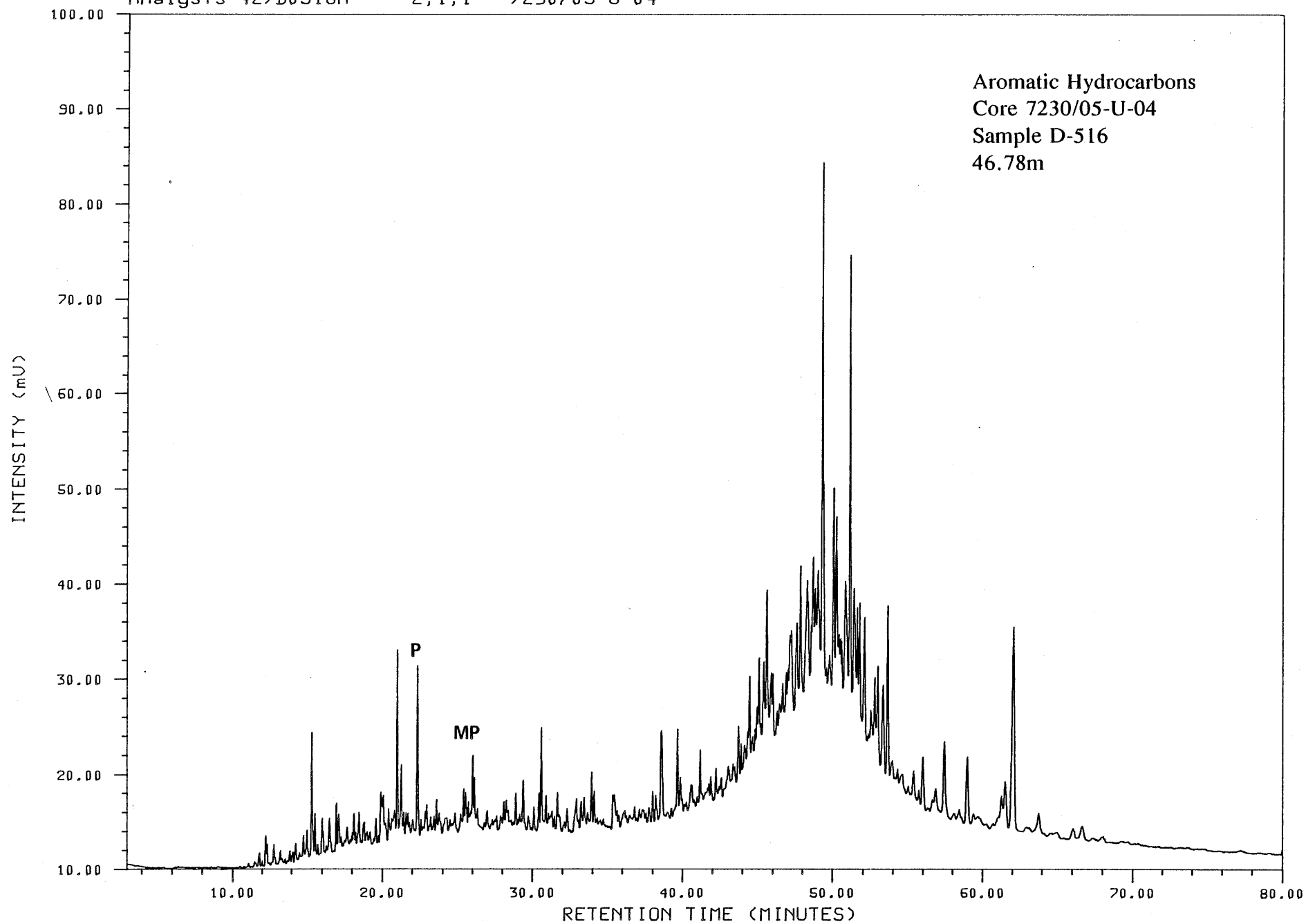
Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

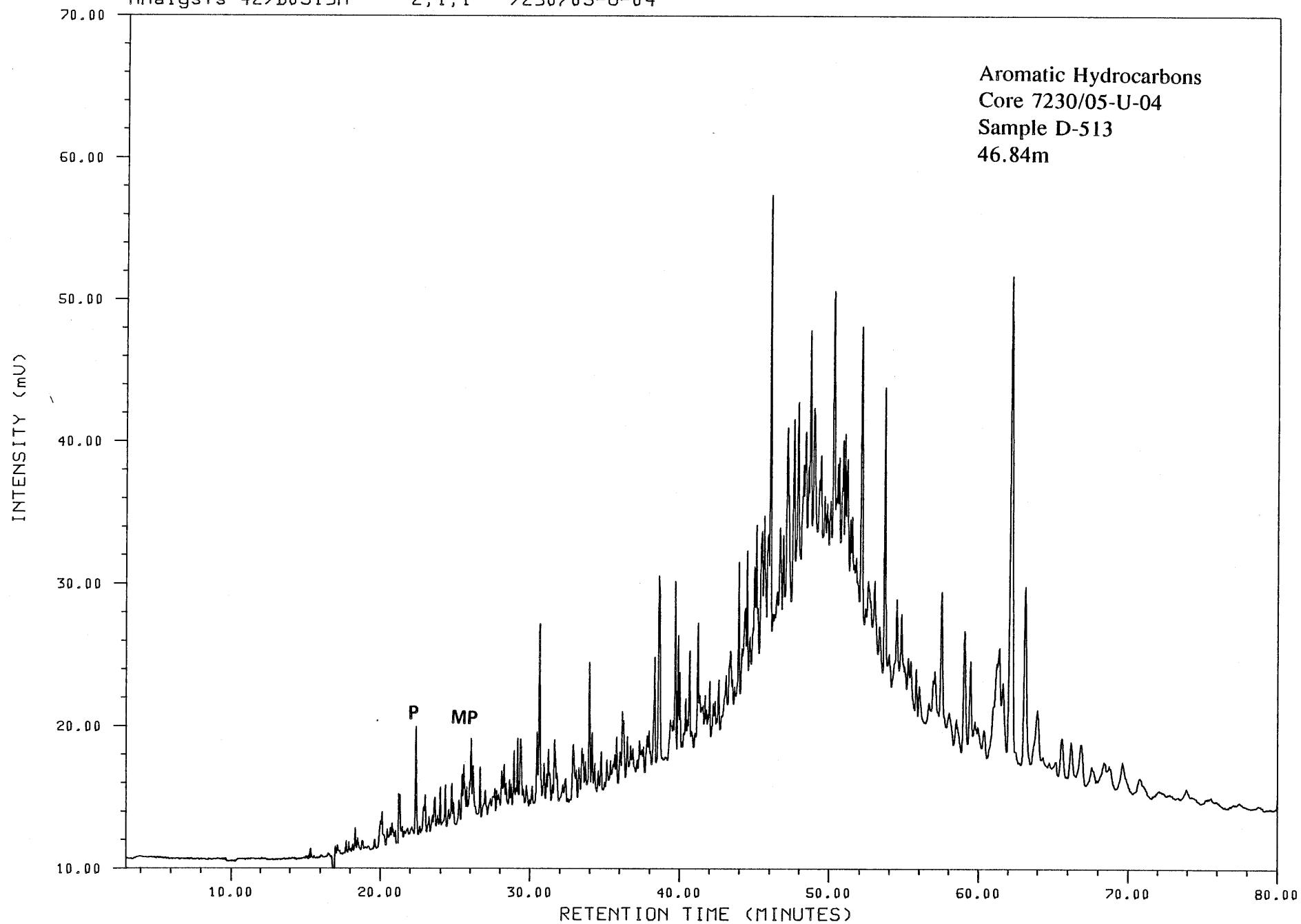
Analysis 427D2006A 2,1,1 7230/05-U-04



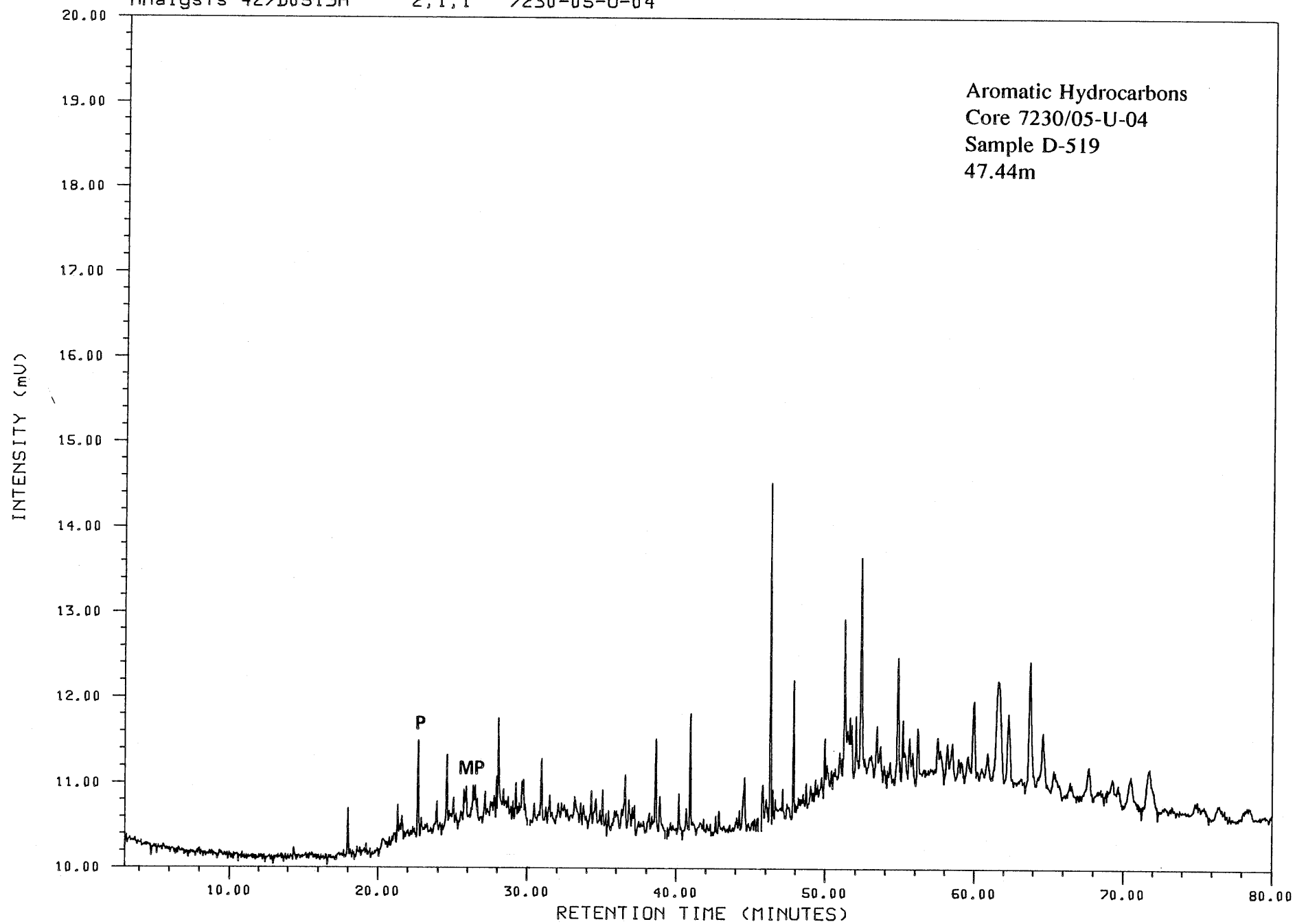
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Analysis 427D0513A 2,1,1 7230/05-U-04



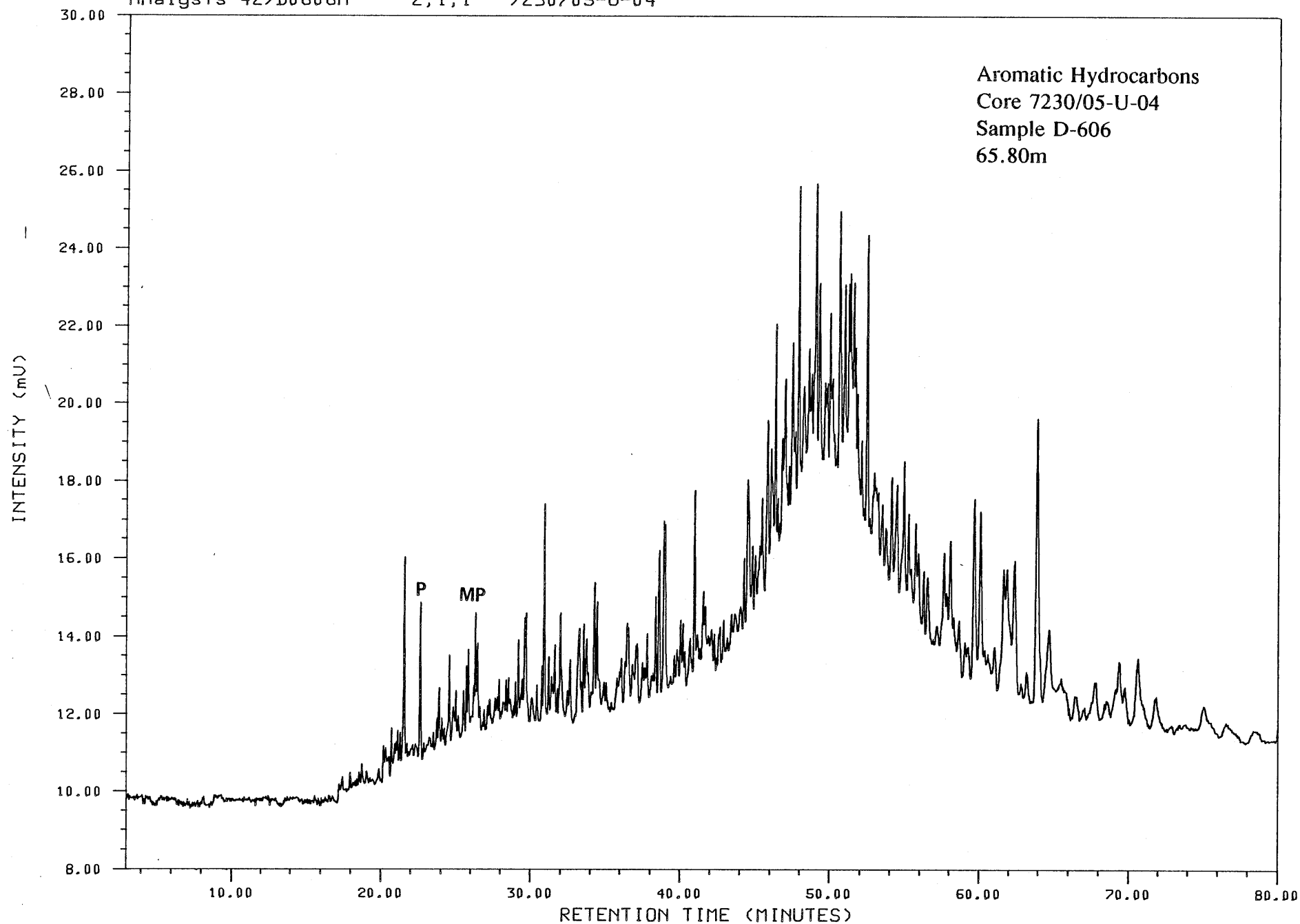
Analysis 427D0519A 2,1,1 7230-05-U-04



Analysis 427D0606A

2,1,1

7230/05-U-04



Analysis 427D0626A

2,1,1

7230-05-U-04

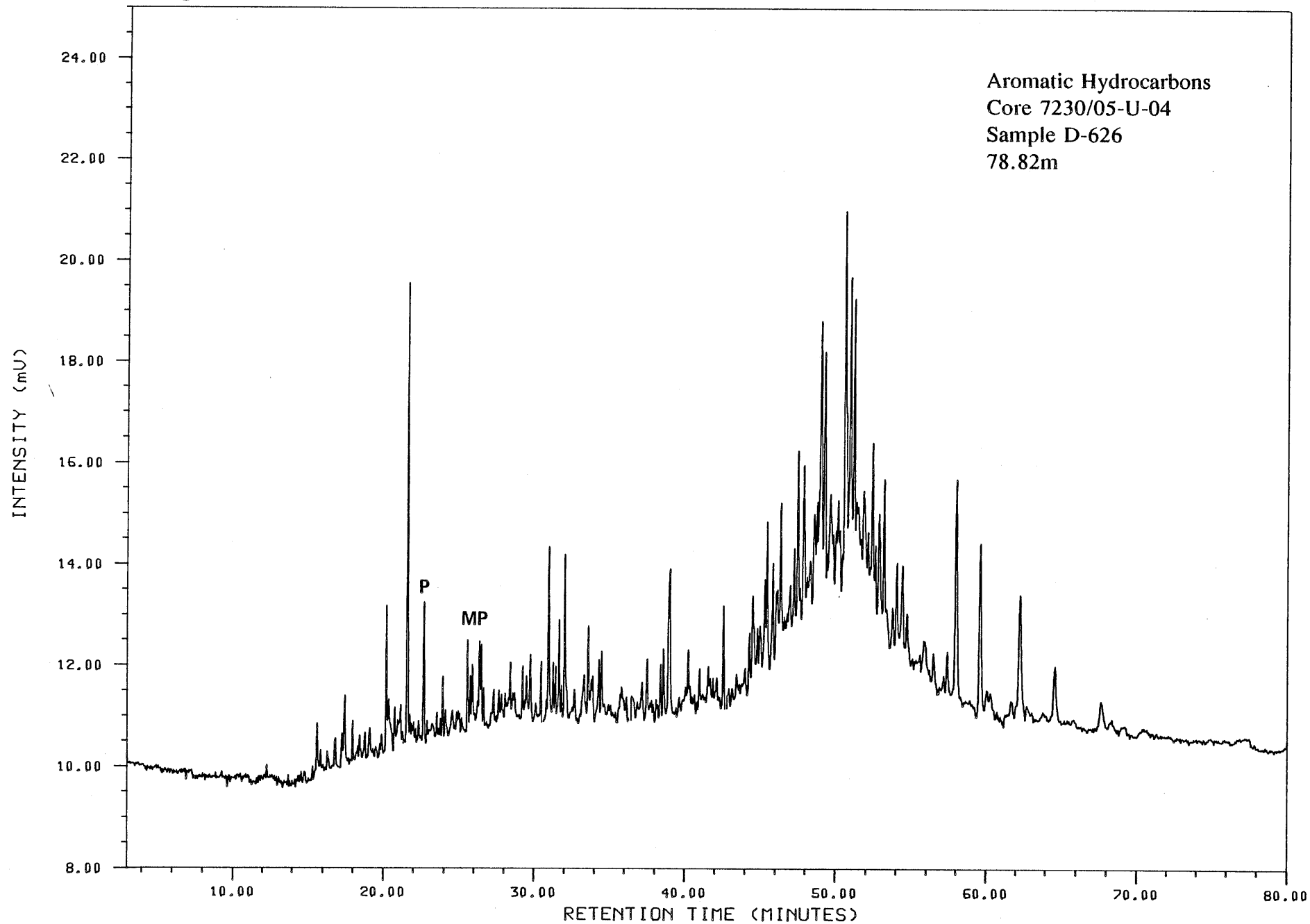
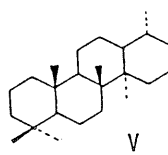
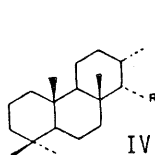
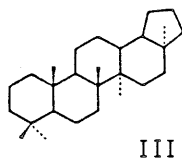
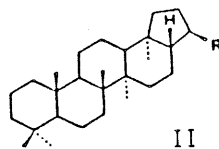
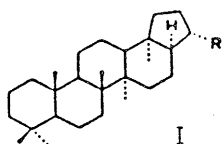


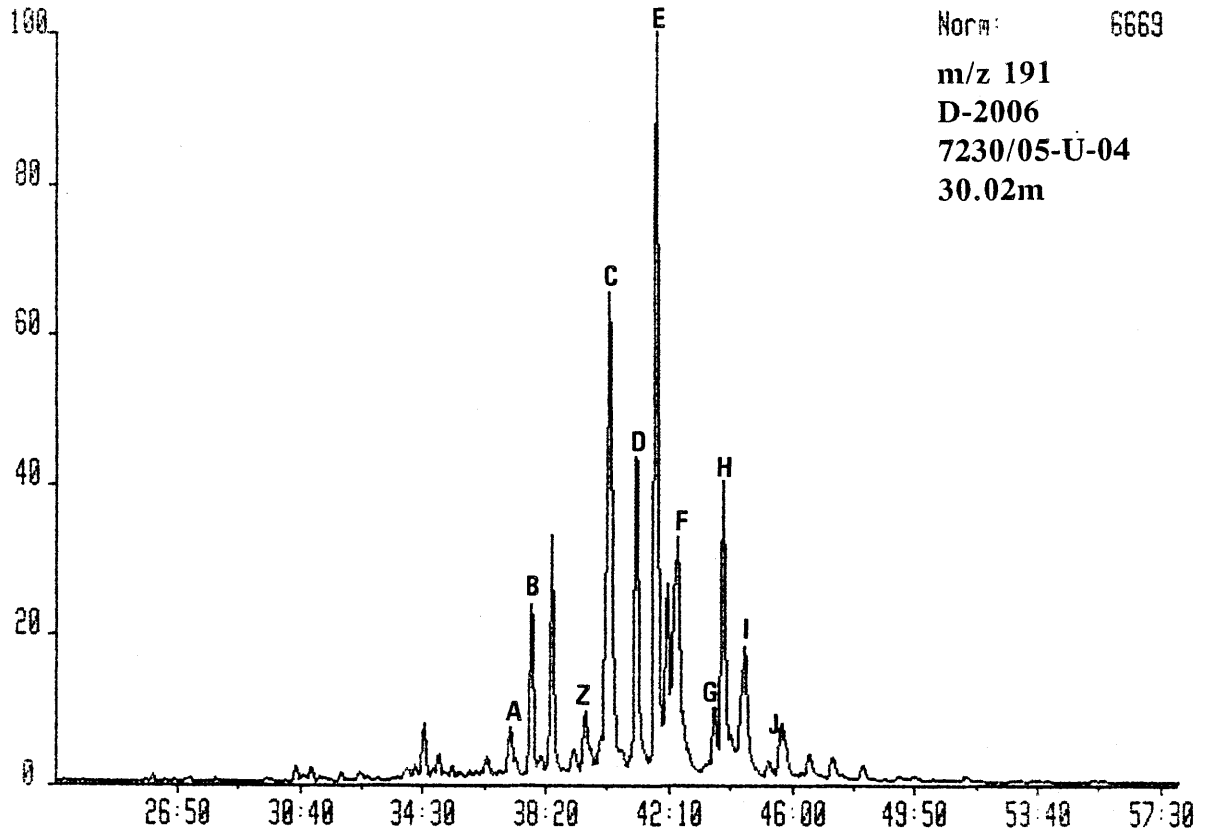
Figure A.II.6.4:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

P	tricyclic terpane	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trisorneohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trisorhopane	$C_{27}H_{46}$	(I, R=H)
Z	bisorhopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})

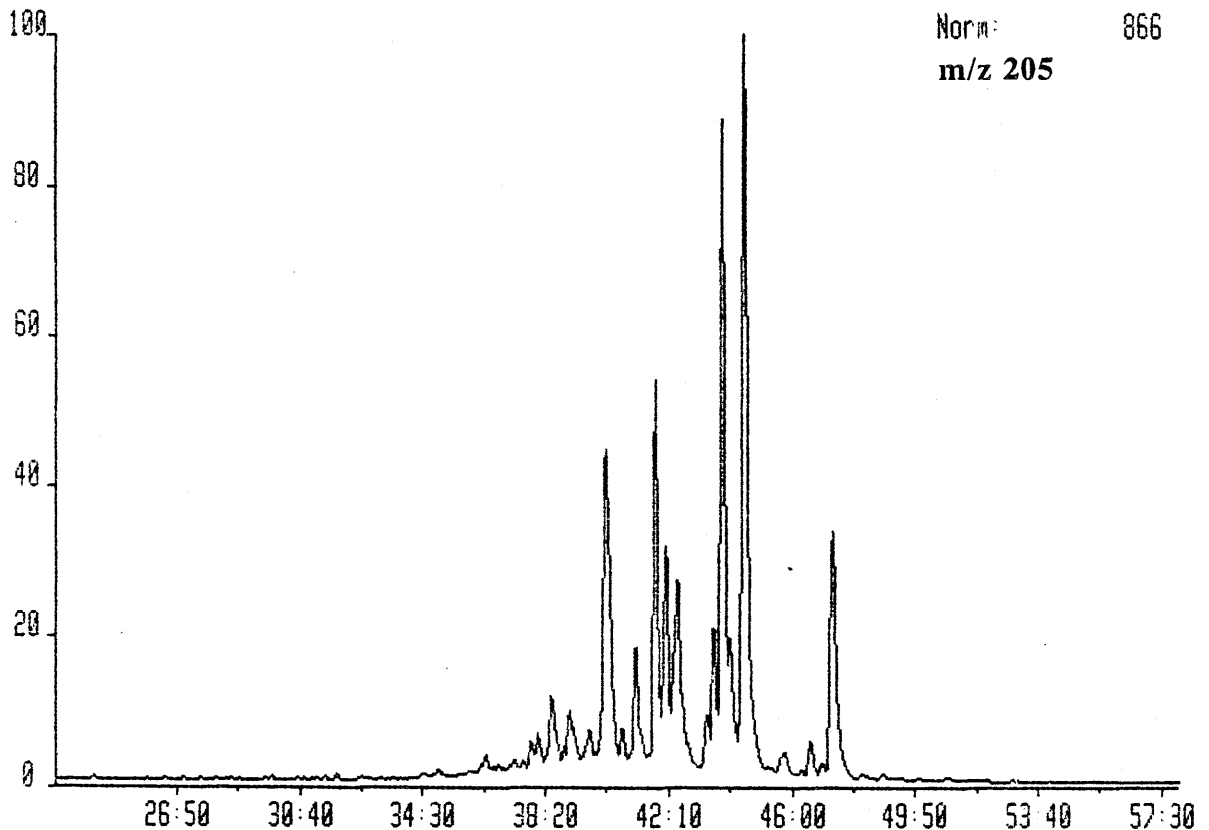


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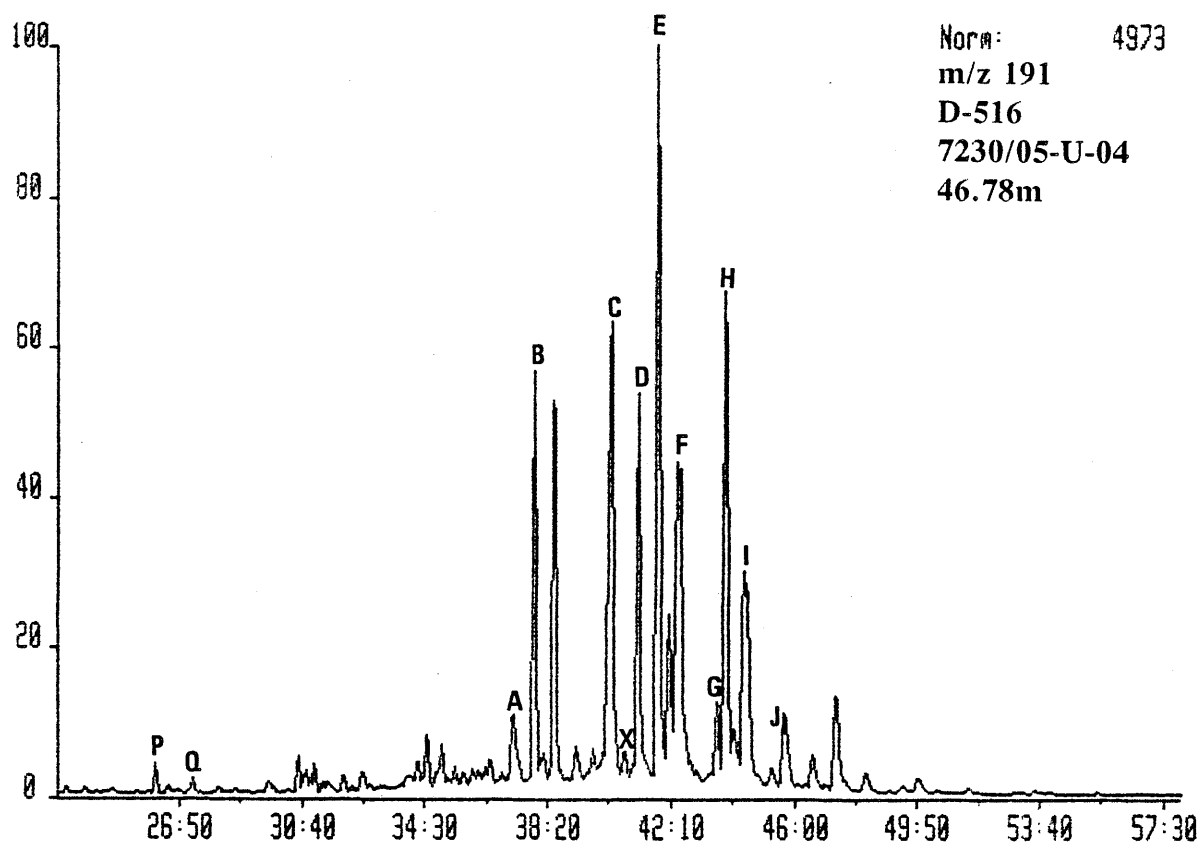
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m/z 191
D-2006
7230/05-U-04
30.02m

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Text:21.3427.23

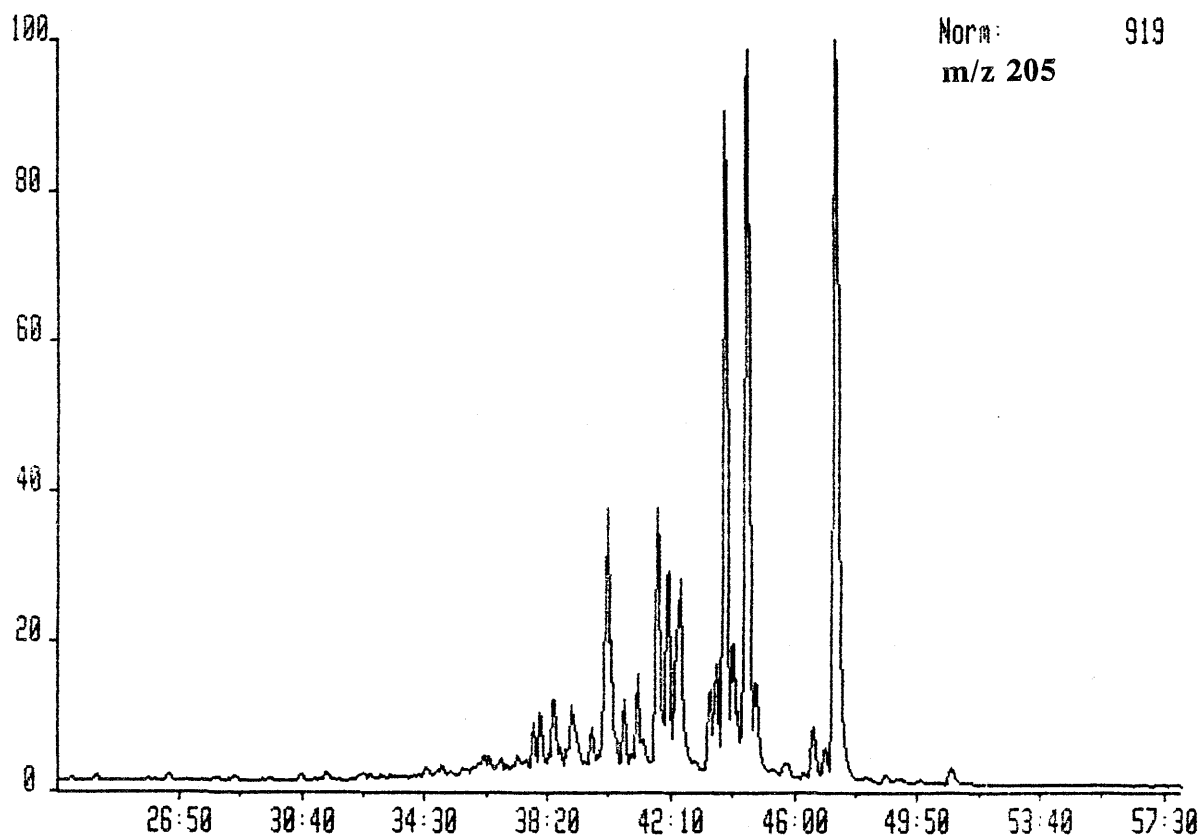


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m/z 205

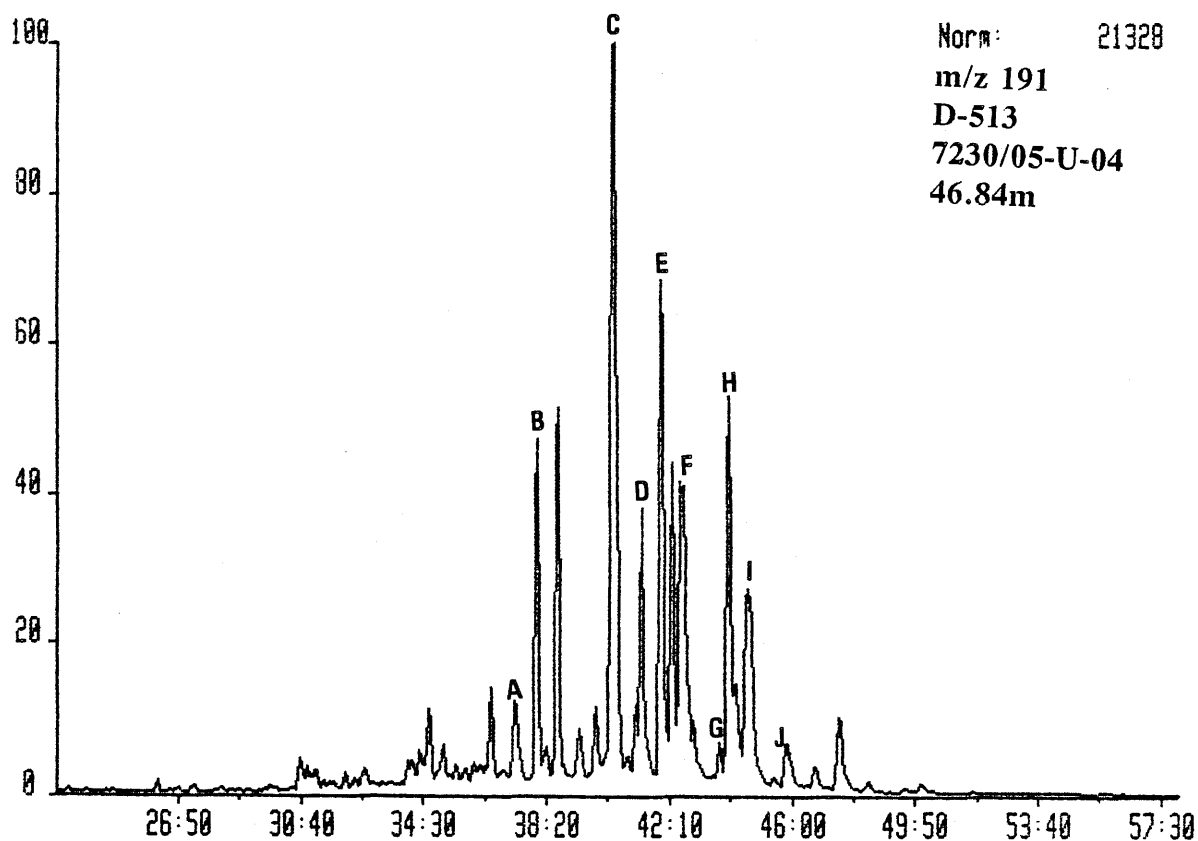
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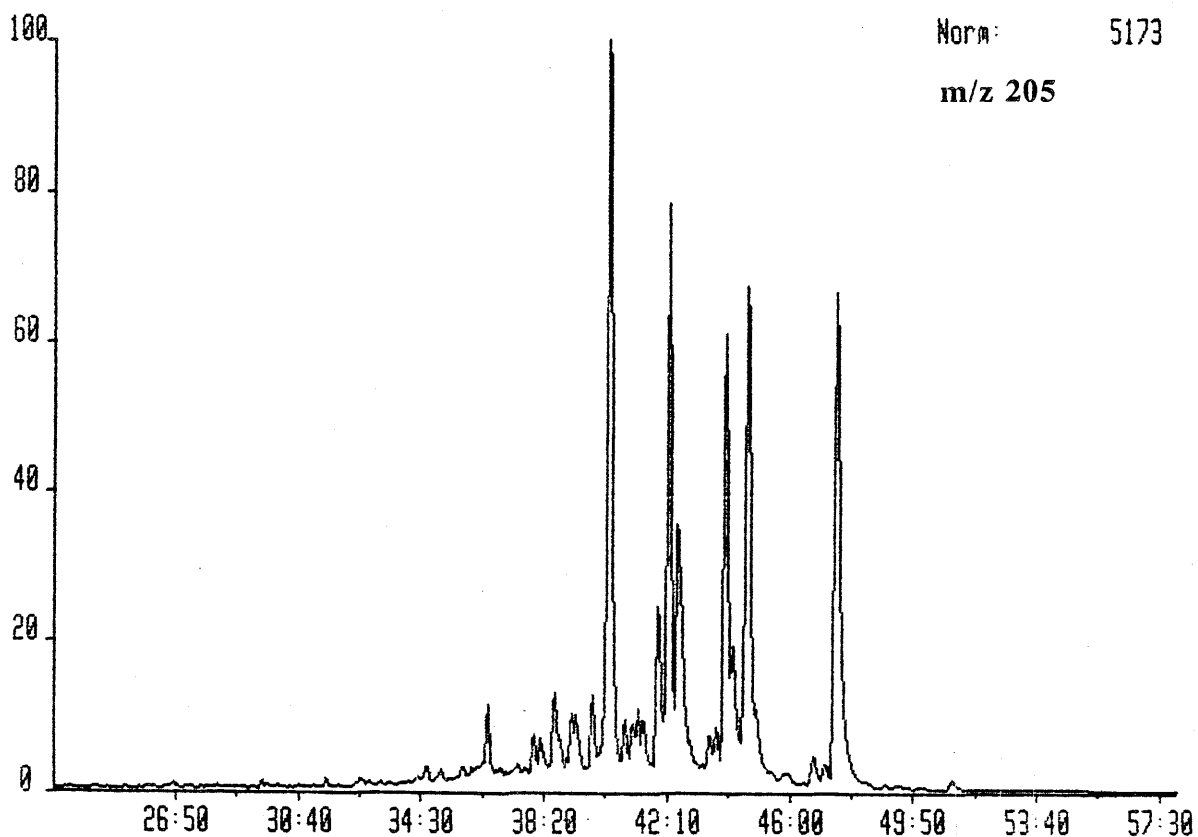
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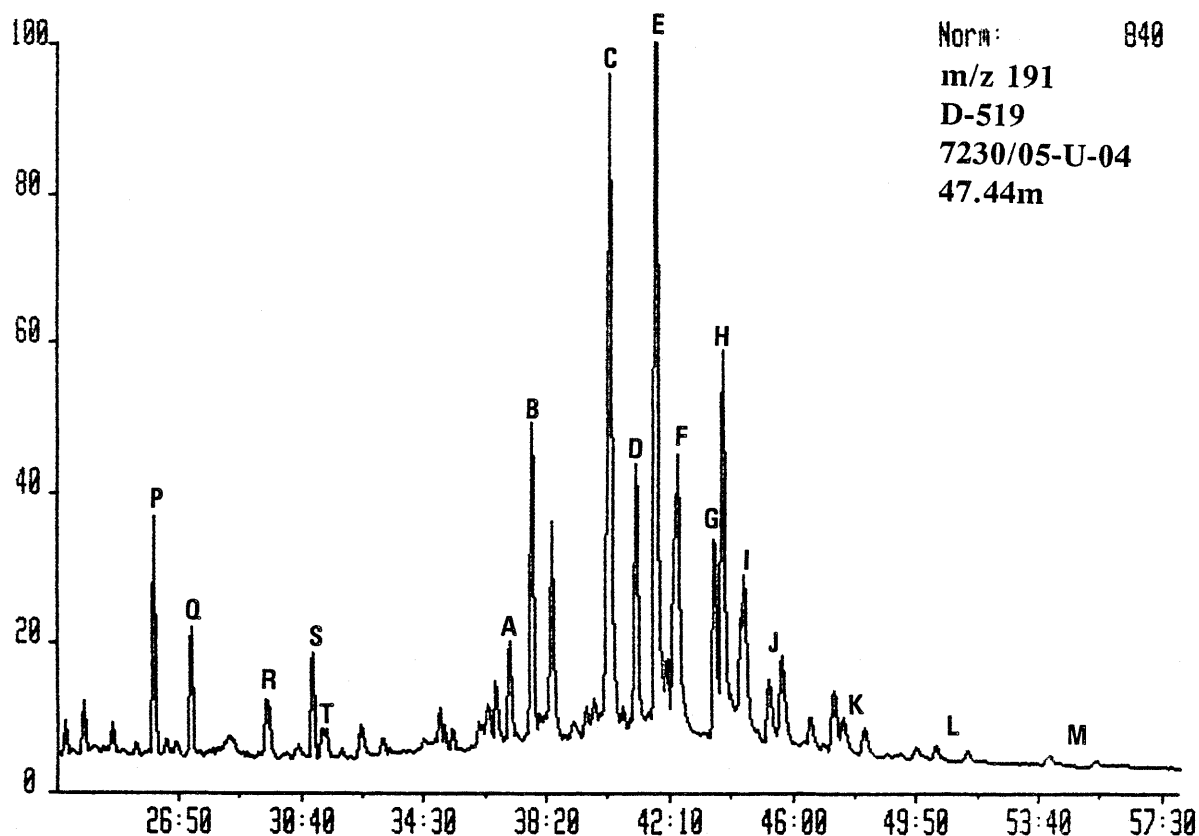
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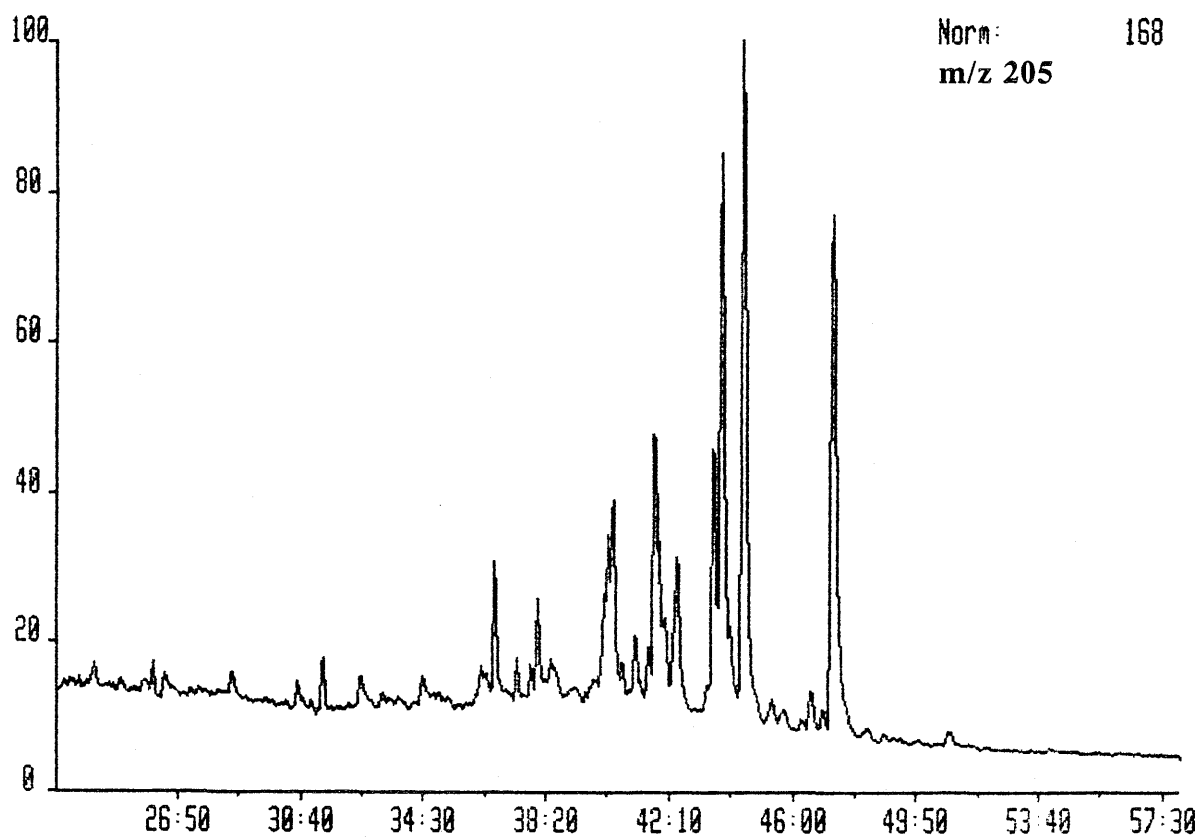
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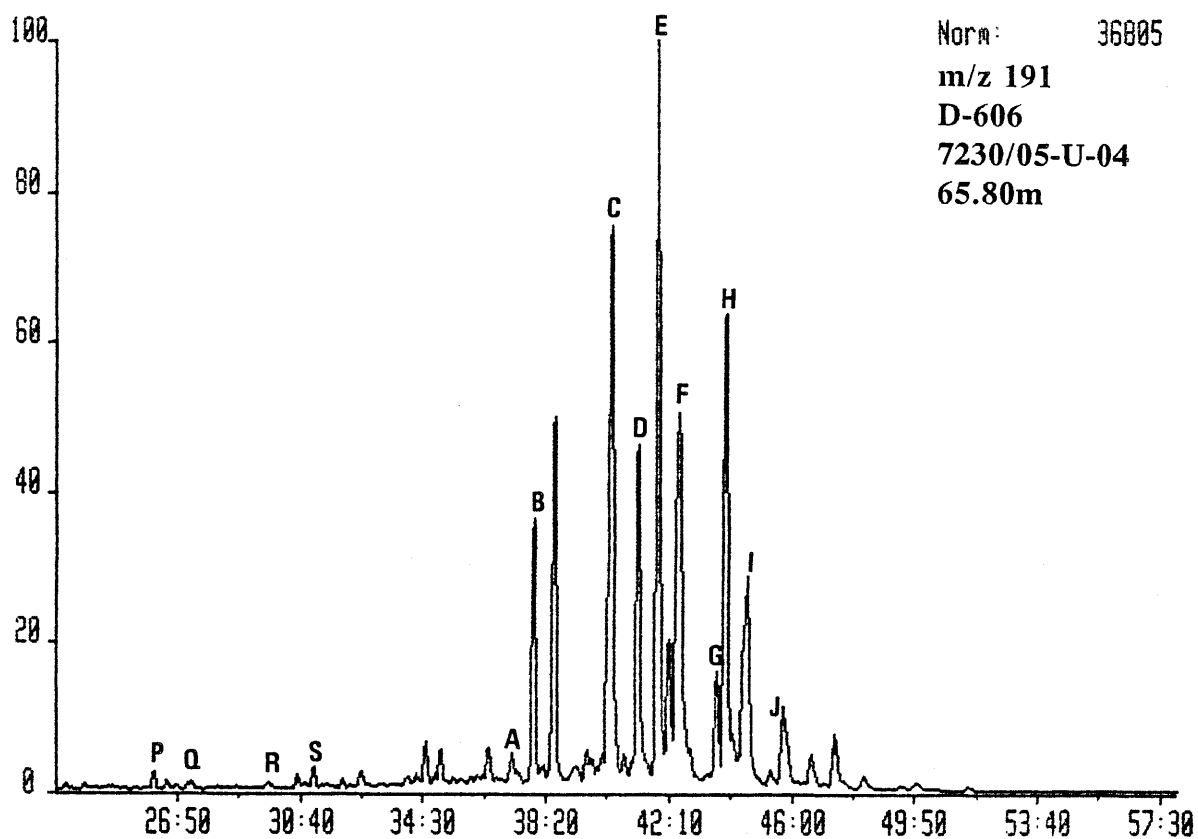
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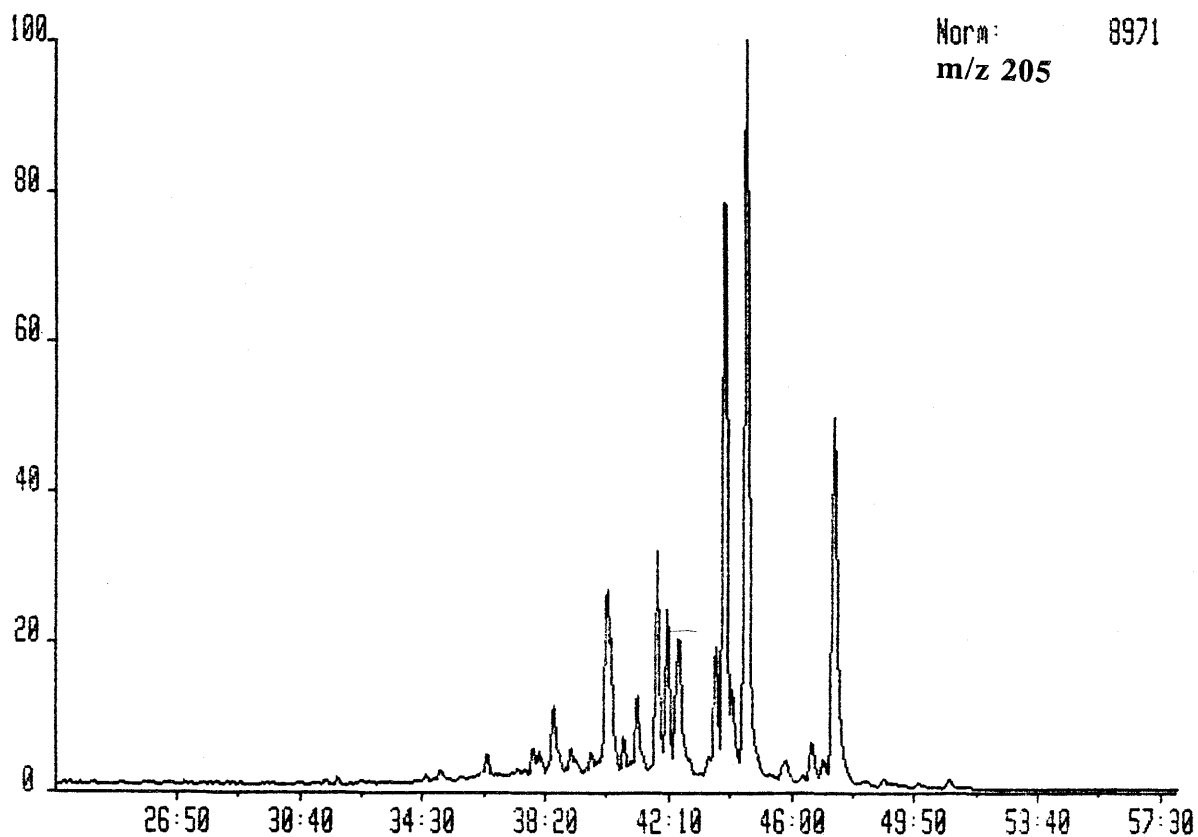
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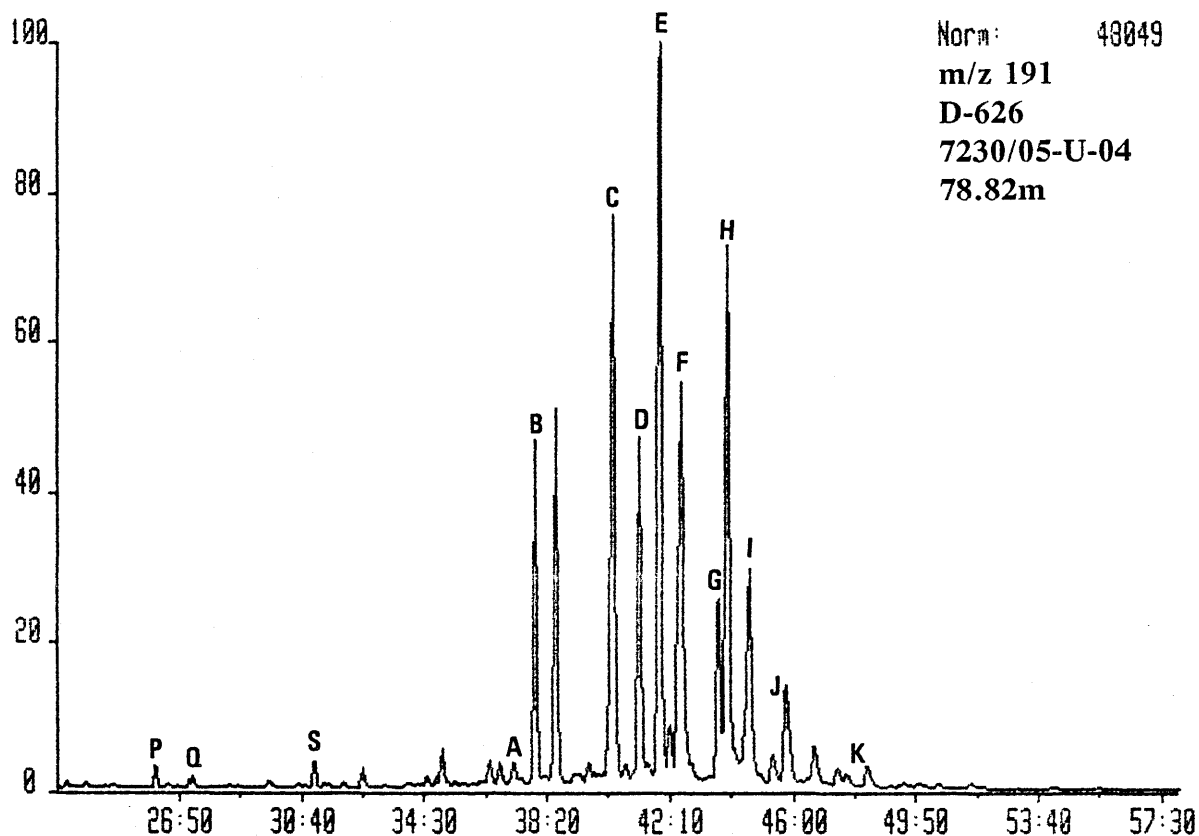
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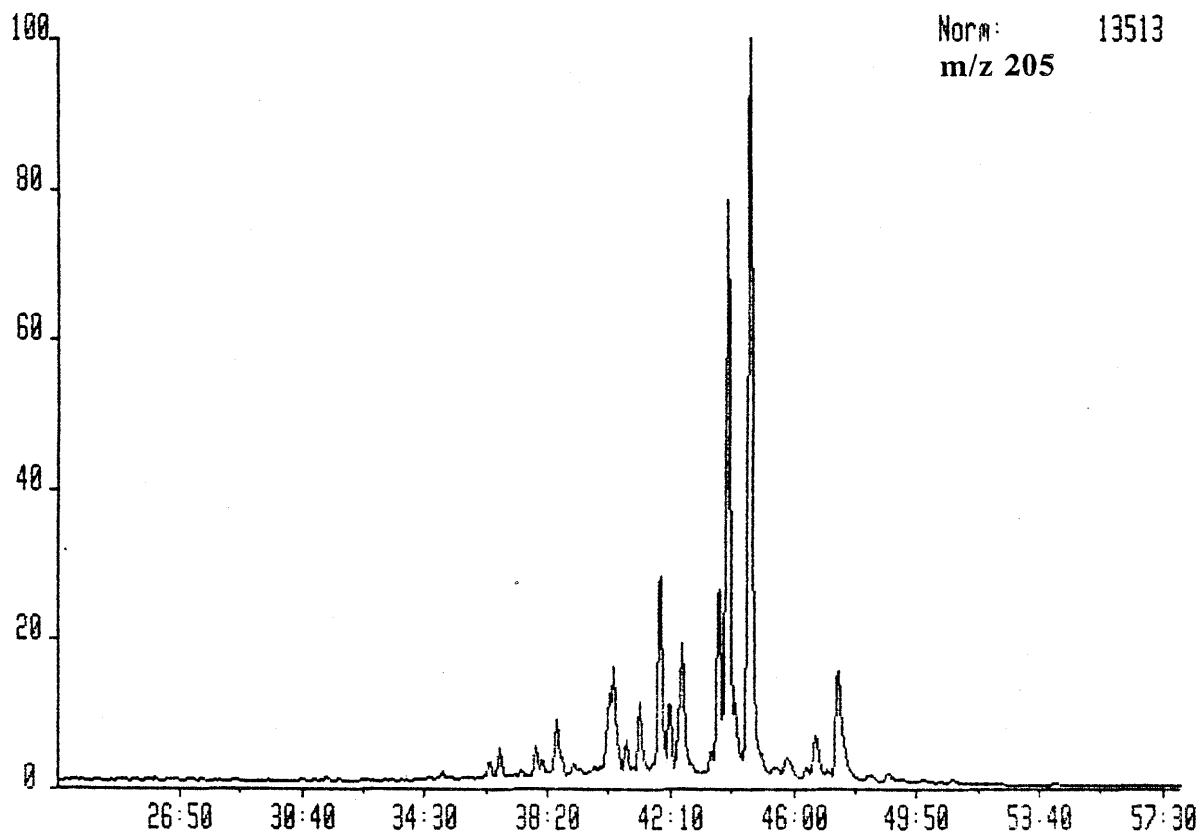
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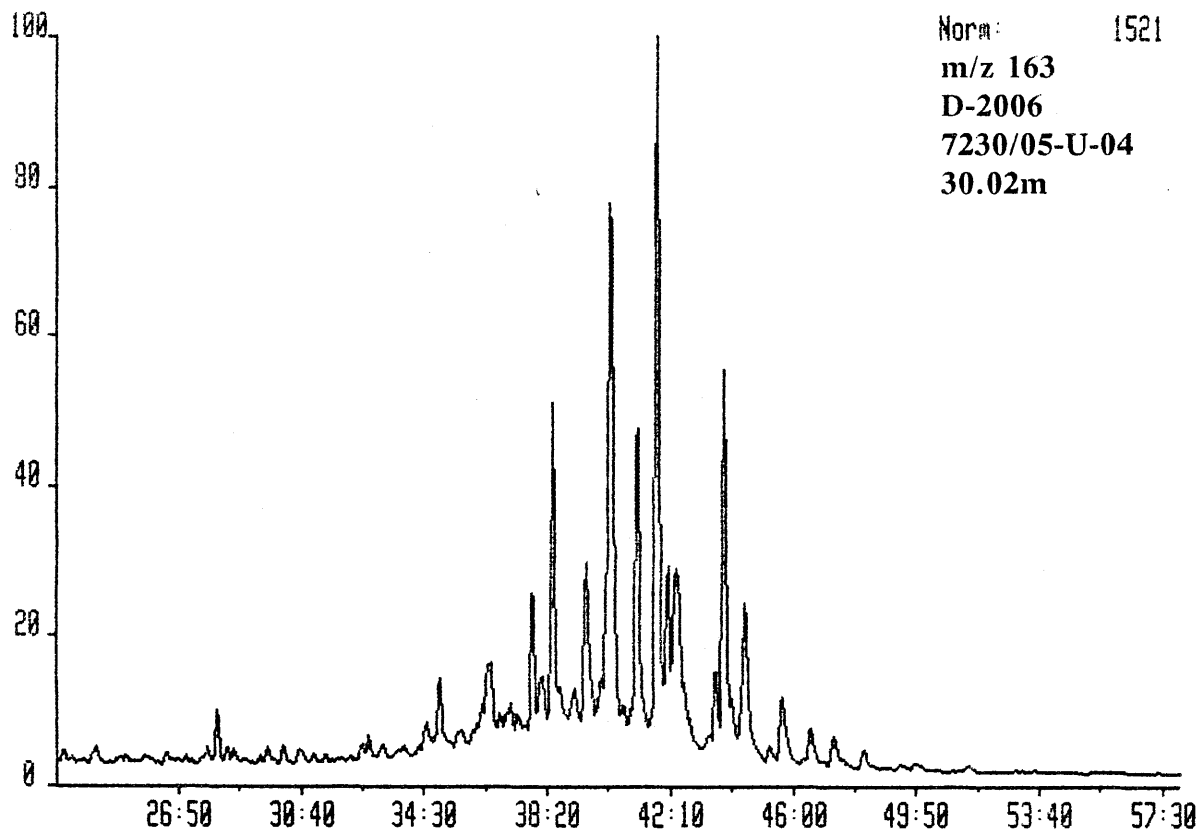
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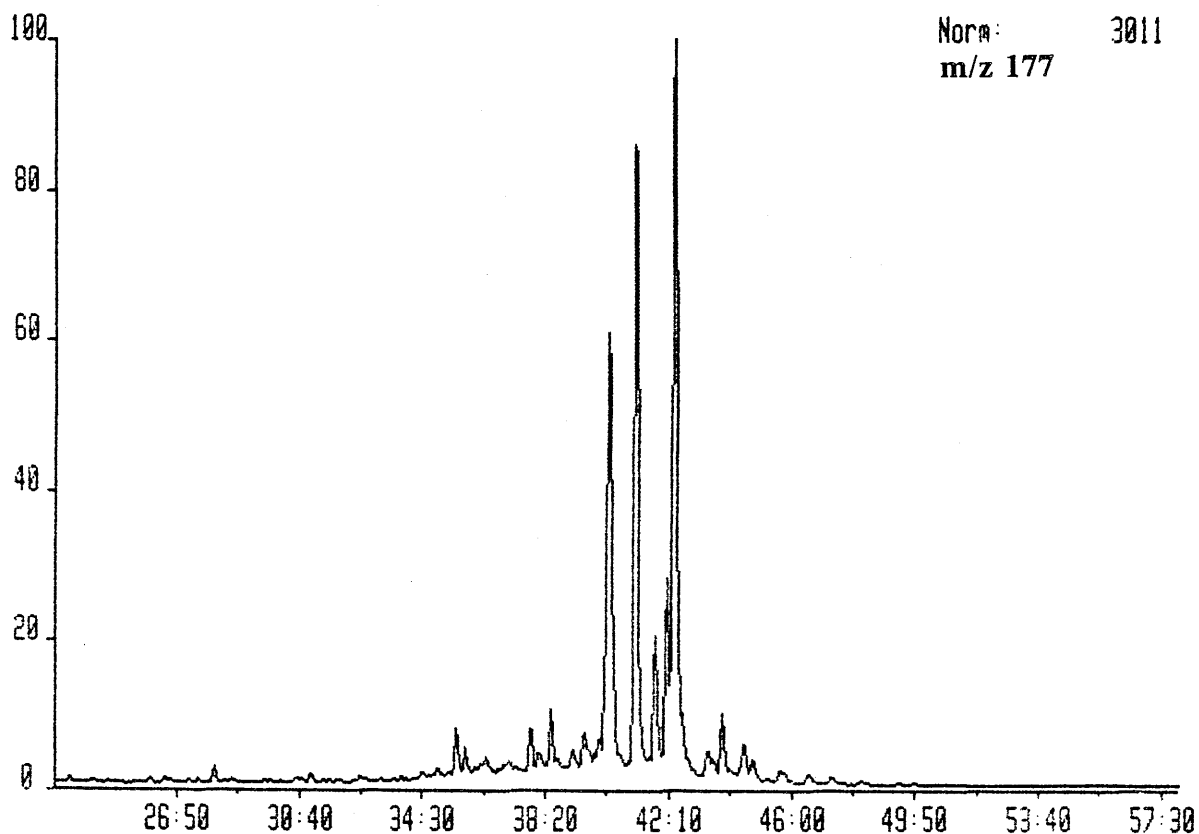
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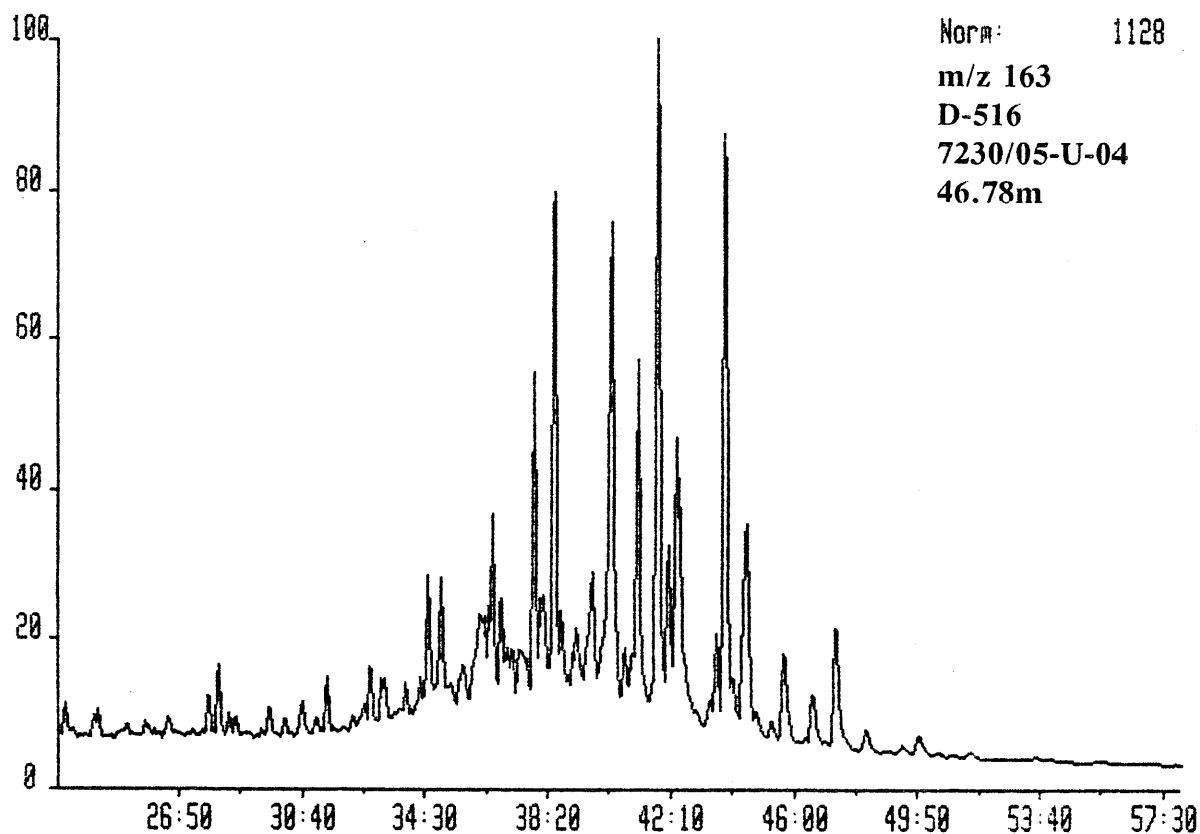
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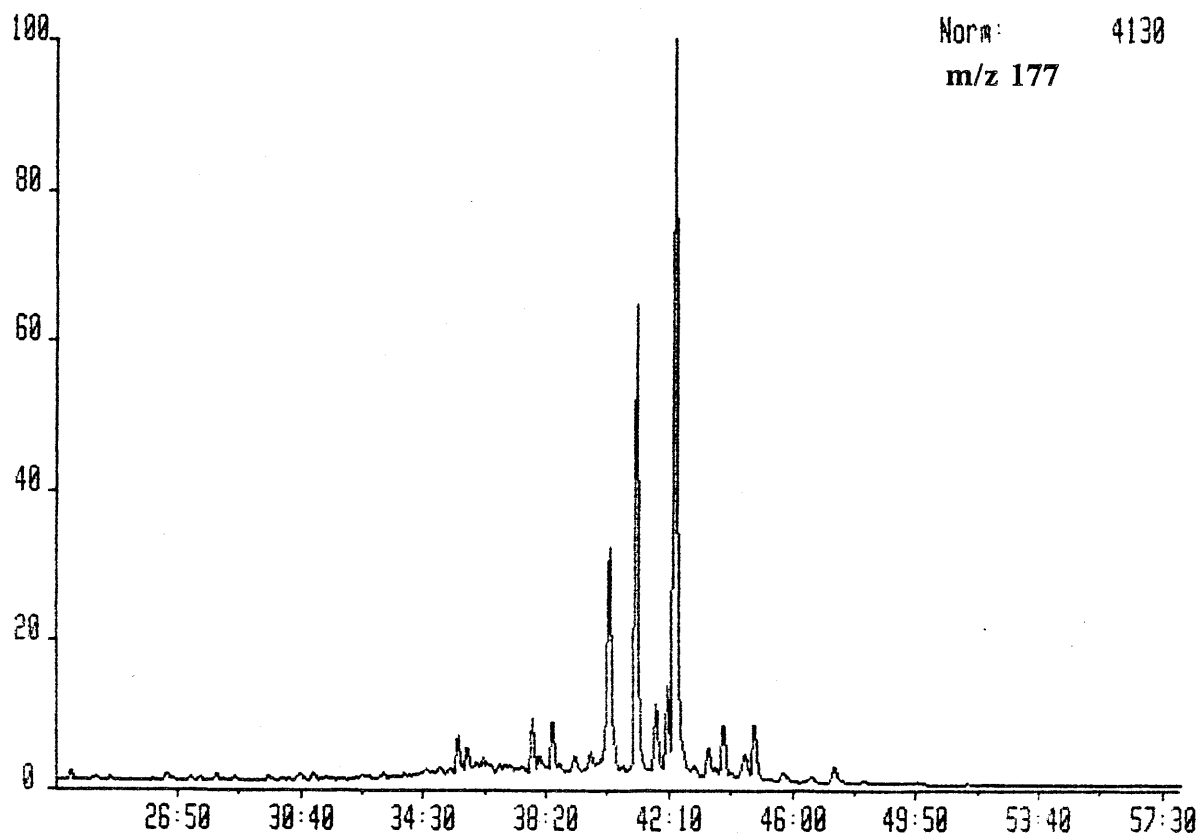
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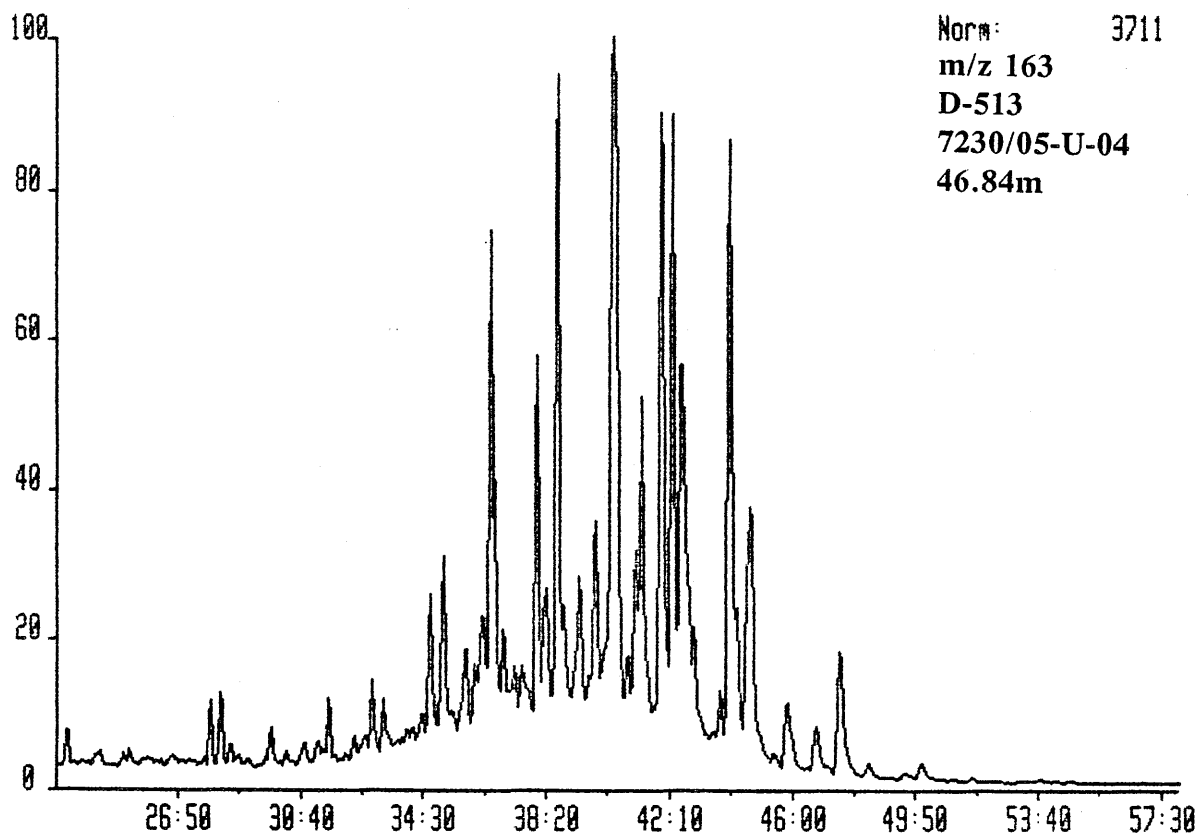
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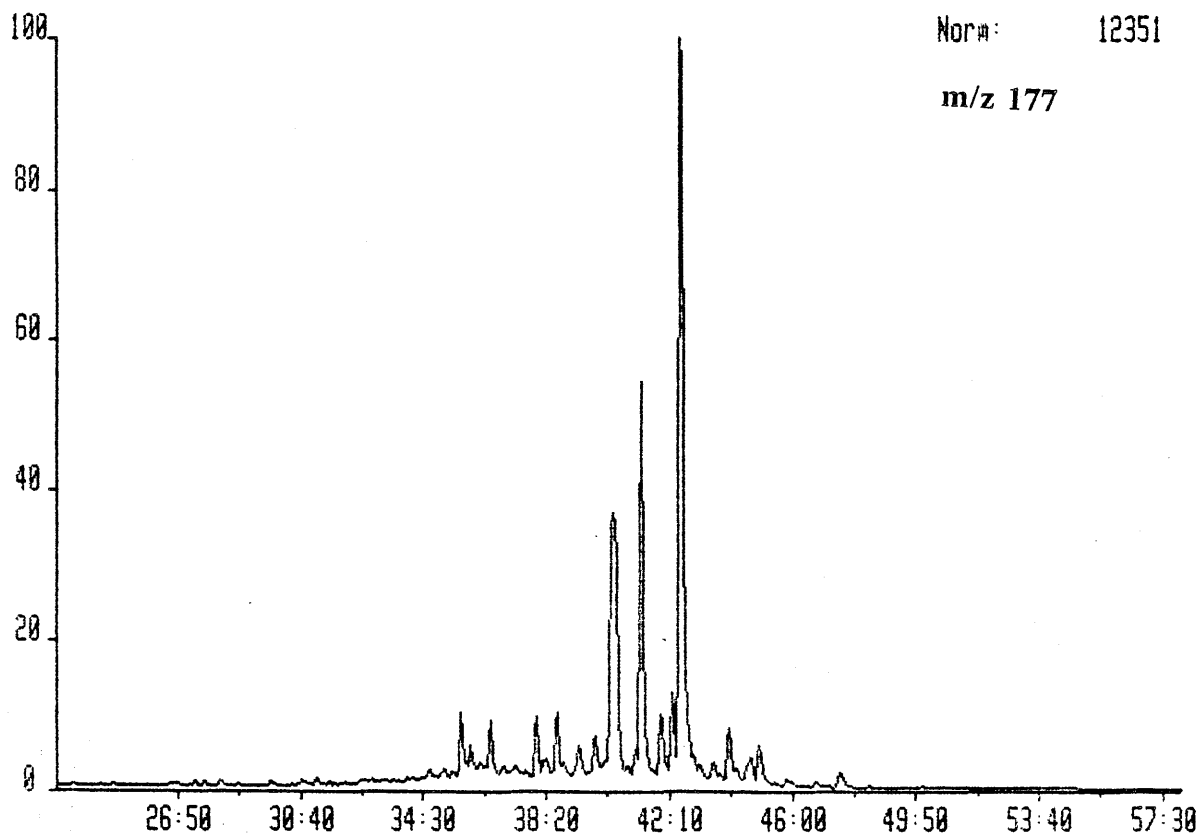
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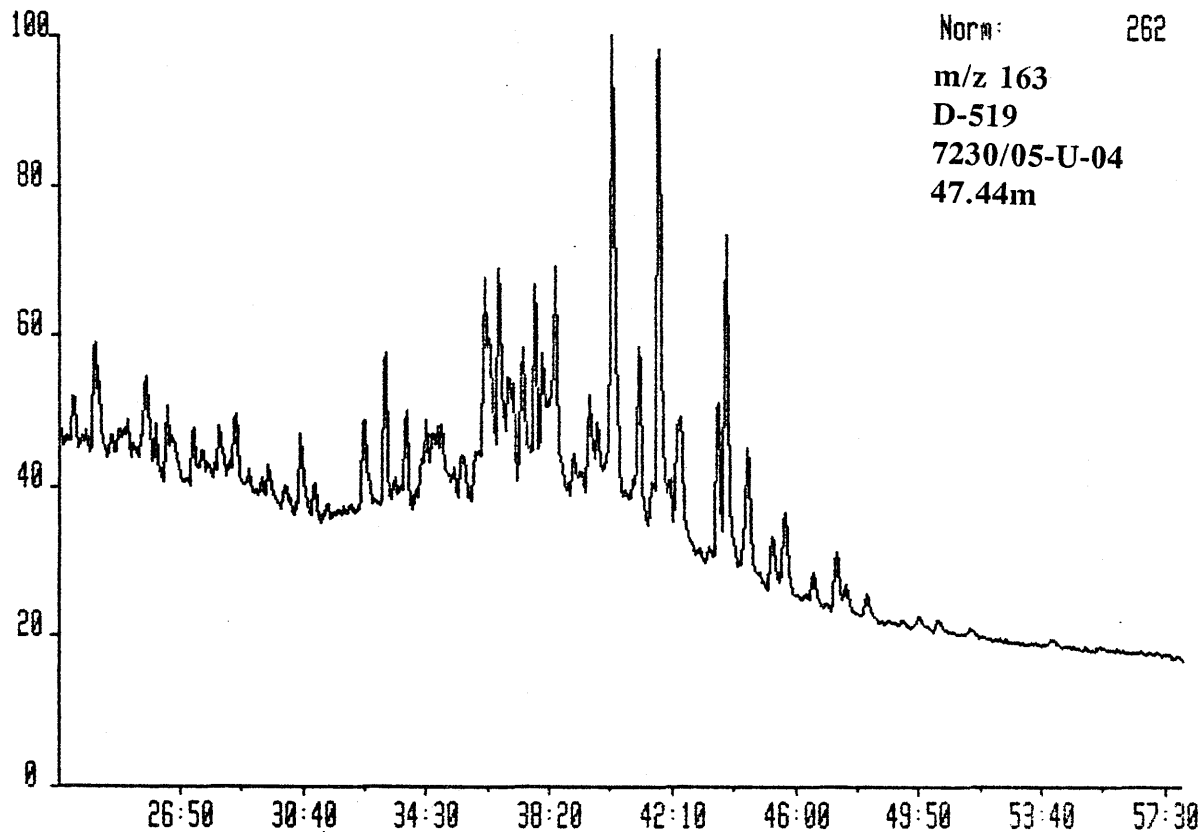
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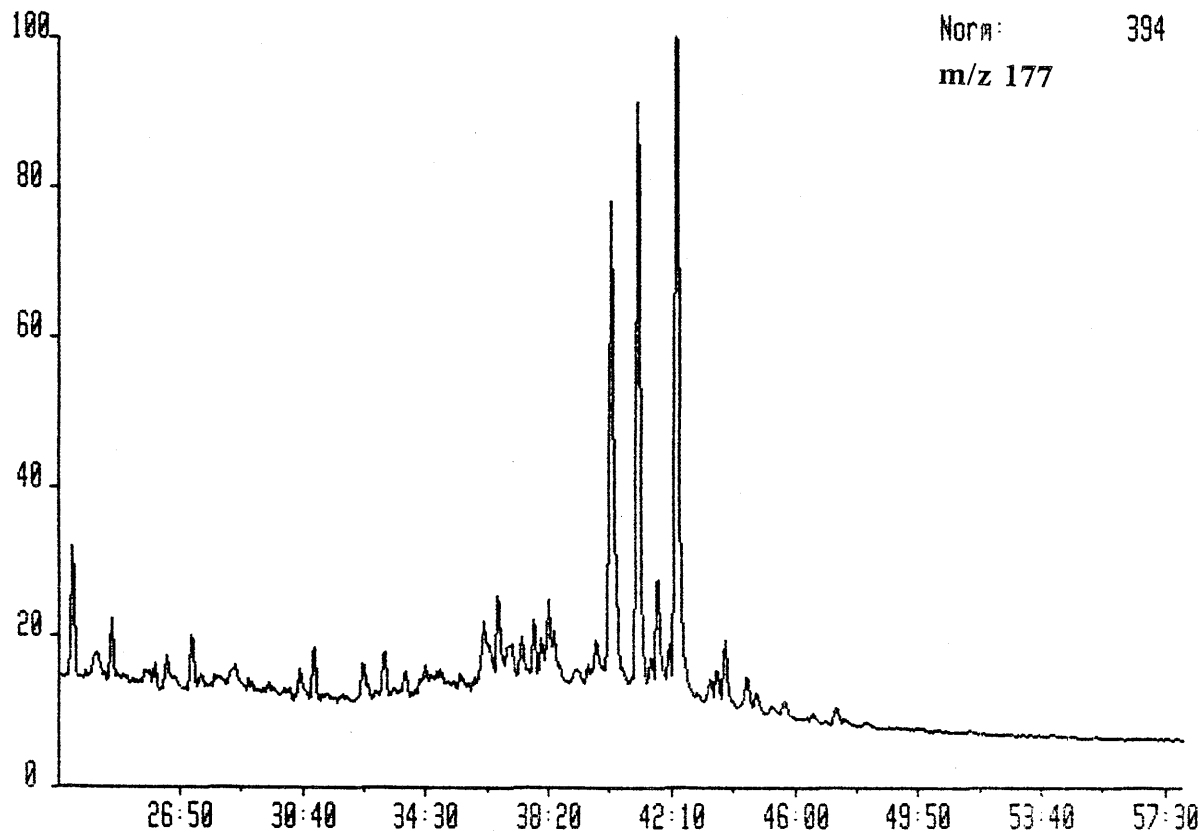
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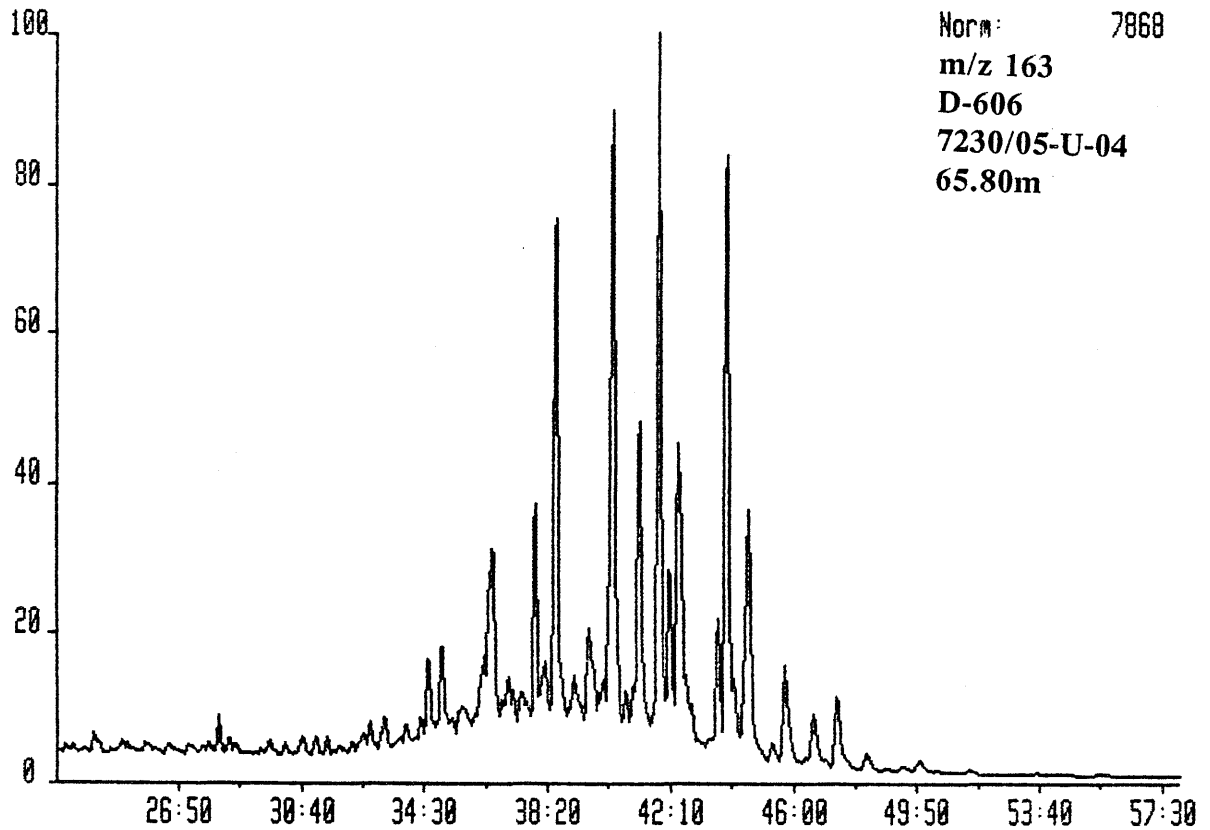
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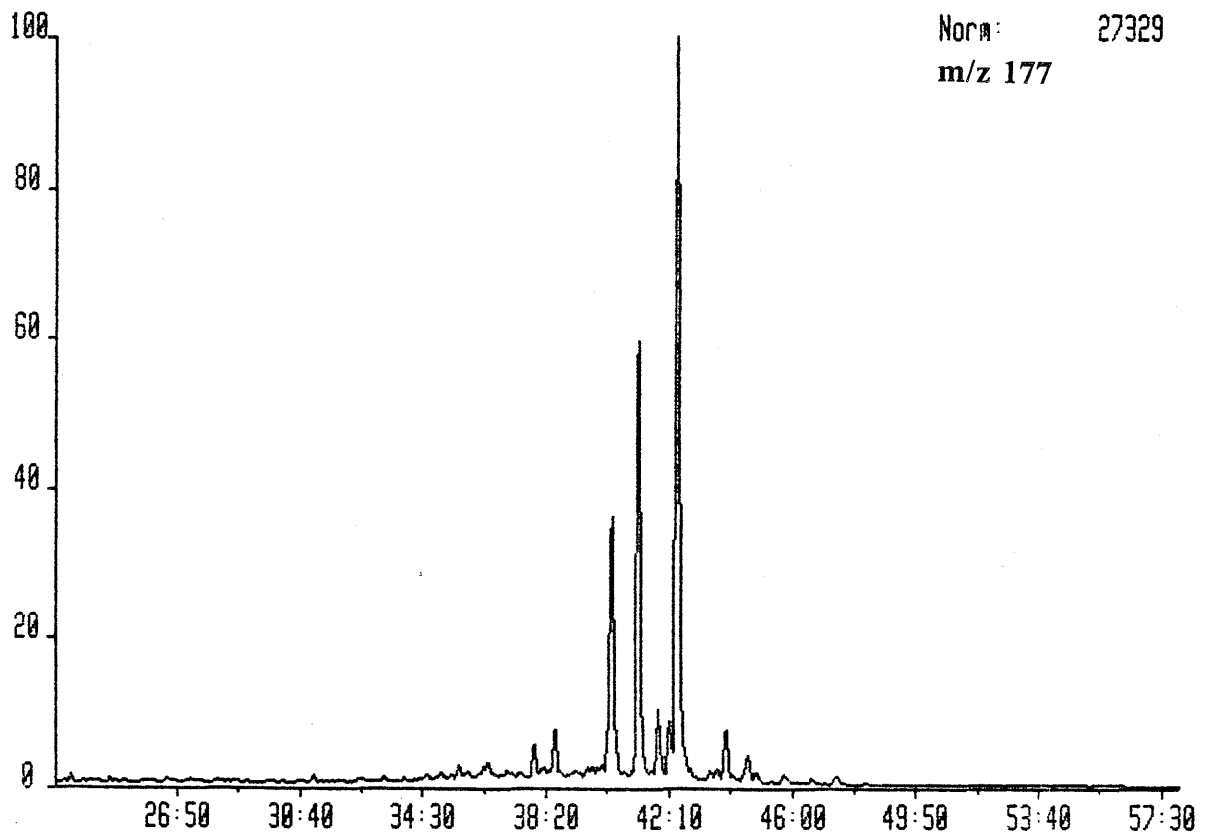
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Text:21.3427.23



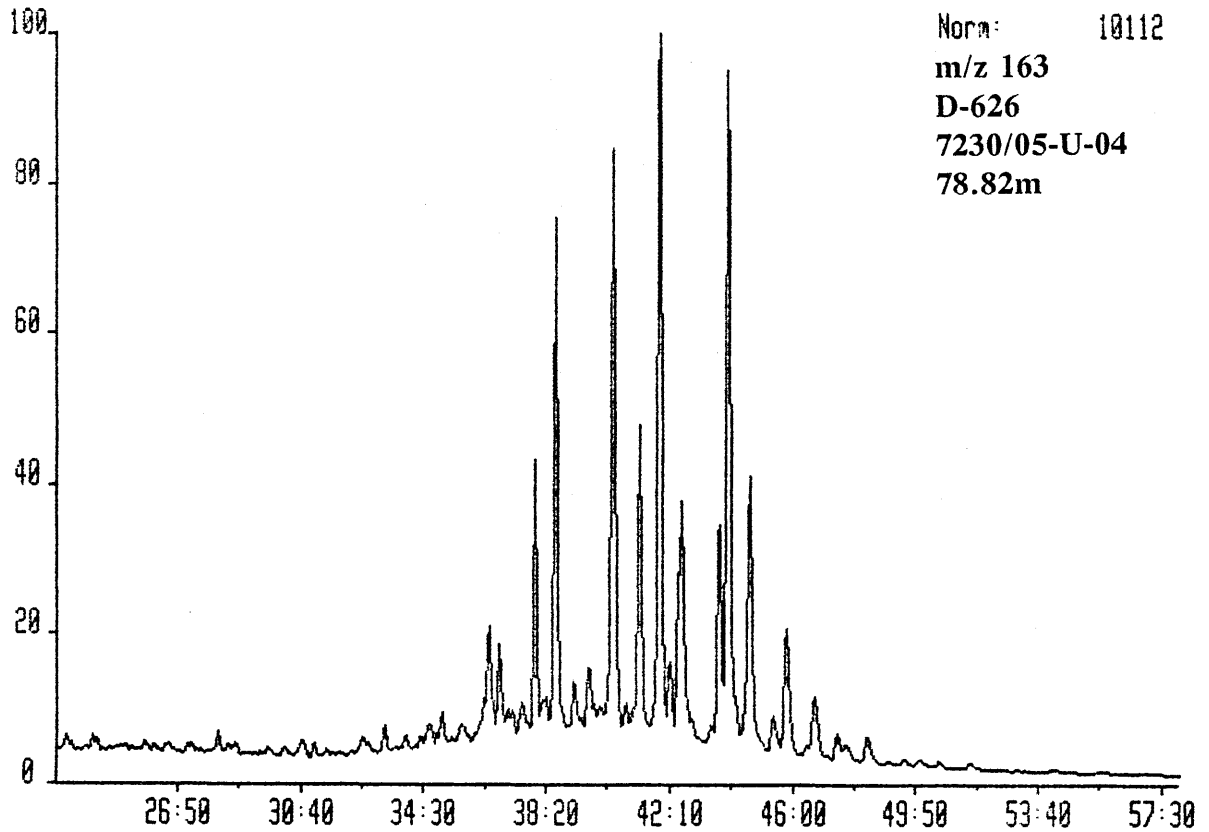
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Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D606SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D626SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



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Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

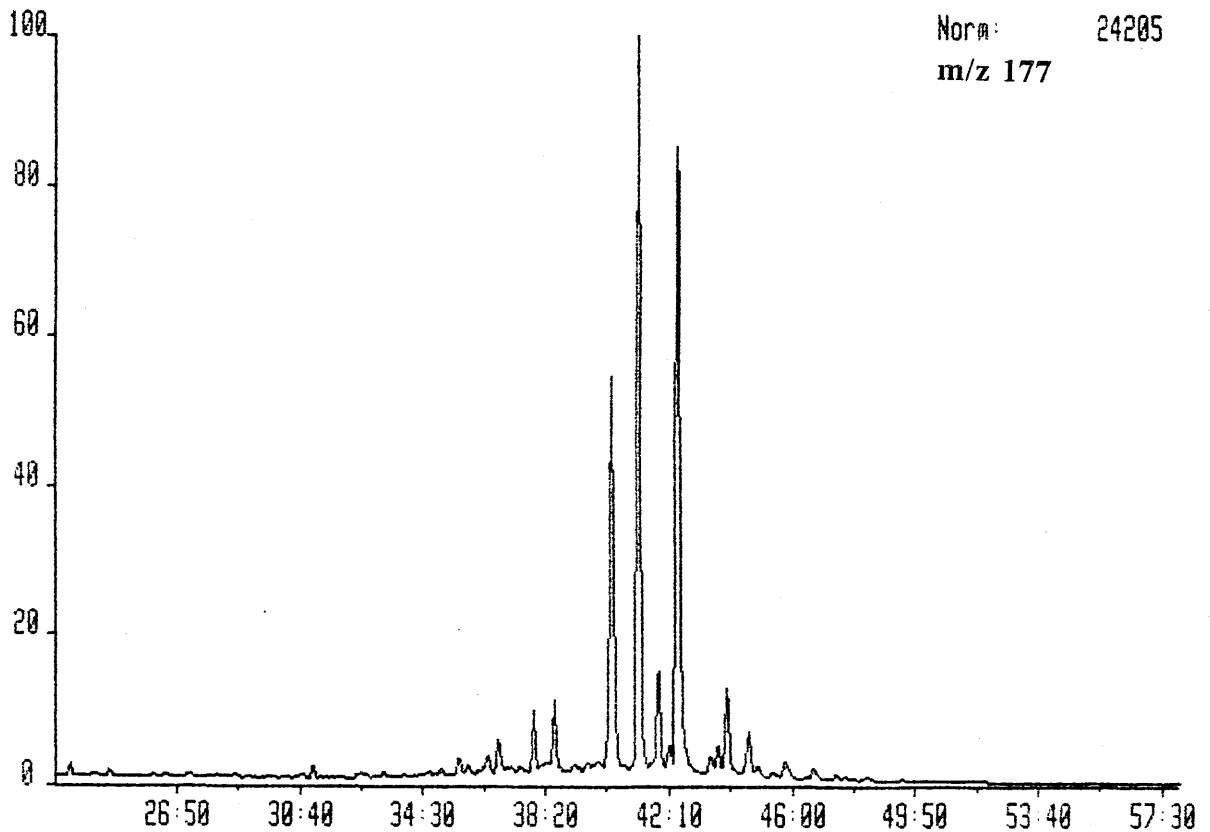
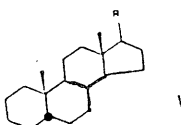
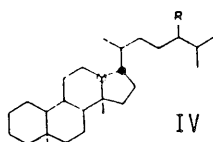
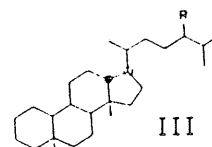
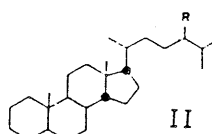
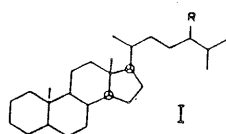


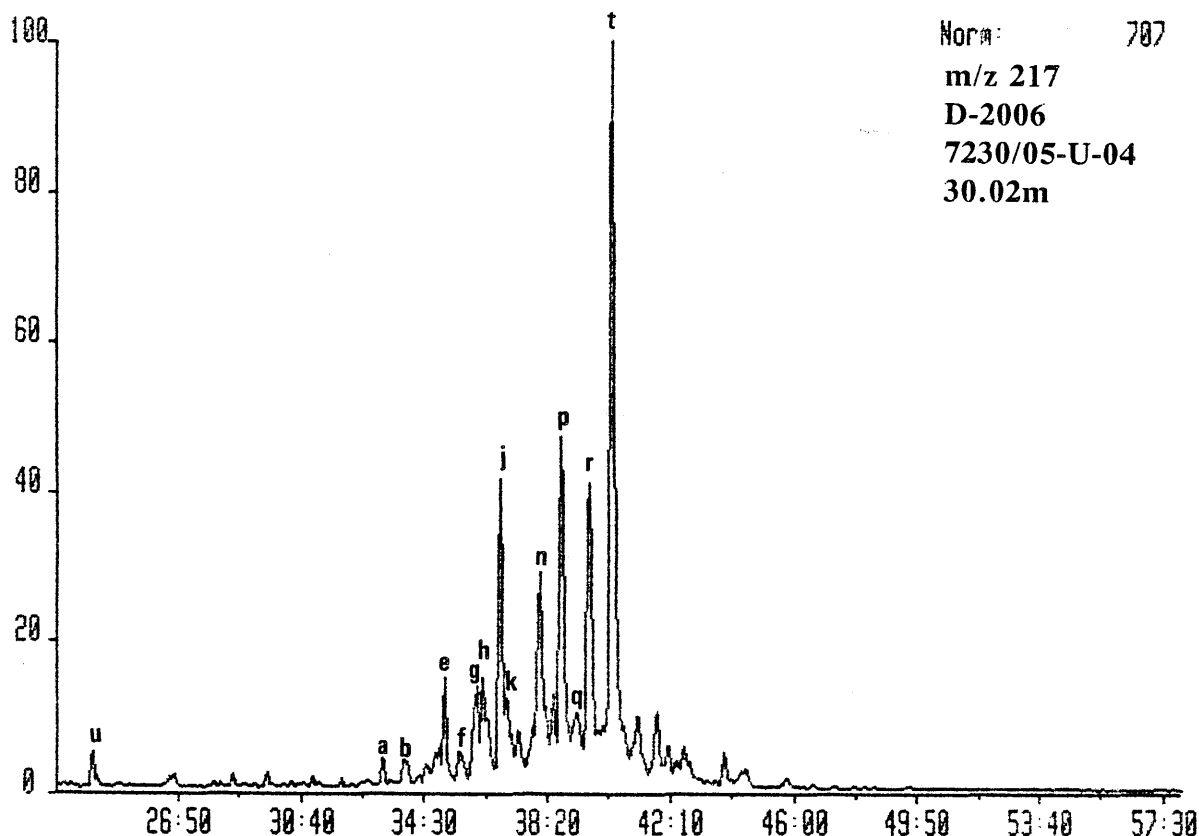
Figure A.II.6.5:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

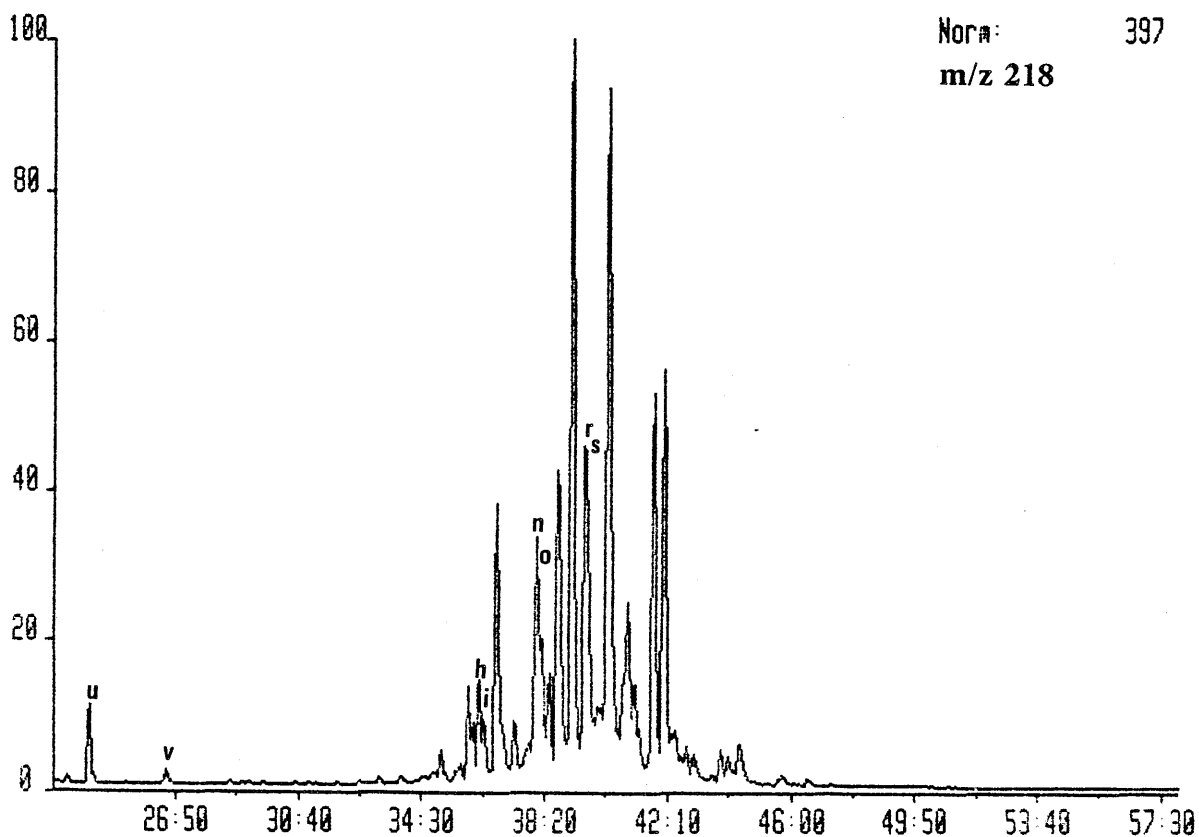
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)



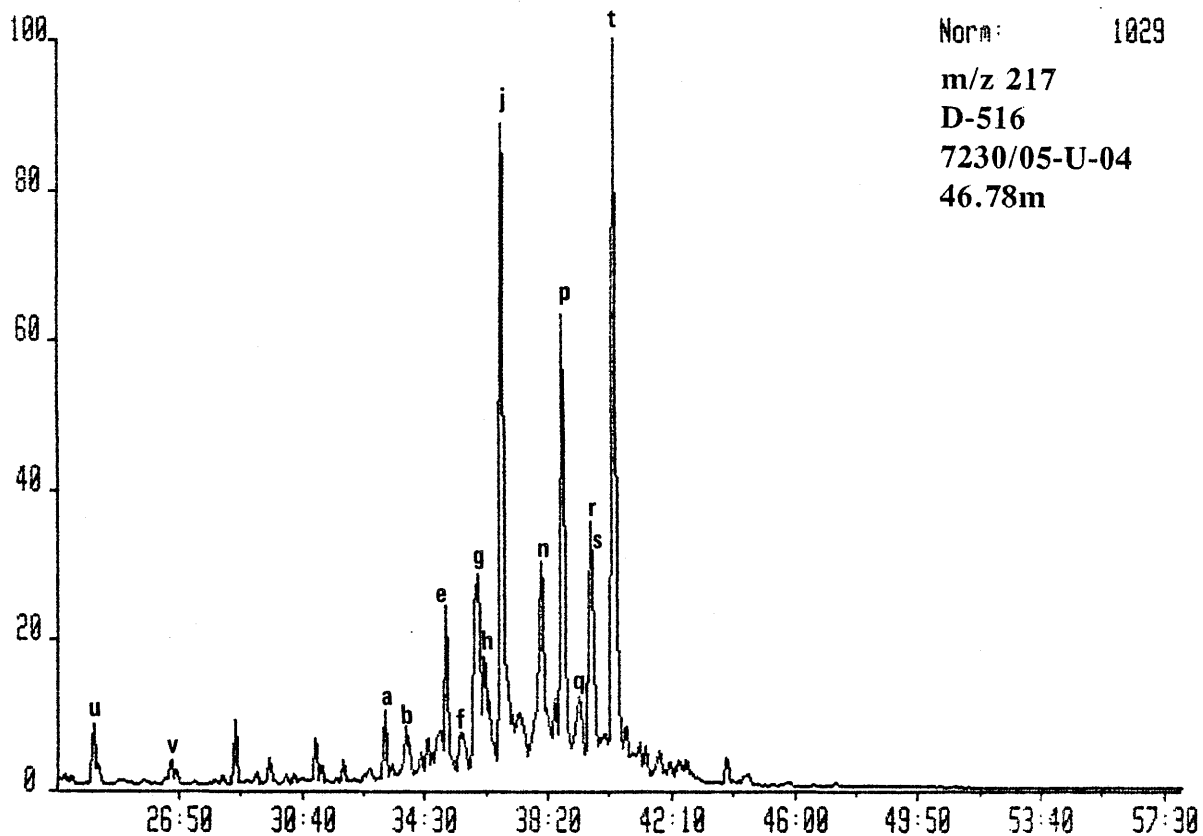
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



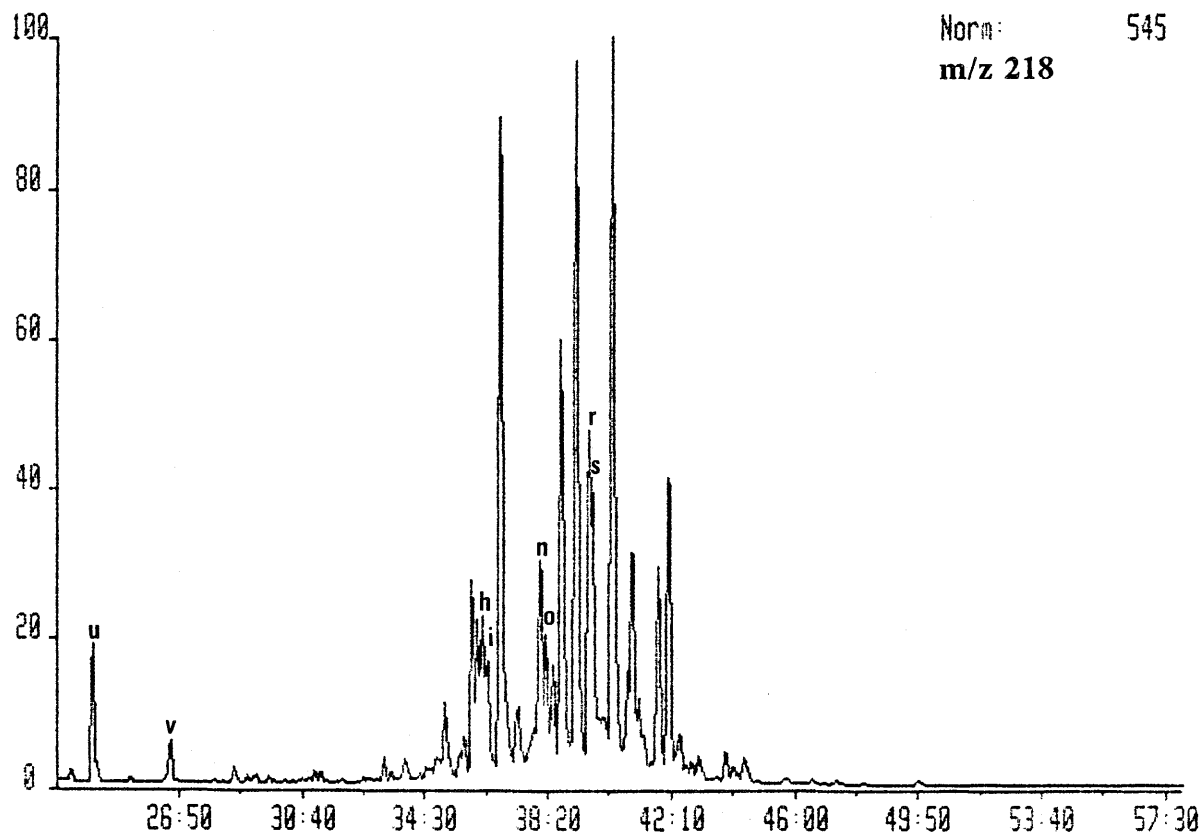
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



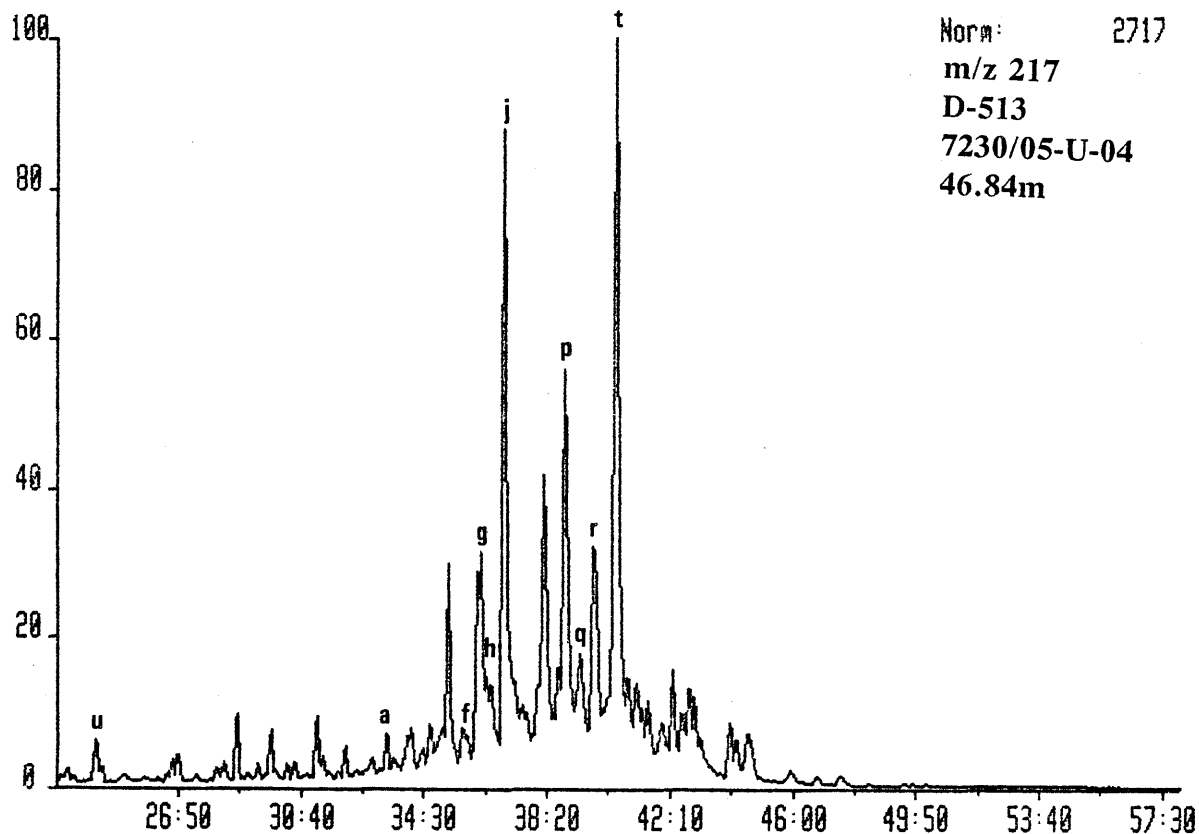
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



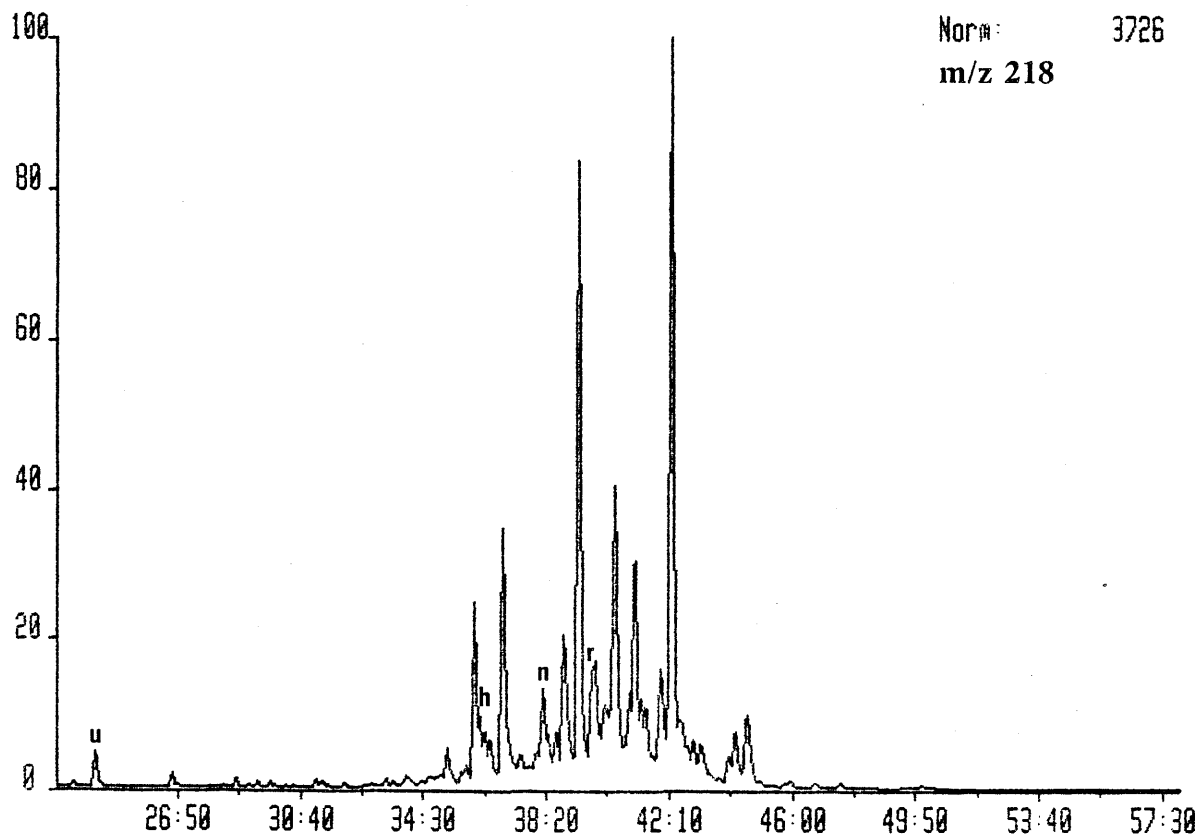
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



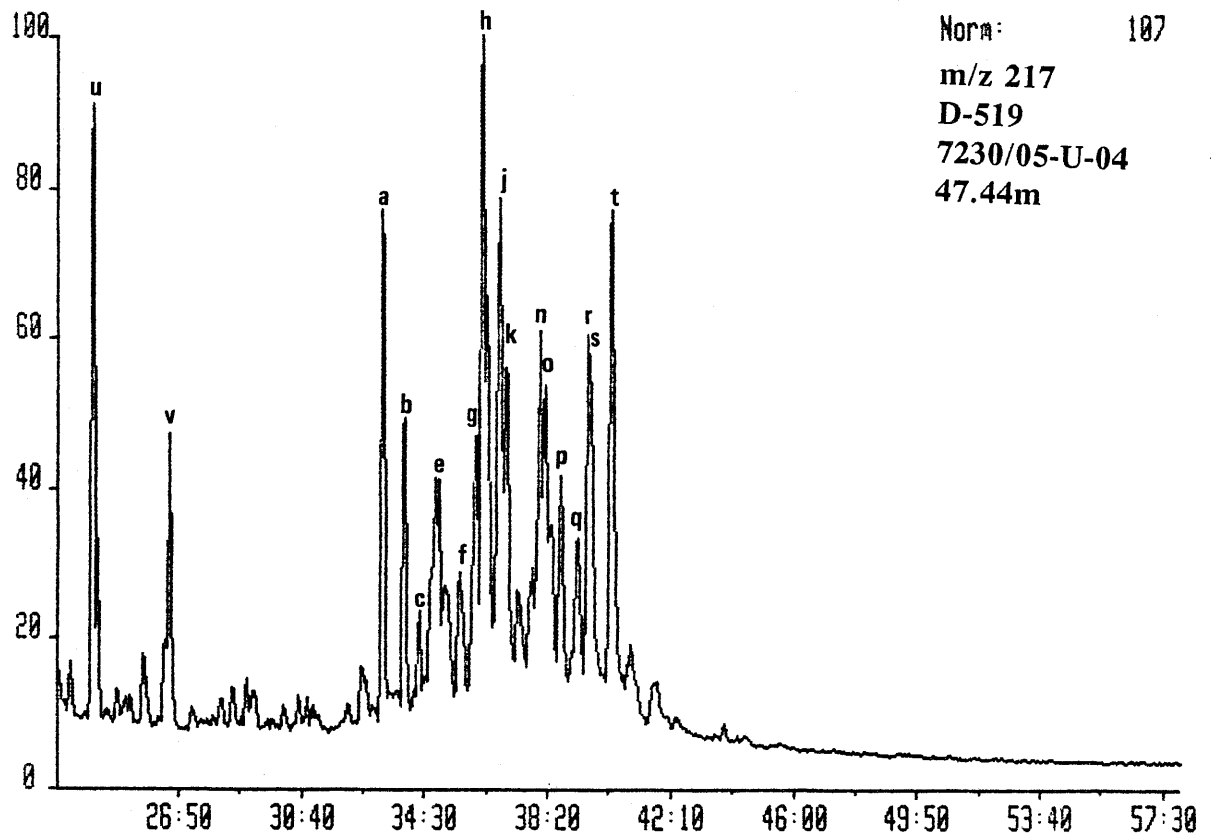
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



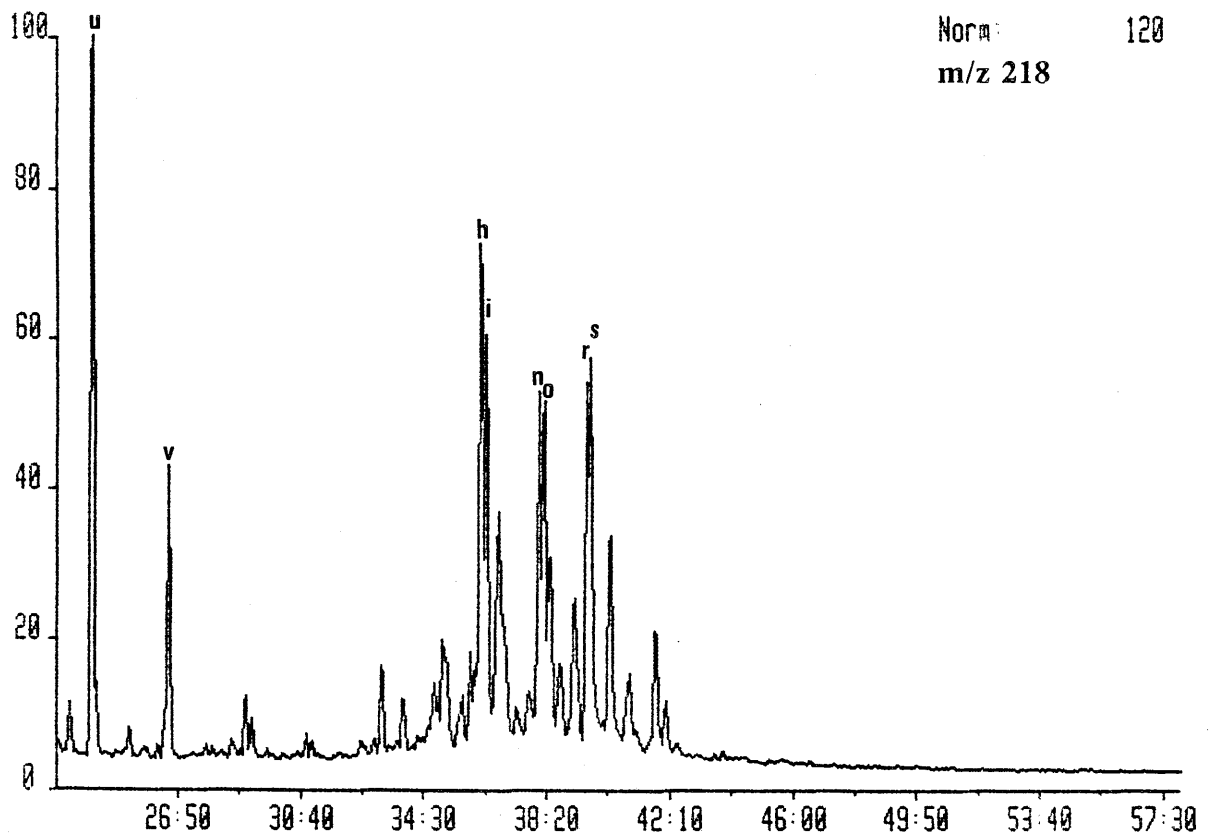
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Text:21.3427.23



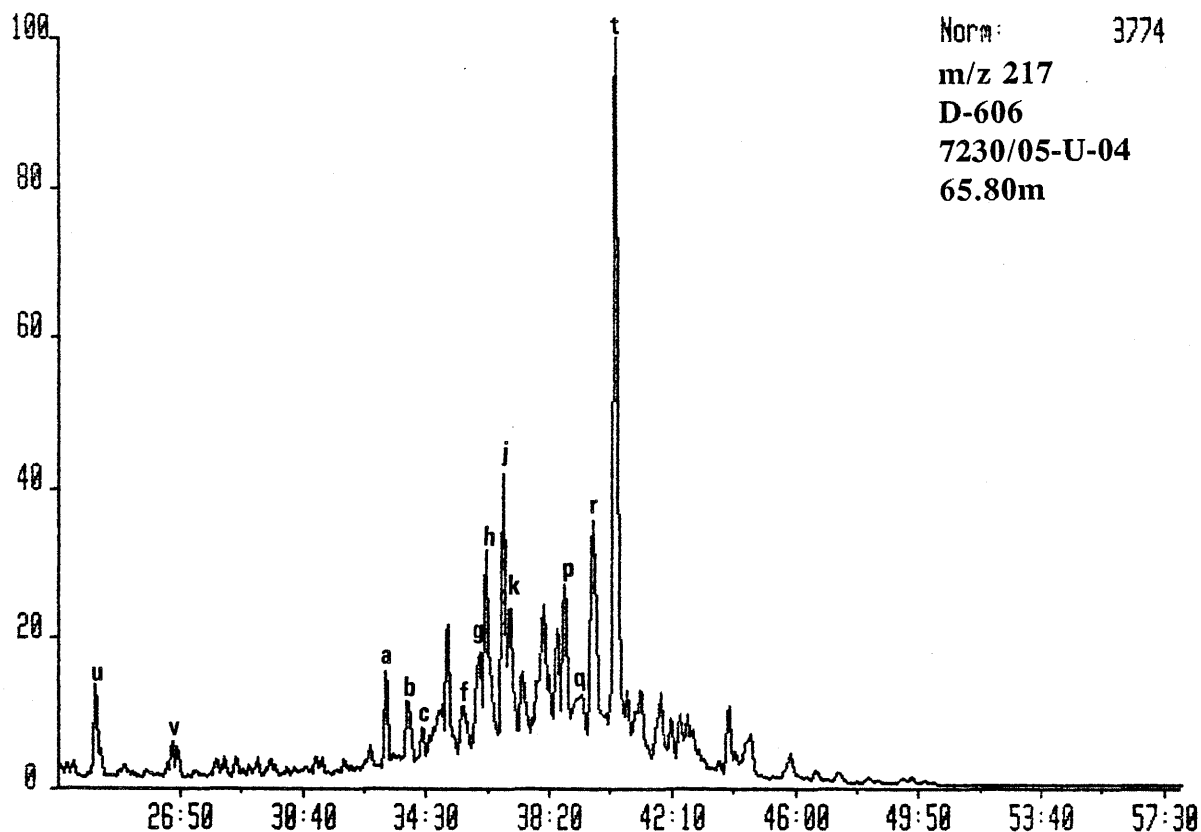
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Sample 1 Injection 1 Group 1 Mass 217.1000
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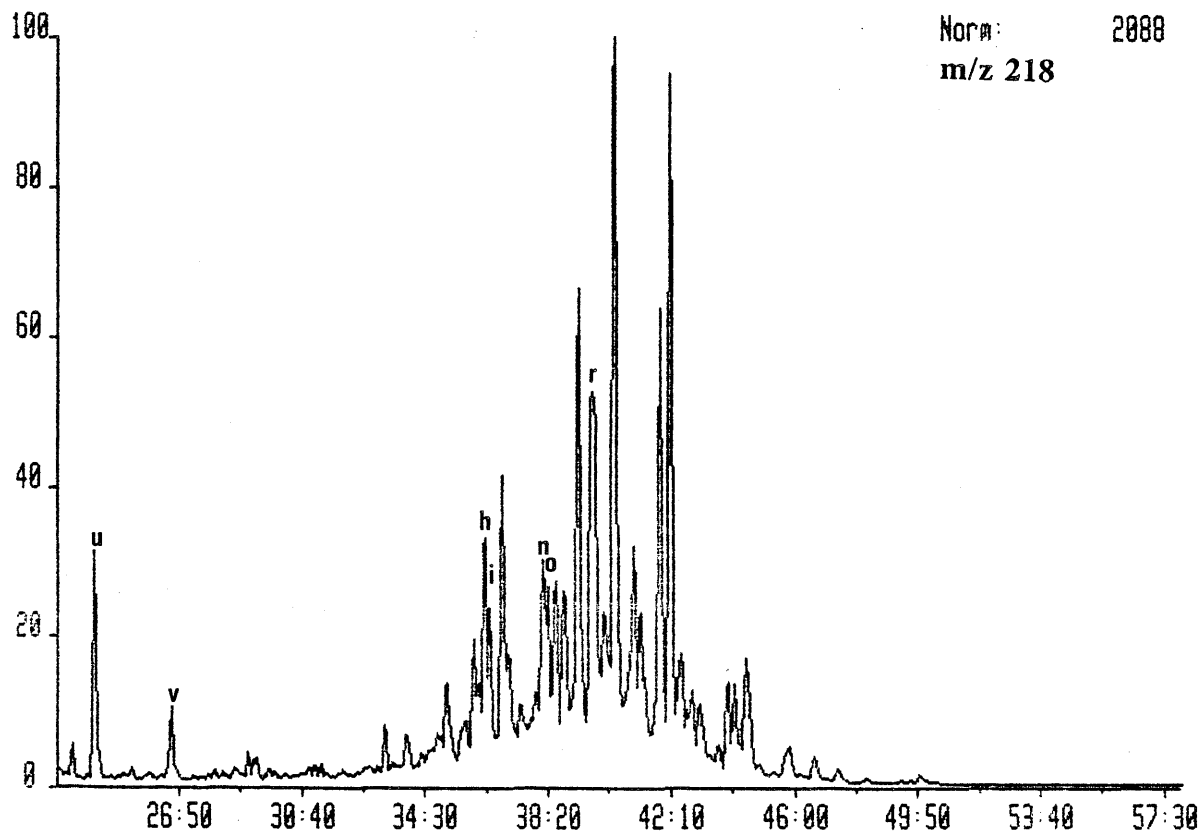
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



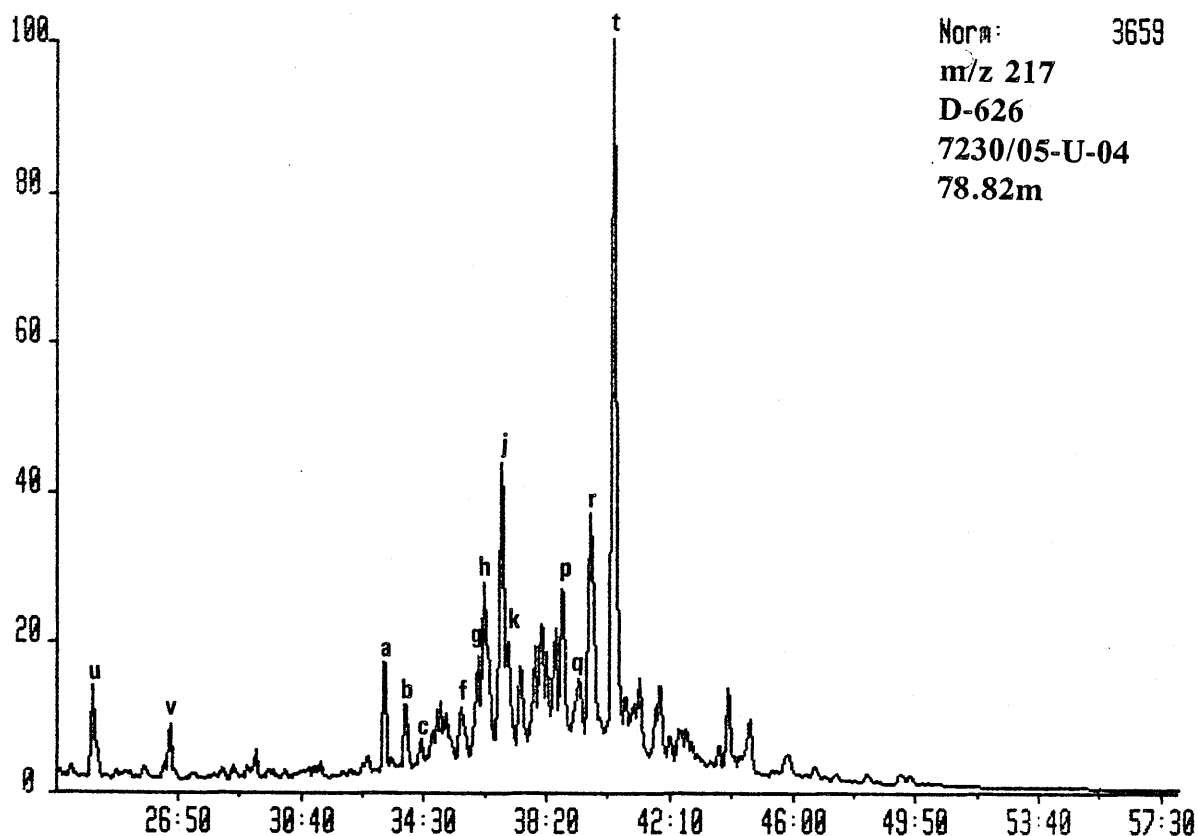
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



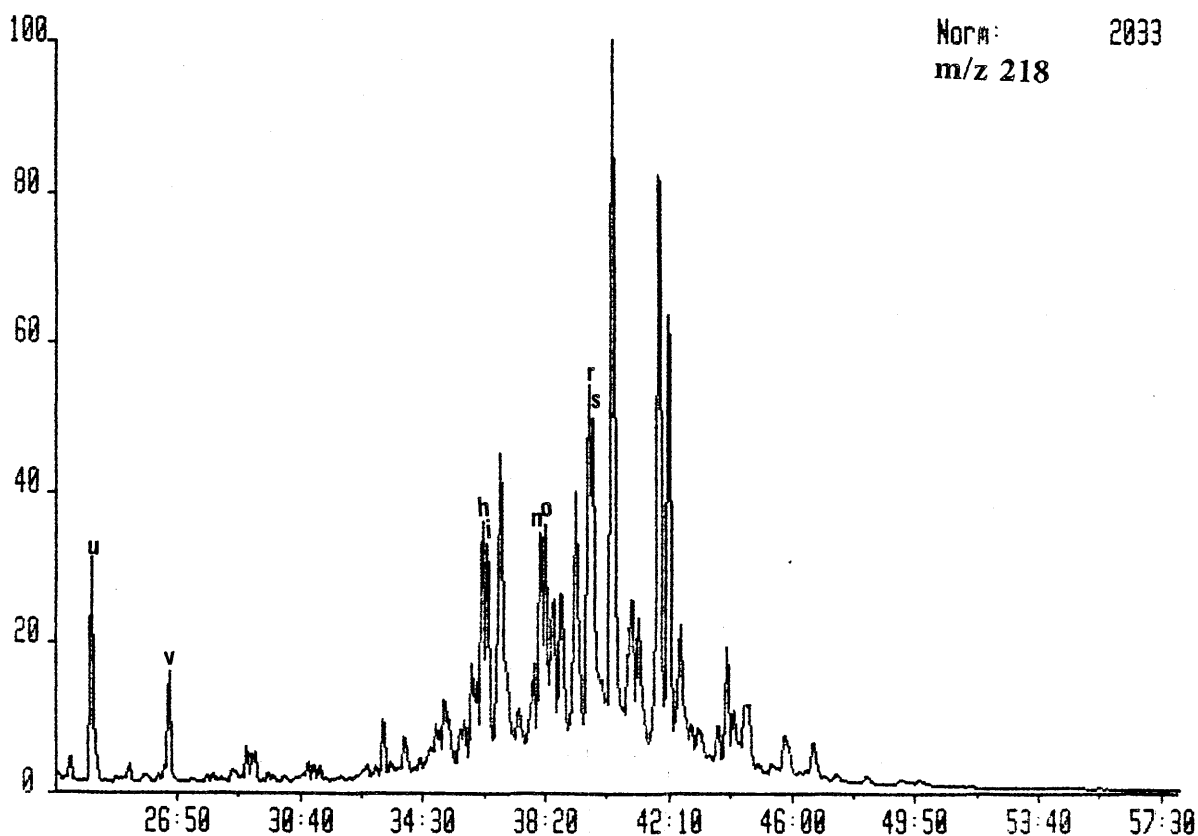
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



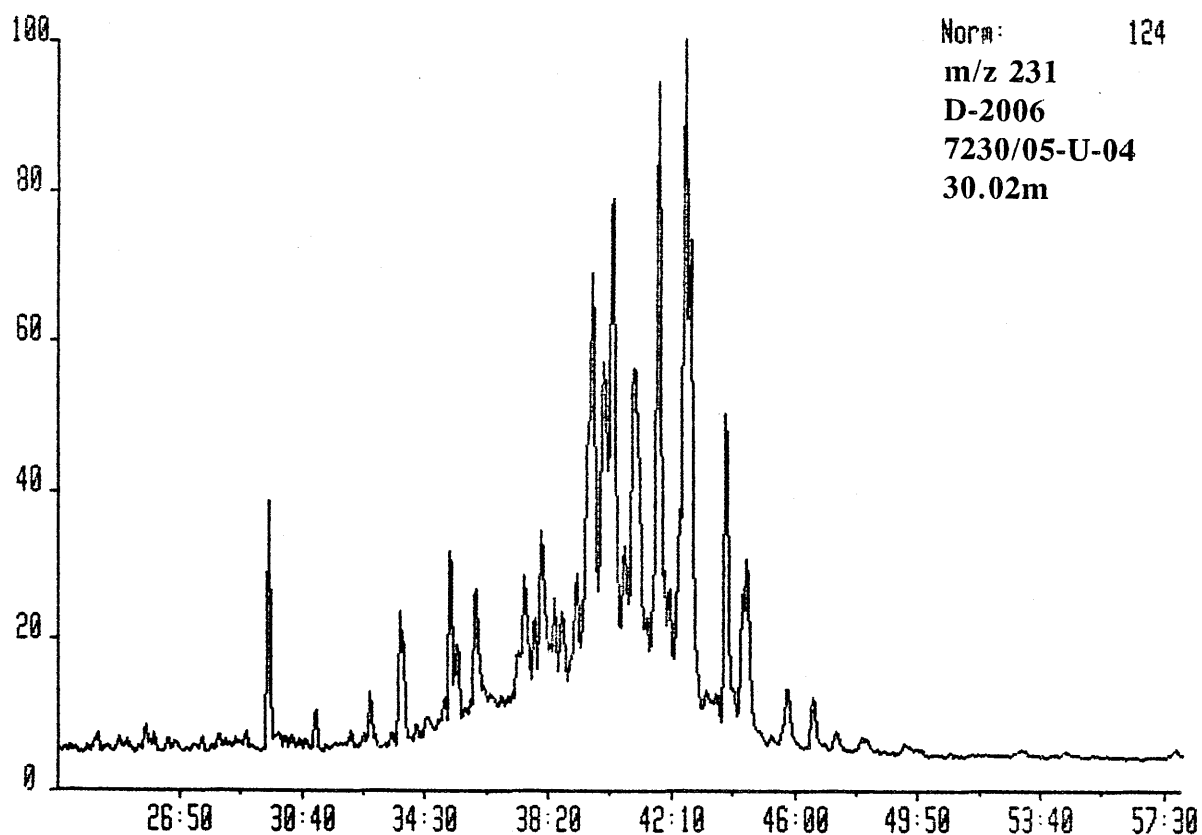
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Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



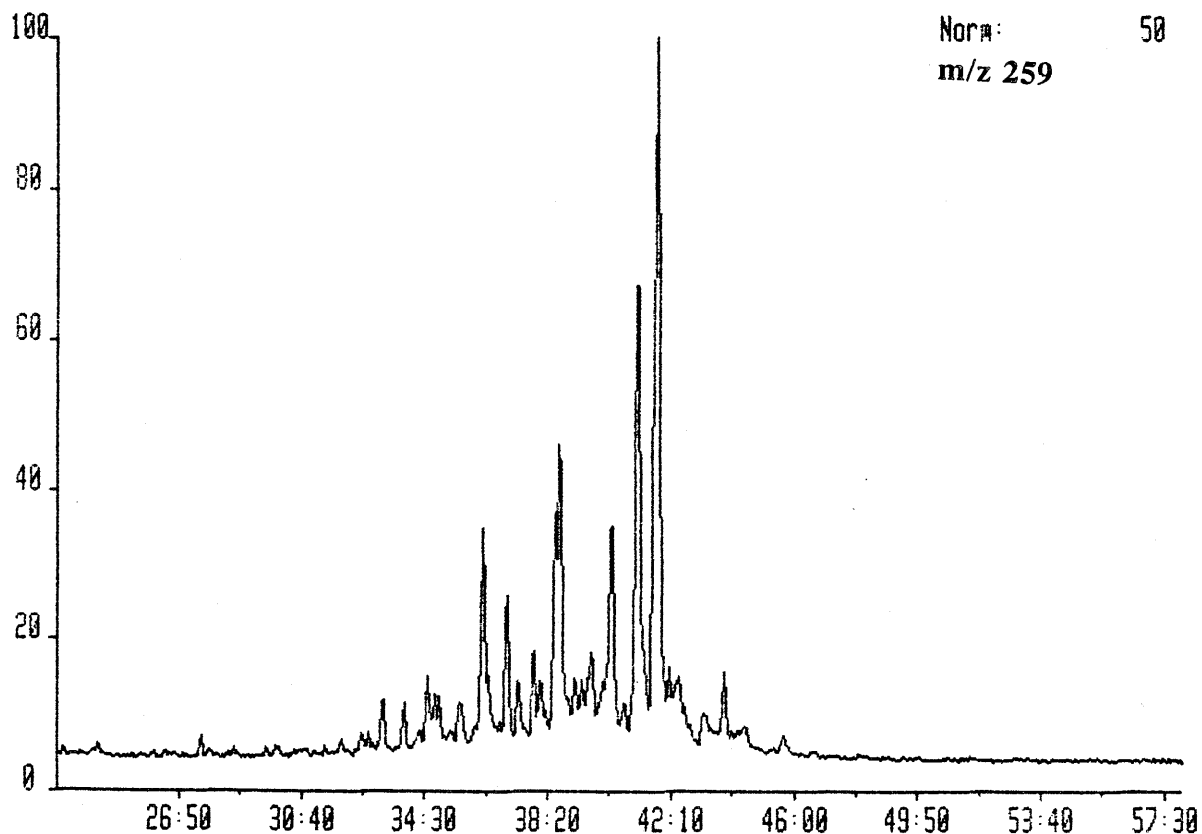
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Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



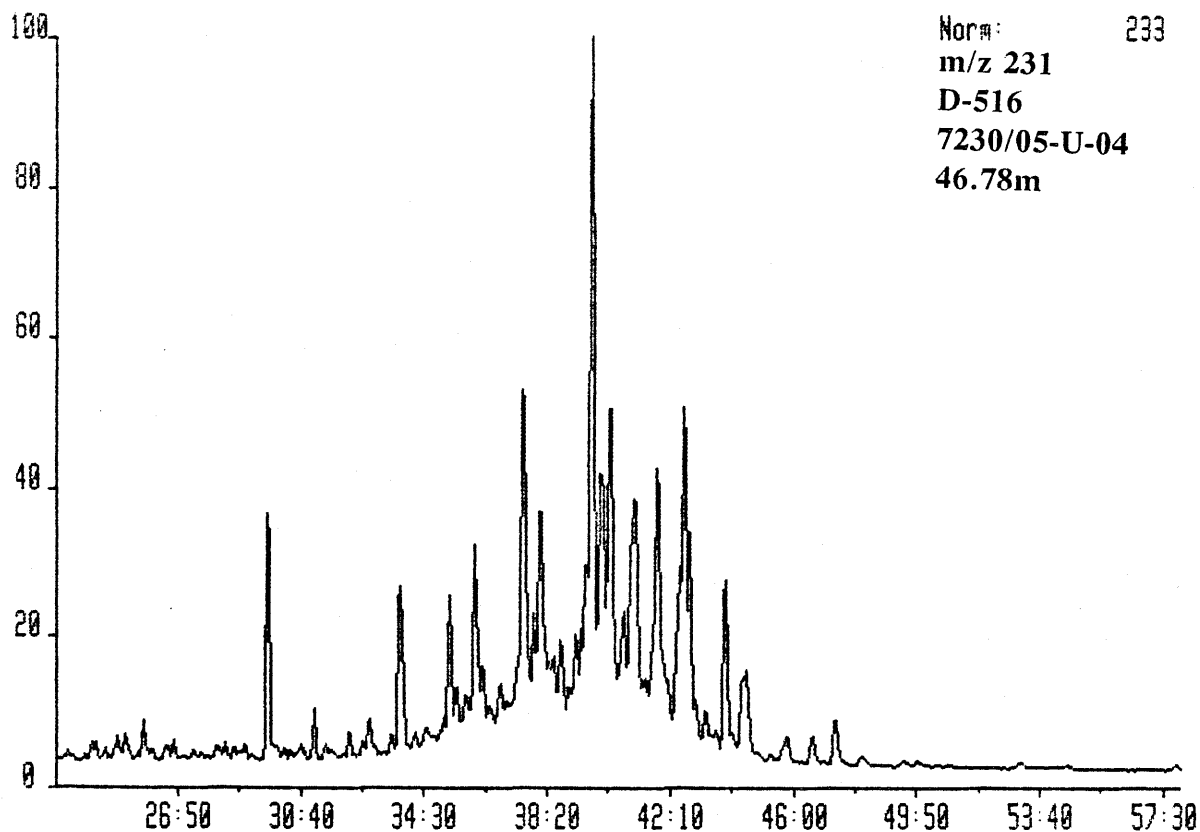
D2006SAT 26-FEB-08 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



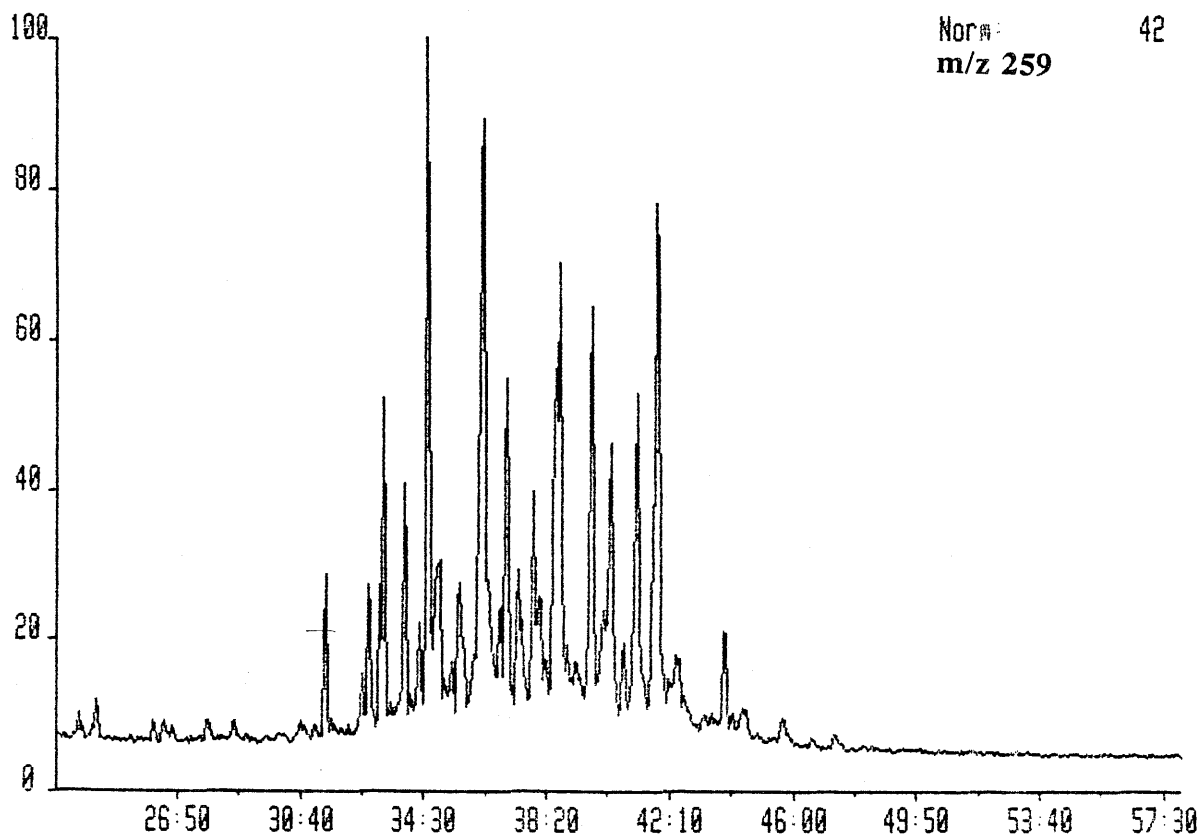
D2006SAT 26-FEB-08 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



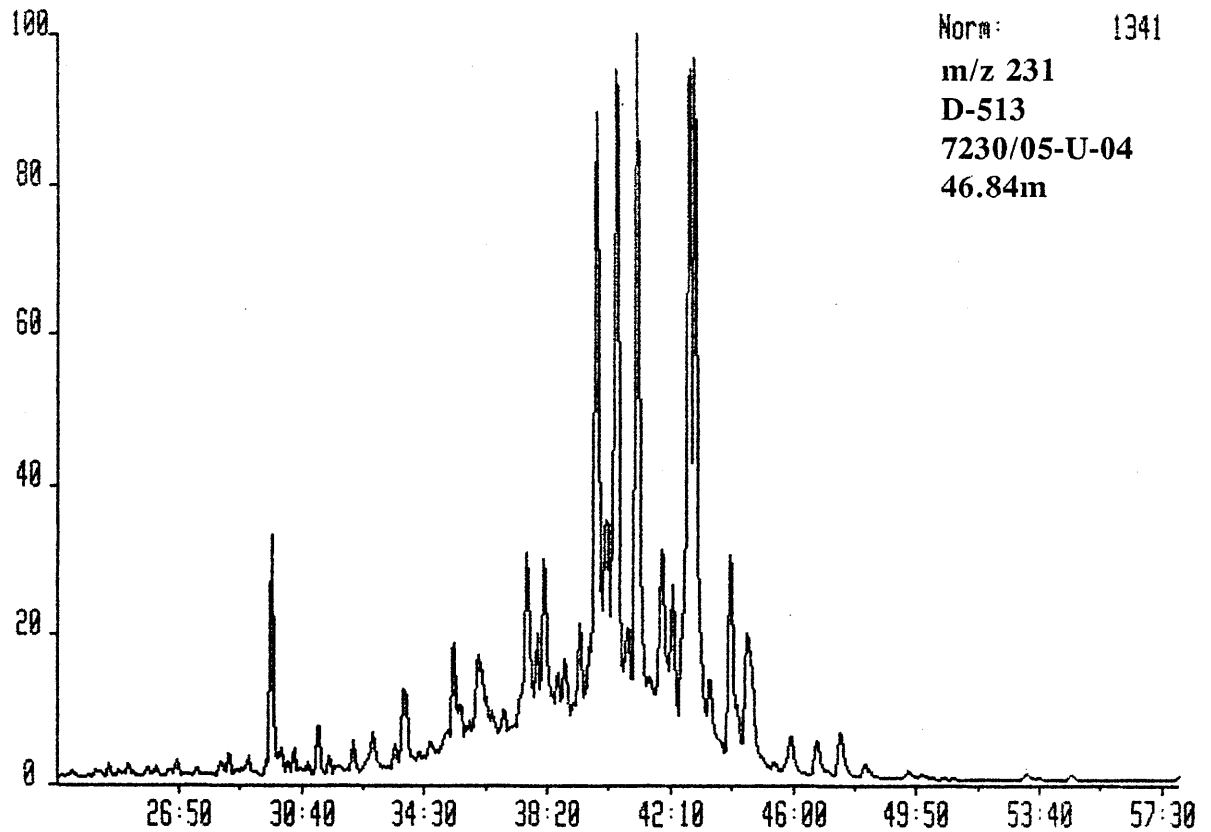
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Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



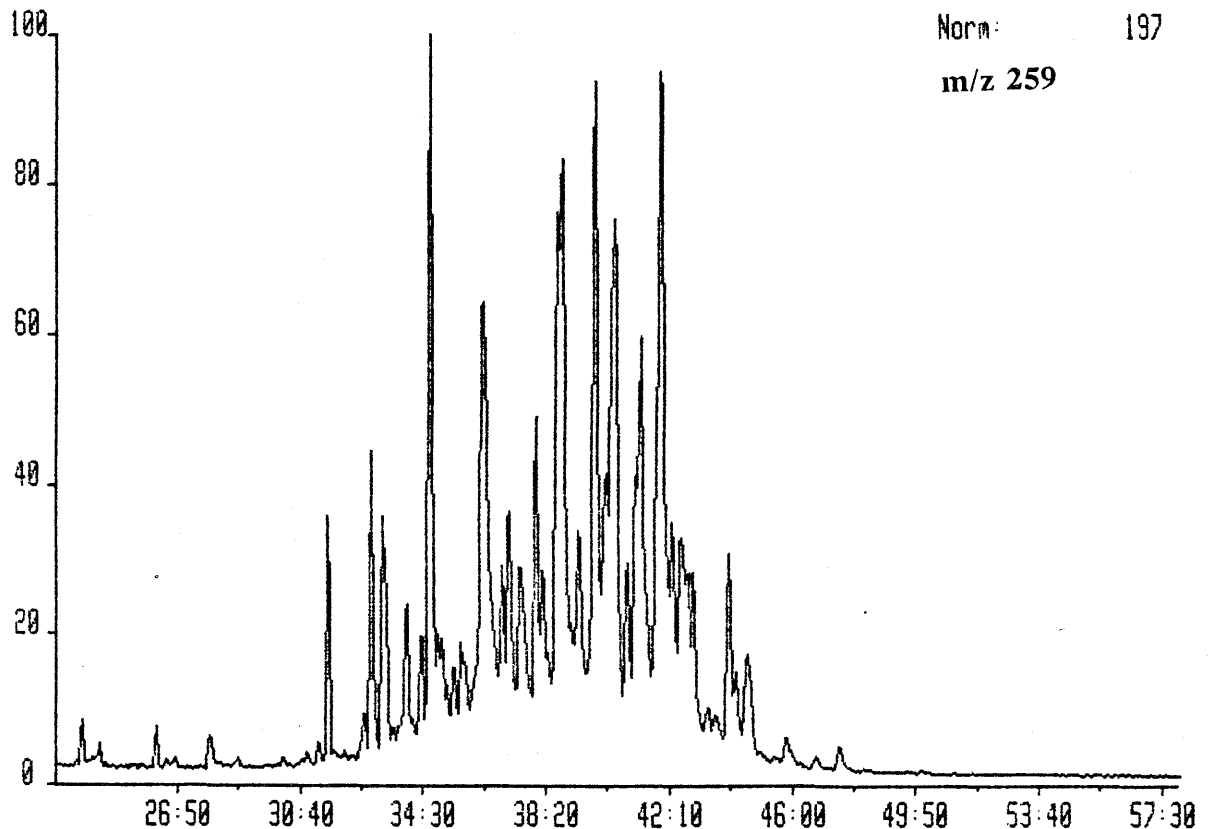
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Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



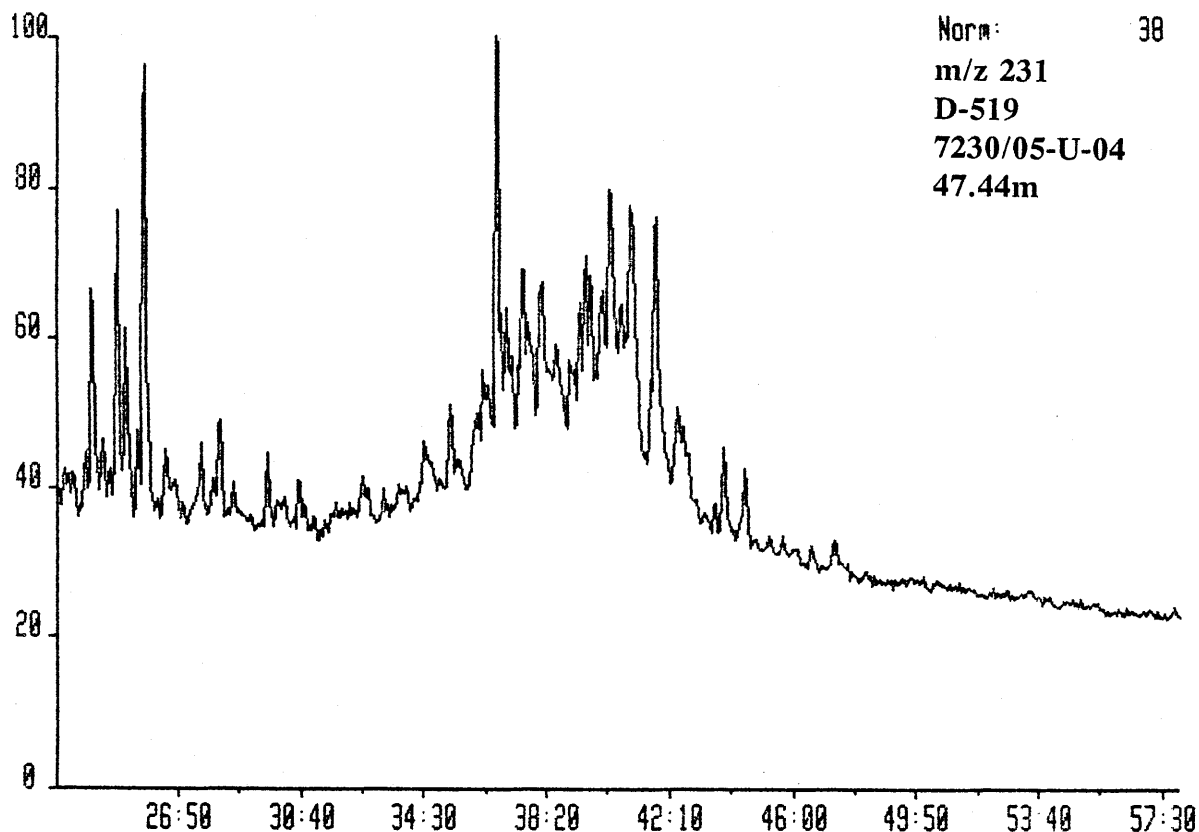
0513SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



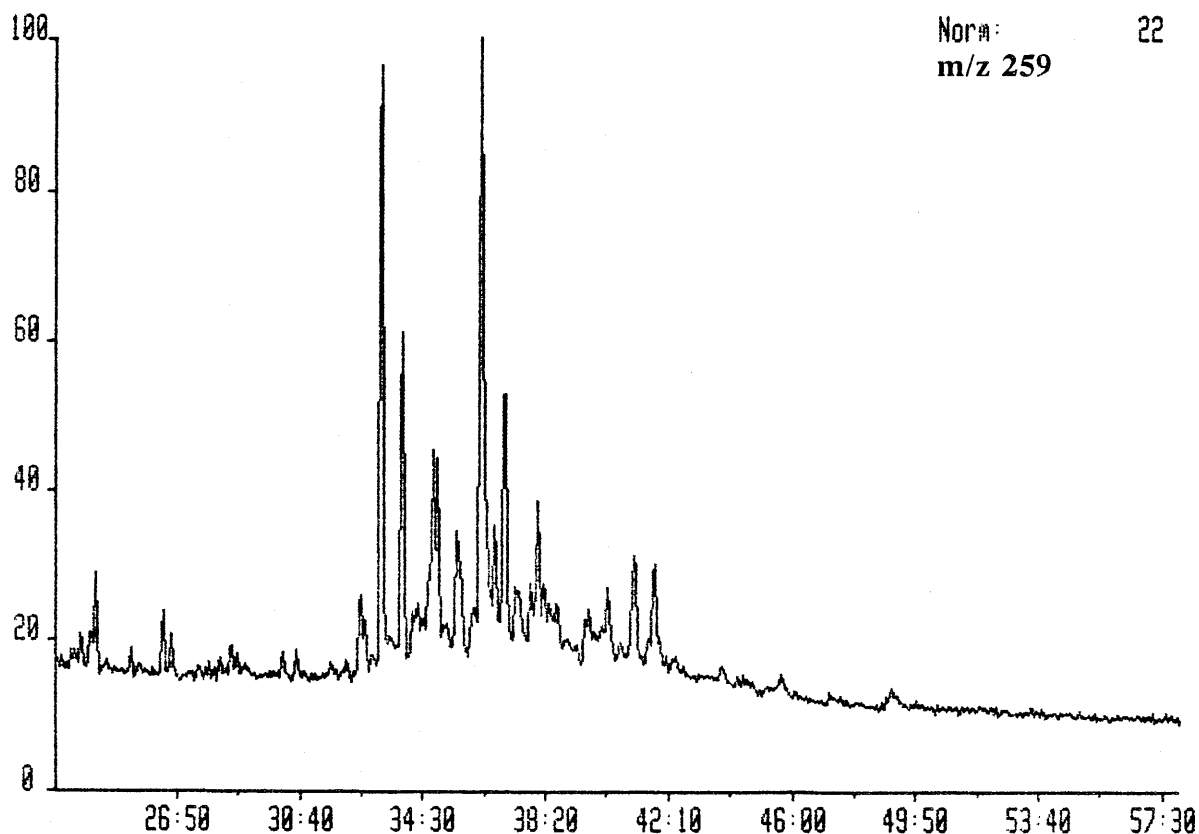
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Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



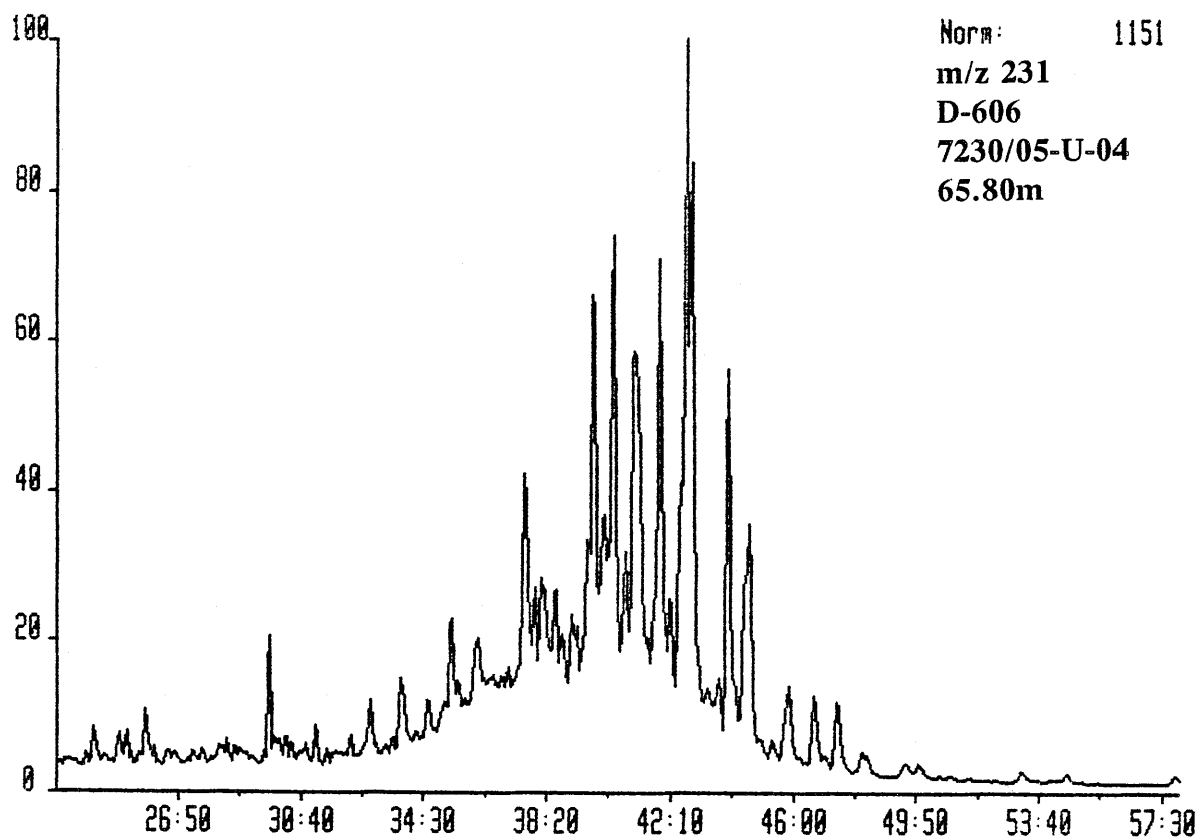
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Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



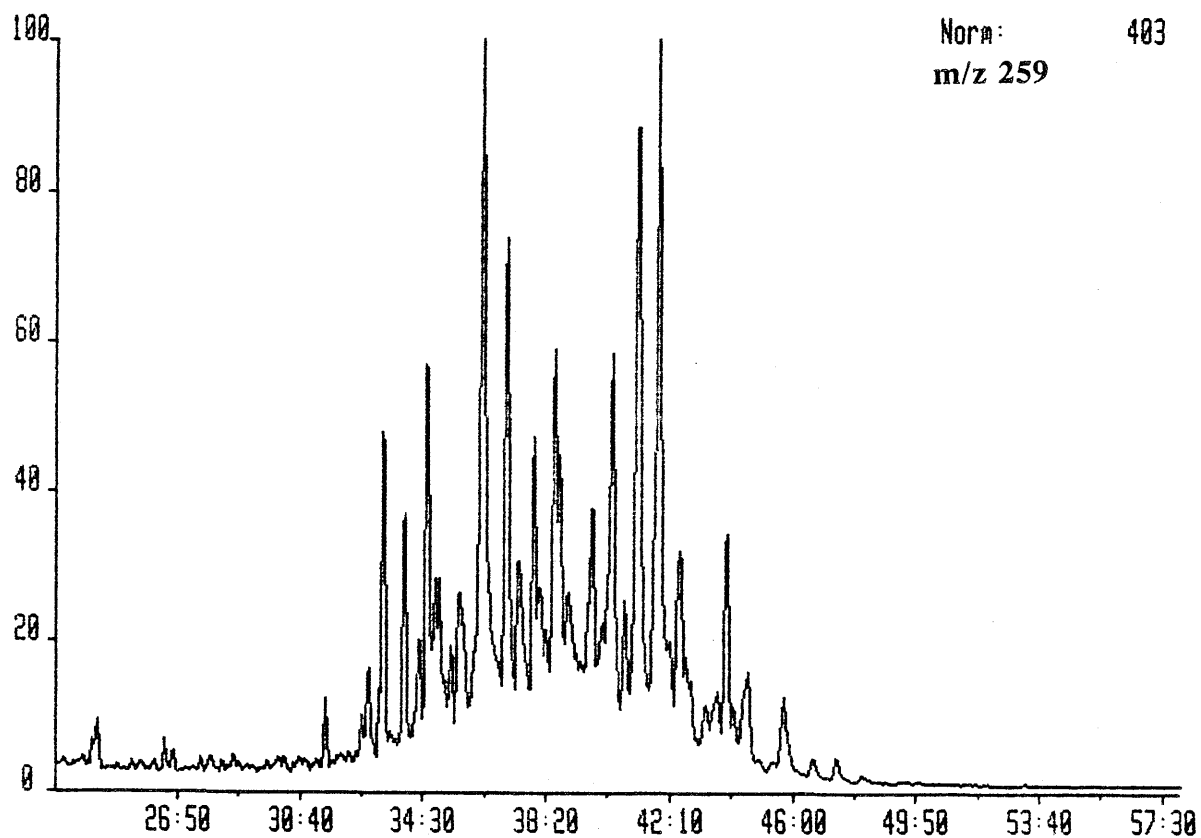
D519SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



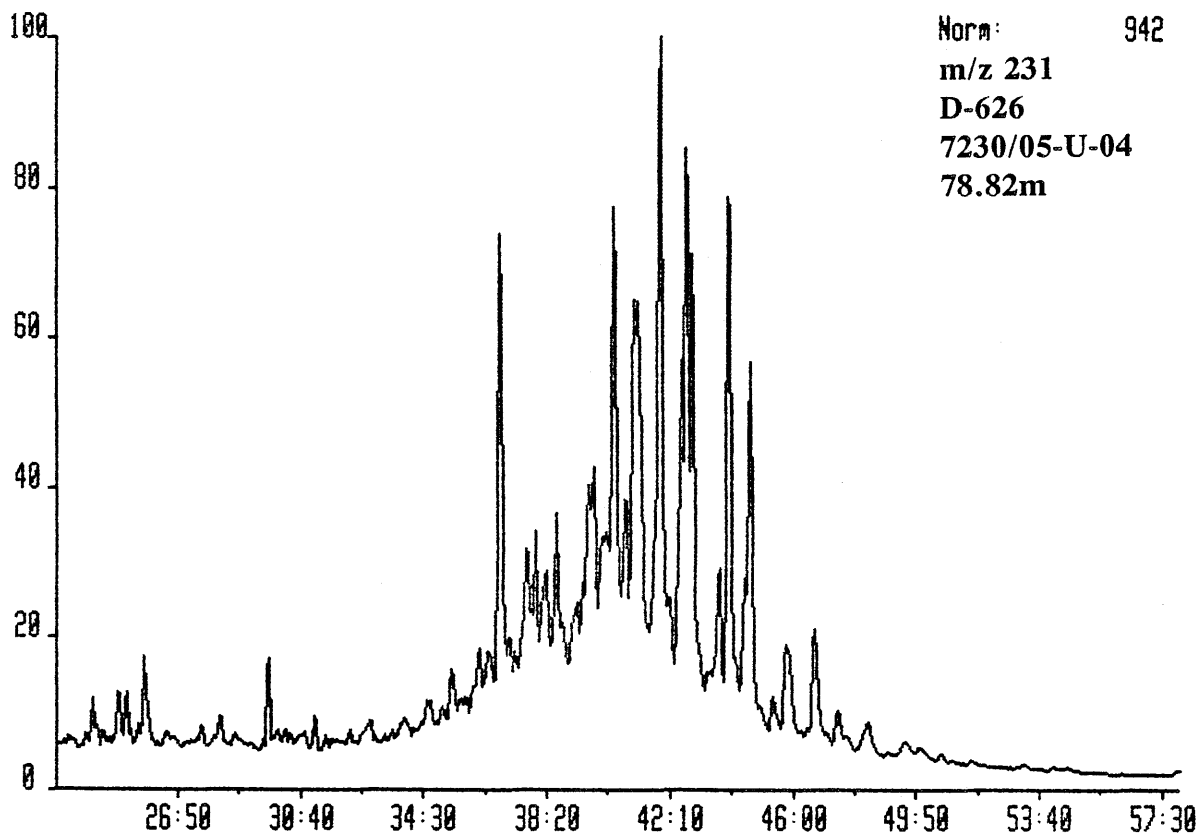
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Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D606SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



0626SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



0626SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

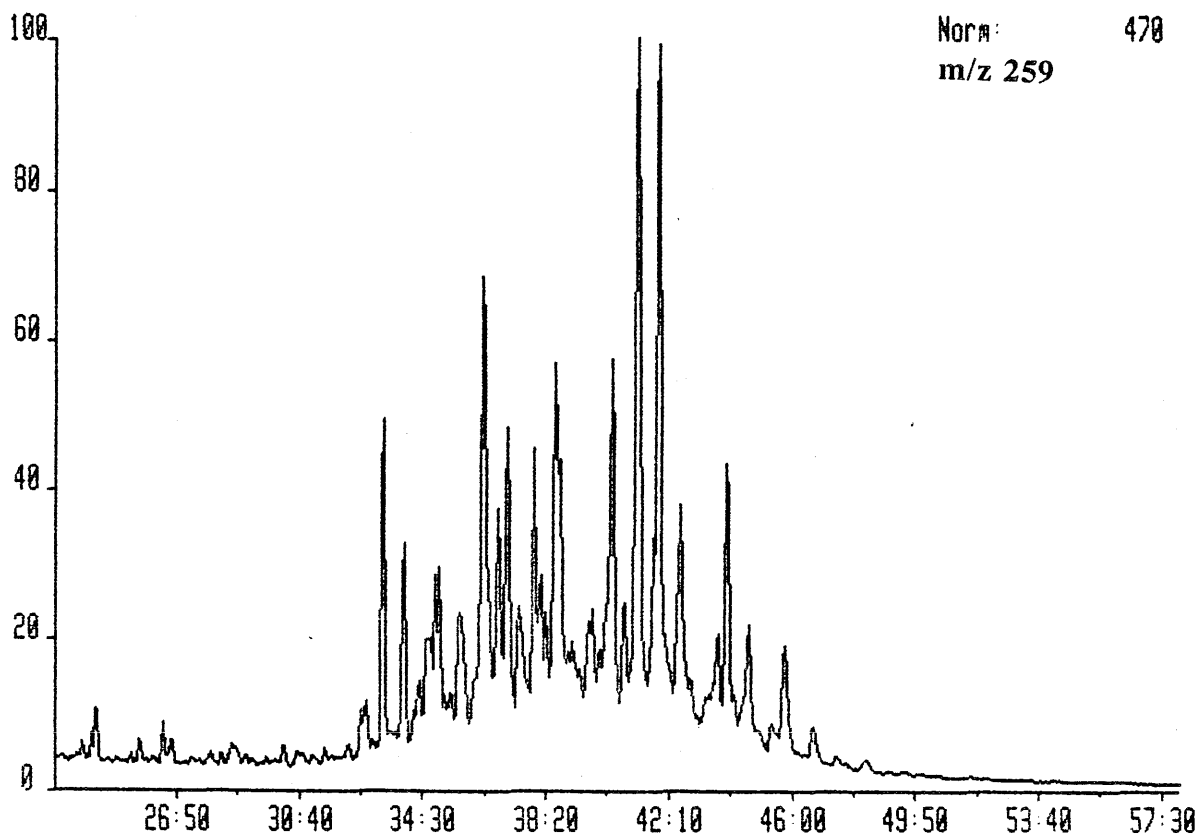


Figure A.II.6.6: Vitrinite reflectance histograms.

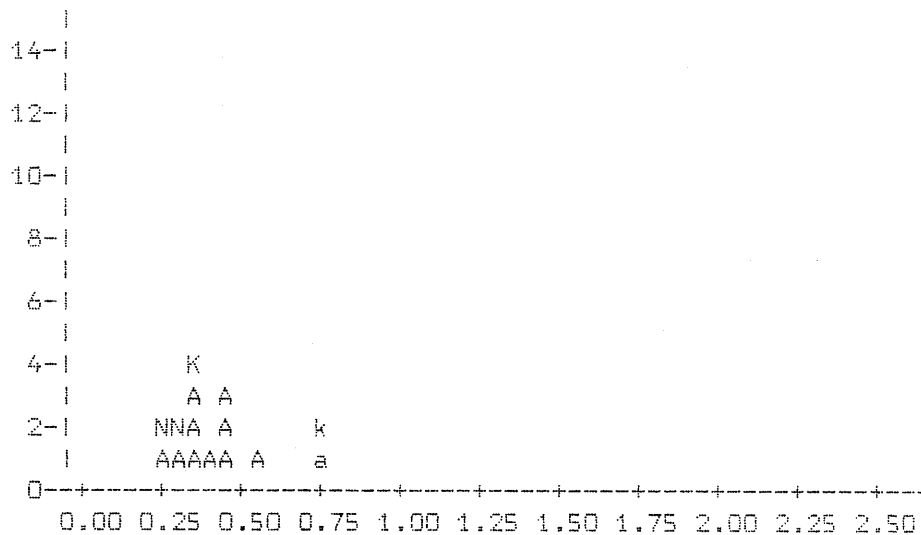
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
PP	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

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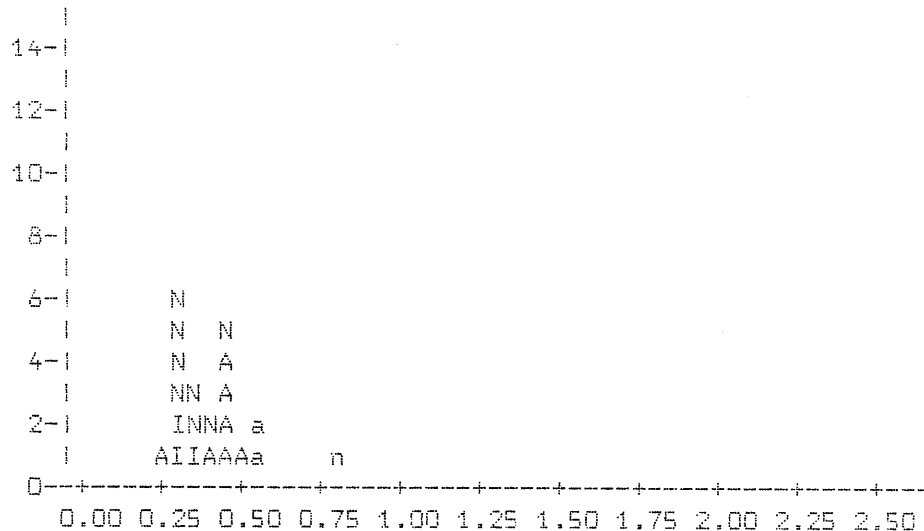


PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.26	0.56	ALL	13	0.39	0.08
N	0.75	0.80	ALL	2	0.77	0.03
OVERALL				15	0.44	0.15

ORDERED VALUES FOLLOW:

0.26N	0.29A	0.34A	0.34N	0.36A	0.38A	0.38A	0.39K	0.40A	0.45A	0.47A
0.47A	0.55A	0.75a	0.79k							

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PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.26	0.51	ALL	18	0.39	0.08
N	0.56	0.58	ALL	2	0.56	0.01
N	0.84	0.85	ALL	1	0.84	0.00
OVERALL				21	0.43	0.13

ORDERED VALUES FOLLOW:

0.26A	0.30I	0.31I	0.32N	0.32N	0.34N	0.34N	0.35I	0.35N	0.37N	0.41N
0.42A	0.45A	0.47A	0.48N	0.49A	0.49A	0.50A	0.56a	0.57a	0.84n	

APPENDIX II.7: TABLE OF CONTENTS

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Table A.II.7.1a

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I													I
I	D 0903	39.47	123						123		0.00	*****	I
I	D 0906	42.59	189	3					192	3	1.53	*****	I
I	D 0910	45.47	170	4					173	4	2.11	*****	I
I	D 0914	48.45	152	2					154	2	1.28	*****	I
I	D 0919	51.44	180						180		0.00	*****	I
I	D 0922	53.43	185	2					187	2	1.06	*****	I
I	D 0923	57.41	83	2					85	2	2.00	*****	I
I	D 0925	60.90	256	4					259	4	1.48	*****	I
I	D 0928	63.84	174	2					176	2	1.37	*****	I
I	D 0931	66.94	210	2					212	2	0.86	*****	I
I	D 0933	69.50	220	2					223	2	1.07	*****	I
I	D 0943	74.18	190	2					192	2	0.90	*****	I
I	D 0946	78.24	178						178		0.00	*****	I
I	D 0950	80.25	170	2					172	2	1.15	*****	I
I	D 0953	82.70	19						19		0.00	*****	I
I	D 0956	87.08	67	1					67	1	1.23	*****	I
I	D 0958	89.03	25						25		0.00	*****	I
I	D 0962	92.23	43	1					43	1	1.80	*****	I
I	D 0964	94.95	28						28		0.00	*****	I
I	D 0968	98.39	42						42		0.00	*****	I
I	D 0973	103.00	27						27		0.00	*****	I
I	D 0979	108.92	2						2		0.00	*****	I
I	D 0988	109.41	6						6		0.00	*****	I
I	D 0989	115.40	33						33		0.00	*****	I

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Table A.II.7.1b

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	
	no.	m							C1-C4	C2-C4	NESS	-----	
											(%)	nC4	
I													
I	D 0903	39.47	1949	68	73			59	2090	141	6.74	*****	
I	D 0906	42.59	1500	47	46			22	1594	93	5.85	*****	
I	D 0910	45.47	1407	52	61			28	1519	112	7.39	*****	
I	D 0914	48.45	1401	58	85			70	1543	142	9.23	*****	
I	D 0919	51.44	1037	48	64			48	1149	112	9.77	*****	
I	D 0922	53.43	1019	52	80			77	1152	132	11.49	*****	
I	D 0923	57.41	947	53	84			68	1084	137	12.62	*****	
I	D 0925	60.90	1071	63	101			86	1236	165	13.33	*****	
I	D 0928	63.84	1388	79	125			124	1591	203	12.78	*****	
I	D 0931	66.94	1056	104	153		32	155	1346	290	21.54	0.00	
I	D 0933	69.50	812	53	86			96	952	140	14.66	*****	
I	D 0943	74.18	1114	86	142			149	1343	229	17.02	*****	
I	D 0946	78.24	605	50	79	29		57	764	158	20.73	*****	
I	D 0950	80.25	1862	94	137		26	171	2119	257	12.13	0.00	
I	D 0953	82.70	1386	65	91			120	1542	156	10.14	*****	
I	D 0956	87.08	1290	39	15			34	1344	54	4.03	*****	
I	D 0958	89.03	1414	54	57			25	1526	112	7.32	*****	
I	D 0962	92.23	1605	65	77			70	1748	142	8.15	*****	
I	D 0964	94.95	391	37	57				485	94	19.35	*****	
I	D 0968	98.39	2267	86	106			102	2458	191	7.79	*****	
I	D 0973	103.00	348	38	61			65	447	99	22.16	*****	
I	D 0979	108.92	262	31	46			32	339	78	22.86	*****	
I	D 0988	109.41	419	36	55			39	510	91	17.84	*****	
I	D 0989	115.40	253	29	44			29	325	72	22.18	*****	

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Table A.II.7.1a

CORE 7230/05-U-03

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4		
	no.	m							C1-C4	C2-C4	NESS	-----		
											(%)	nC4		
I														
I	D 0903	39.47	2072	68	73			59	2213	141	6.37	*****		
I	D 0906	42.59	1689	50	46			22	1786	96	5.38	*****		
I	D 0910	45.47	1577	55	61			28	1693	116	6.85	*****		
I	D 0914	48.45	1553	60	85			70	1697	144	8.50	*****		
I	D 0919	51.44	1217	48	64			48	1329	112	8.45	*****		
I	D 0922	53.43	1204	54	80			77	1338	134	10.03	*****		
I	D 0923	57.41	1030	55	84			68	1169	138	11.84	*****		
I	D 0925	60.90	1327	67	101			86	1495	169	11.27	*****		
I	D 0928	63.84	1562	81	125			124	1768	206	11.64	*****		
I	D 0931	66.94	1266	106	153		32	155	1558	292	18.72	0.00		
I	D 0933	69.50	1032	56	86			96	1174	142	12.08	*****		
I	D 0943	74.18	1304	88	142			149	1535	230	15.01	*****		
I	D 0946	78.24	783	50	79	29		57	941	158	16.82	*****		
I	D 0950	80.25	2032	96	137		26	171	2291	259	11.30	0.00		
I	D 0953	82.70	1405	65	91			120	1561	156	10.02	*****		
I	D 0956	87.08	1356	40	15			34	1411	55	3.89	*****		
I	D 0958	89.03	1439	54	57			25	1551	112	7.20	*****		
I	D 0962	92.23	1648	66	77			70	1791	143	7.99	*****		
I	D 0964	94.95	420	37	57				514	94	18.29	*****		
I	D 0968	98.39	2309	86	106			102	2501	191	7.65	*****		
I	D 0973	103.00	375	38	61			65	474	99	20.90	*****		
I	D 0979	108.92	264	31	46			32	342	78	22.70	*****		
I	D 0988	109.41	425	36	55			39	516	91	17.64	*****		
I	D 0989	115.40	286	29	44			29	358	72	20.17	*****		

Table A.II.7.2

Core 7230/05-U-03

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	I
I		m	:	(mg/g ROCK)	(%)	(mg/g TOC)				S1+S2	S1+S2	(C)
I			:									
I	D 903	39.47	:	****	****	****	0.14	*****	****	*****	*****	***
I	D 906	42.59	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 910	45.47	:	****	****	****	0.20	*****	****	*****	*****	***
I	D 914	48.45	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 919	51.44	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 922	53.43	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 2007	56.09	:	0.17	0.87	0.17	1.93	45	9	1.04	0.16	436
I	D 923	57.41	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 925	60.90	:	****	****	****	0.18	*****	****	*****	*****	***
I	D 928	63.84	:	****	****	****	0.15	*****	****	*****	*****	***
I	D 931	66.94	:	****	****	****	0.10	*****	****	*****	*****	***
I	D 933	69.50	:	****	****	****	0.17	*****	****	*****	*****	***
I	D 943	74.18	:	****	****	****	0.48	*****	****	*****	*****	***
I	D 946	78.24	:	****	****	****	0.84	*****	****	*****	*****	***
I	D 950	80.25	:	****	****	****	0.11	*****	****	*****	*****	***
I	D 953	82.70	:	****	****	****	0.16	*****	****	*****	*****	***
I	D 956	87.08	:	****	****	****	0.12	*****	****	*****	*****	***
I	D 958	89.03	:	****	****	****	0.19	*****	****	*****	*****	***
I	D 962	92.23	:	****	****	****	0.12	*****	****	*****	*****	***
I	D 2008	93.10	:	0.18	0.54	1.39	1.50	36	93	0.72	0.25	434
I	D 964	94.95	:	****	****	****	0.90	*****	****	*****	*****	***
I	D 968	98.39	:	****	****	****	0.10	*****	****	*****	*****	***
I			:									

DATE : 26 - 2 - 88.

Table A.II.7.2 (continued)

Core 7230/05-U-03

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	:	I	I	I	I	HYDR.	OXYGEN	PETROLEUM	PROD.	TEMP.	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	INDEX	INDEX	POTENTIAL	INDEX	MAX	I
I	No.		:								S1		I
I			:								-----		I
I		m	:	(	mg/g ROCK	)	(%)	(	mg/g TOC	)	S1+S2	S1+S2	(C)
I			:										I
I			:										I
I	D	973	:	****	****	****	0.27	*****	****	*****	*****	***	I
I			:										I
I	D	979	:	****	****	****	0.17	*****	****	*****	*****	***	I
I			:										I
I	D	988	:	****	****	****	0.17	*****	****	*****	*****	***	I
I			:										I
I	D	989	:	****	****	****	0.17	*****	****	*****	*****	***	I
I			:										I

DATE : 26 - 2 - 88.

Table A.II.7.3

 Core number: 7230/05-U-03
 Reference number: 21.3427.23
 (1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-2007	-----	56.09	0.37 (12)	F	0.08	2-3
D-2008	-----	93.10	0.35 (17)	F	0.05	2-3
			0.53 (5)	R	0.04	
			0.70 (1)	R	0.00	

 REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
 S = Stained; R = Reworked.

Visual Kerogen Analysis

Table no.: A.II.7.4
Well no.: 7230/05-U-03

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 2007	56.09	Am: 25-30% Lm: 20-25% W+C:50%	F-M-L	Fair-Good	3.0 - 4.0	Organic residue rich in dark brown, structured, woody phytoclasts; dark brown to black, elongated and angular woody/coaly fragments; together with cuticle sheets and common palynomorphs.
D 2008	93.10	Am: 25-30% Lm: 20-25% W+C:50%	F-M-L	Fair	3.0 - 4.0	Comparable to sample D 2007.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.7.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7230/05-U-03

I		:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:	:	:	I
I		(m)	:	(mg)	:	I
I			:		:	I
I	D 950	80.25	:	1.0	:	I
I			:		:	I

Project no.: 21.3427.23
Well ident.: 7230/05-U-03
DATE : 9 - 2 - 88.

Table A.II.7.6

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

I			: Rock							I
I	IKU-No	DEPTH	: Extr.	EOM	Sat.	Aro.	HC	Non HC	TOC	I
I			:							I
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	I
I			:							I
I	D 0950	80.25	: 12.6	2.9	0.7	0.4	1.1	1.8	0.11	I
I			:							I

Project no.: 21.3427.23
 Well ident.: 7230/05-U-03
 DATE : 9 - 2 - 88.

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Table A.II.7.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

I		:						I
I	IKU-No	DEPTH :	EOM	Sat.	Aro.	HC	Non HC	I
I		(m) :						I
I		:						I
I	D 0950	80.25 :	230	57	29	86	145	I
I		:						I

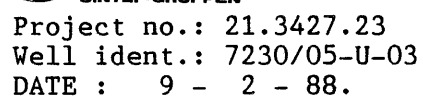


Table A.II.7.8

(mg/g TOC)

I		:						I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC
I		(m)	:					
I								I
I								I
I								I
I								I
I	D 0950	80.25	:	209.4	52.0	26.0	78.0	131.4
I			:					I

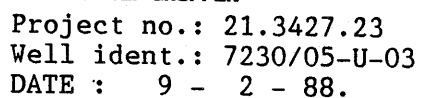


Table A.II.7.9

I			:	Sat	Aro	HC	SAT	Non HC	HC	I
I	IKU-No	DEPTH	:	---	---	---	---	---	---	I
I			:	EOM	EOM	EOM	Aro	EOM	Non HC	I
I		(m)	:	%	%	%	x 100	%	x 100	I
I	D 0950	80.25	:	24.8	12.4	37.2	200.0	62.8	59.3	I
I			:							I

Table A.II.7.10

Core 7230/05-U-03

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			I
I IKU No.	:	-----	A=	-----	B=	-----	-----	CPI	CPI	I
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	I
I	:									I
I D 0950	80.25	:	0.9	0.7	0.5	1.4	0.2	1.1	1.2	I
I	:									I

DATE : 29 - 2 - 88.

Table A.II.7.11a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7230/05-U-03

IKU code	Depth	$\alpha\beta/\alpha\beta+\beta\alpha^1)$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-950	80.25	0.77	38.2	66.8	21.6

1) E/E+F in m/z 191

2) Average % distribution between first and second eluting isomers of extended hopanes (G-M in m/z 191)

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217

4) $q/q+t$ in m/z 217

Table A.II.7.11b:

Molecular ratios from terpane and sterane mass chromatograms.
Maturity and source characteristic ratios.

Core 7230/05-U-03

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ⁴⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-950	80.25	0.21	2.62	-	-	0.53

- 1) Relative abundance of tricyclic terpanes (Q/E in m/z 191)
- 2) B/A in m/z 191
- 3) Relative abundance of unknown (X/E in m/z 191)
- 4) Relative abundance of bisnorhopane (Z/E in m/z 191)
- 5) Relative abundance of C₂₇ rearranged steranes (a/a+j in m/z 217)

Figure A.II.7.1:

Pyrolysis-gas chromatograms (S2 peak)

Analysis 427D2007

12,1,1

7230/05-U-05

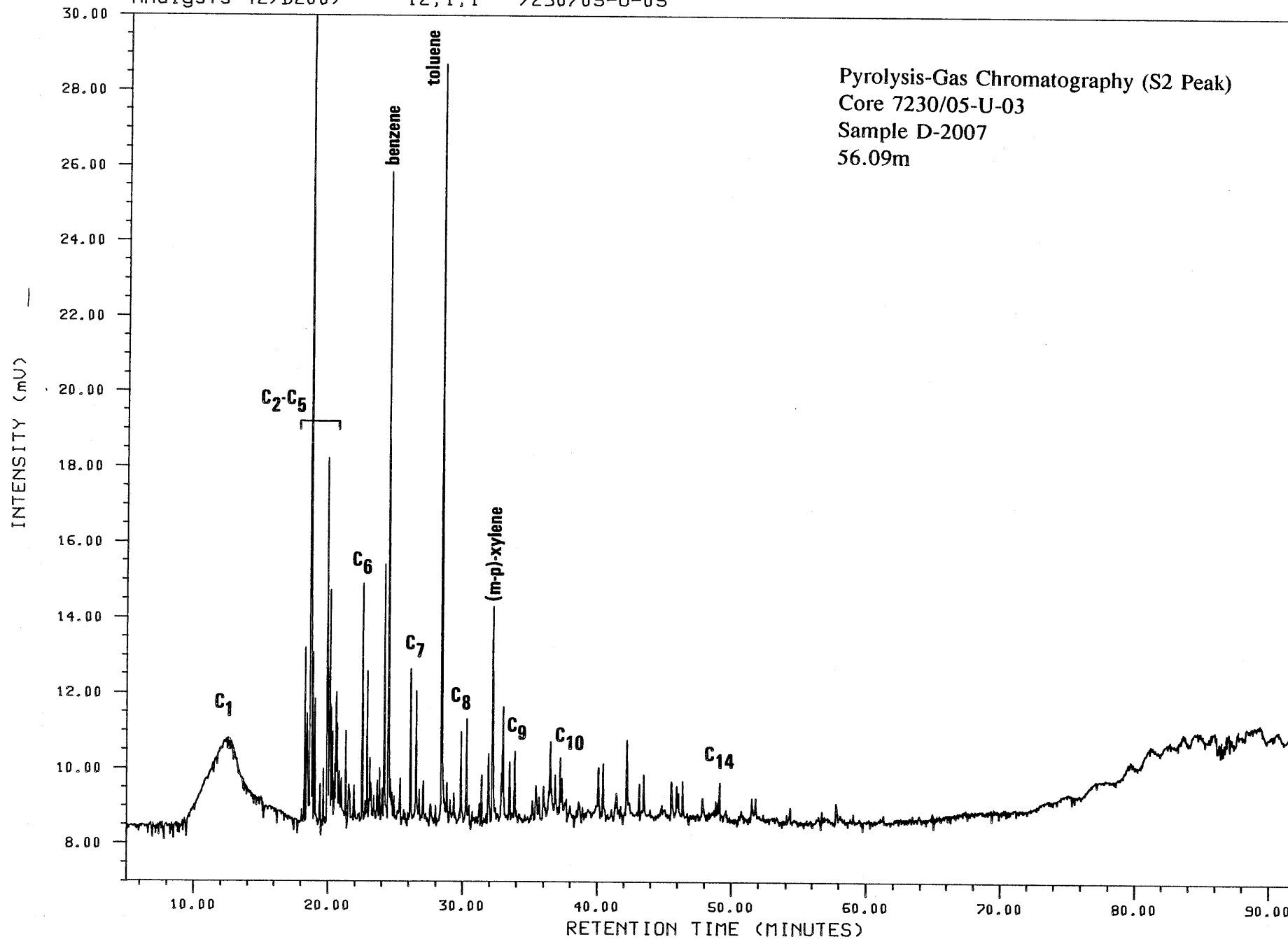


Figure A.II.7.2:

Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D0950S

3,1,1

7230-05-U-03

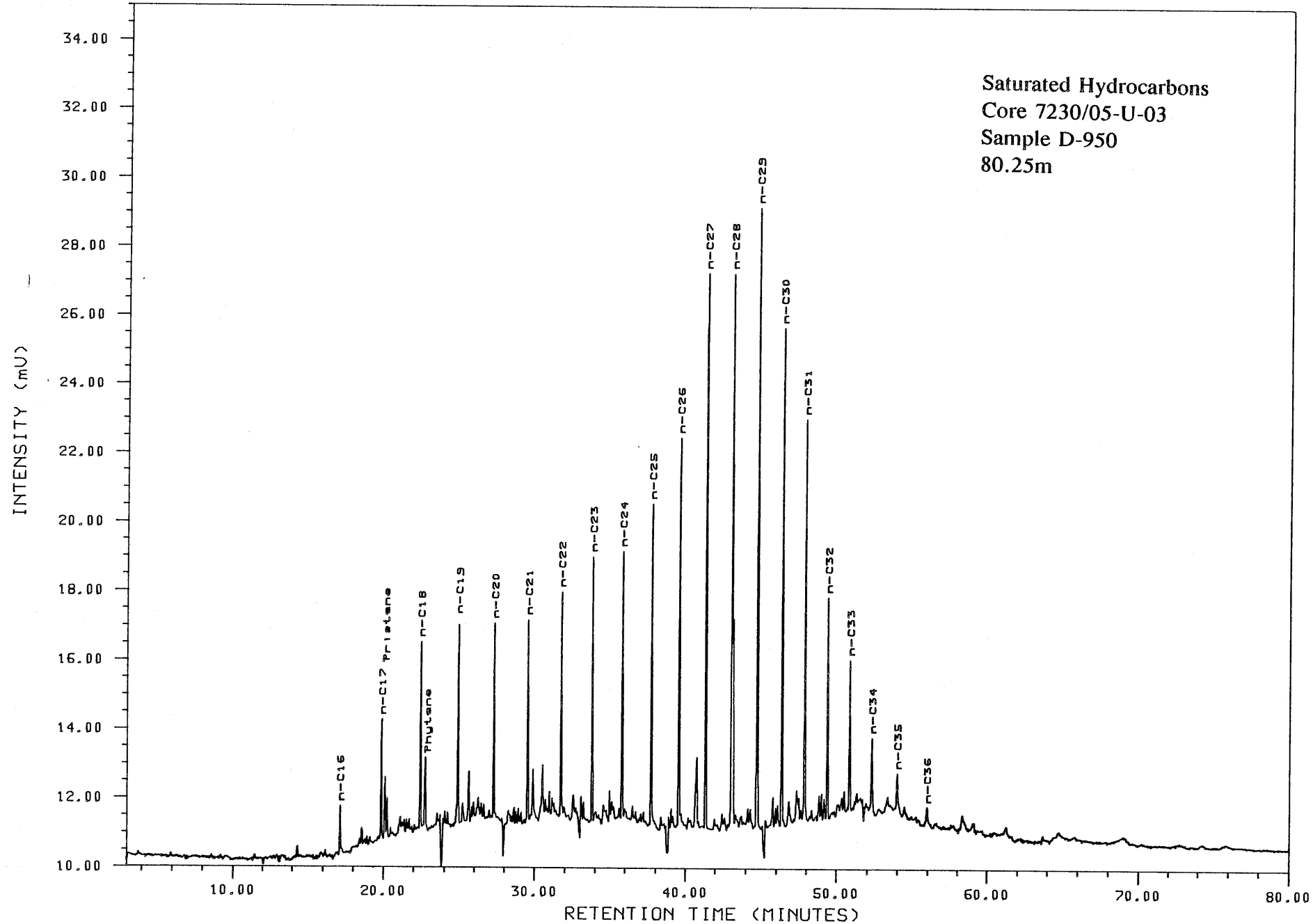


Figure A.II.7.3:

Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

Analysis 427D0950A

2,1,1

7230/05-U-03

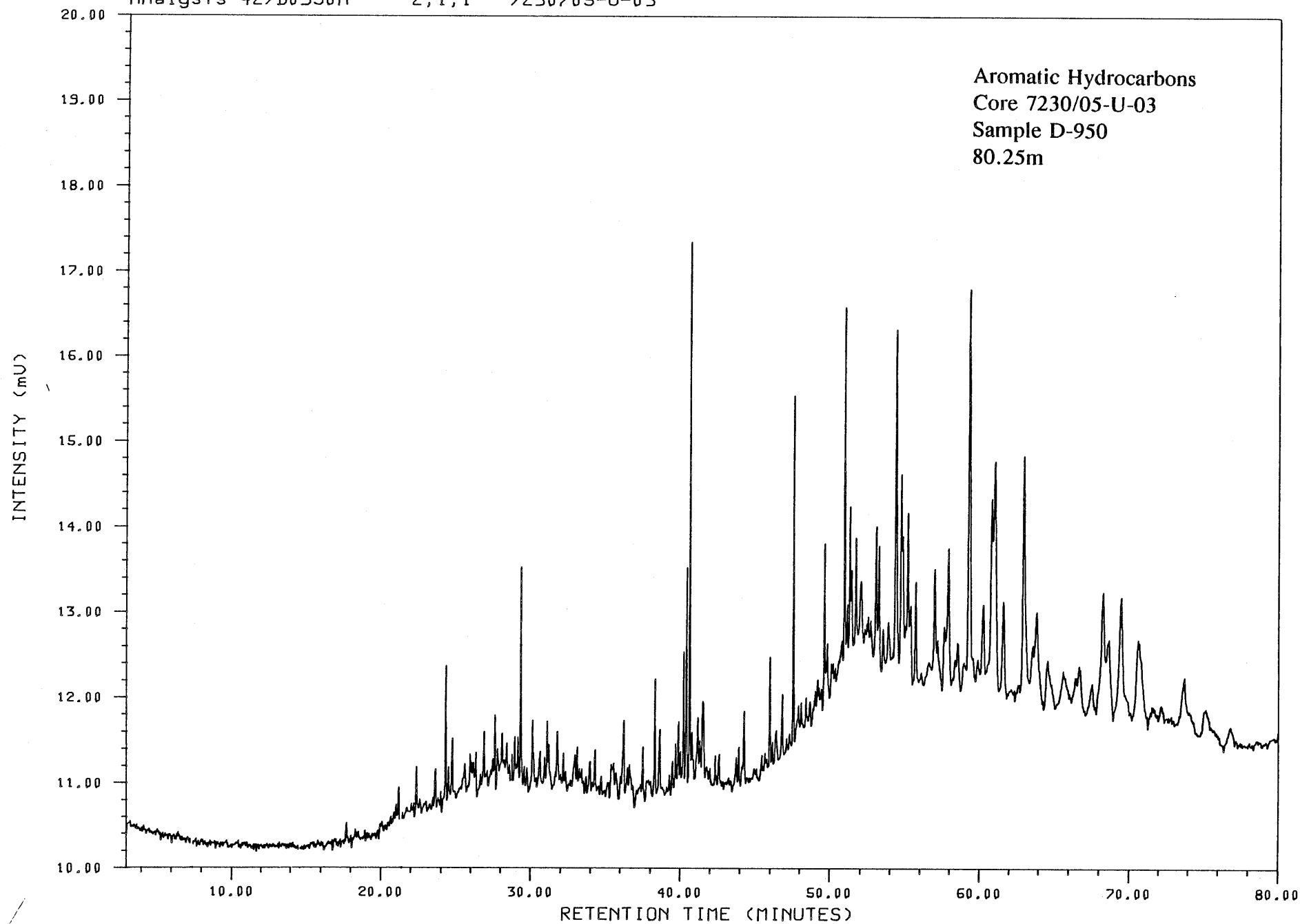
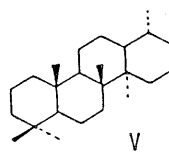
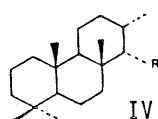
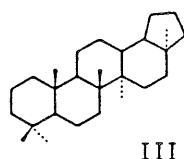
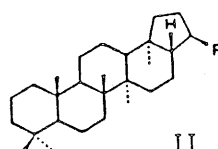
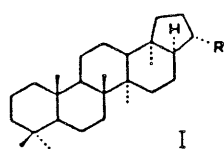


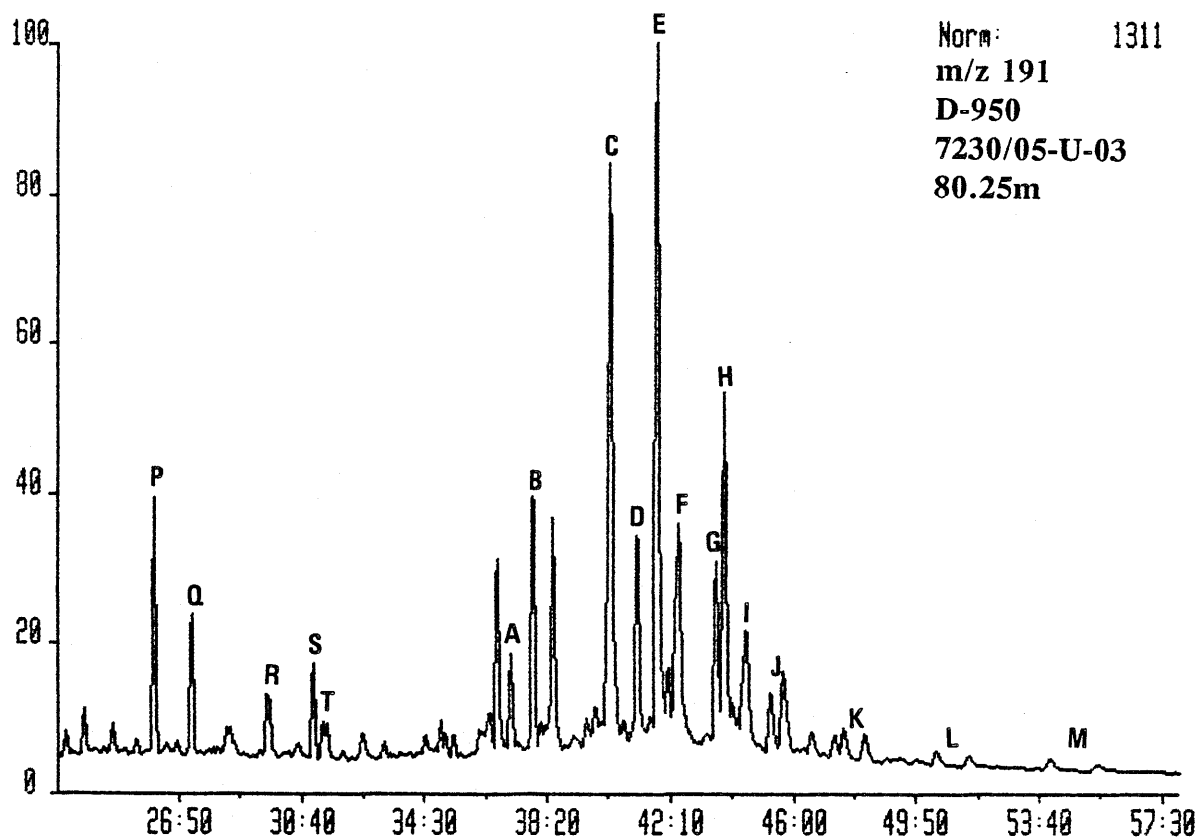
Figure A.II.7.4:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

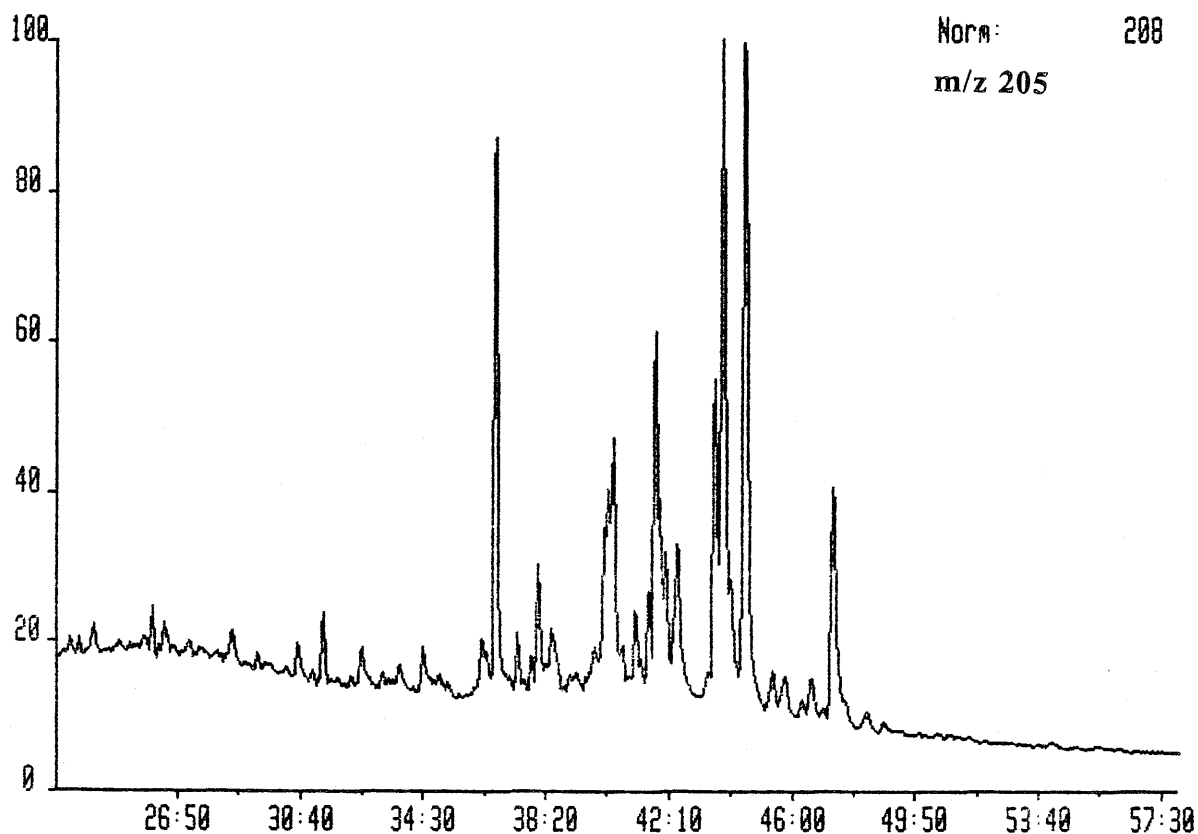
P	tricyclic terpene	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpene	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpene (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpene	$C_{24}H_{42}$	(V)
T	tricyclic terpene (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trishomohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trishomohopane	$C_{27}H_{46}$	(I, R=H)
Z	bishomohopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpene	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpene (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



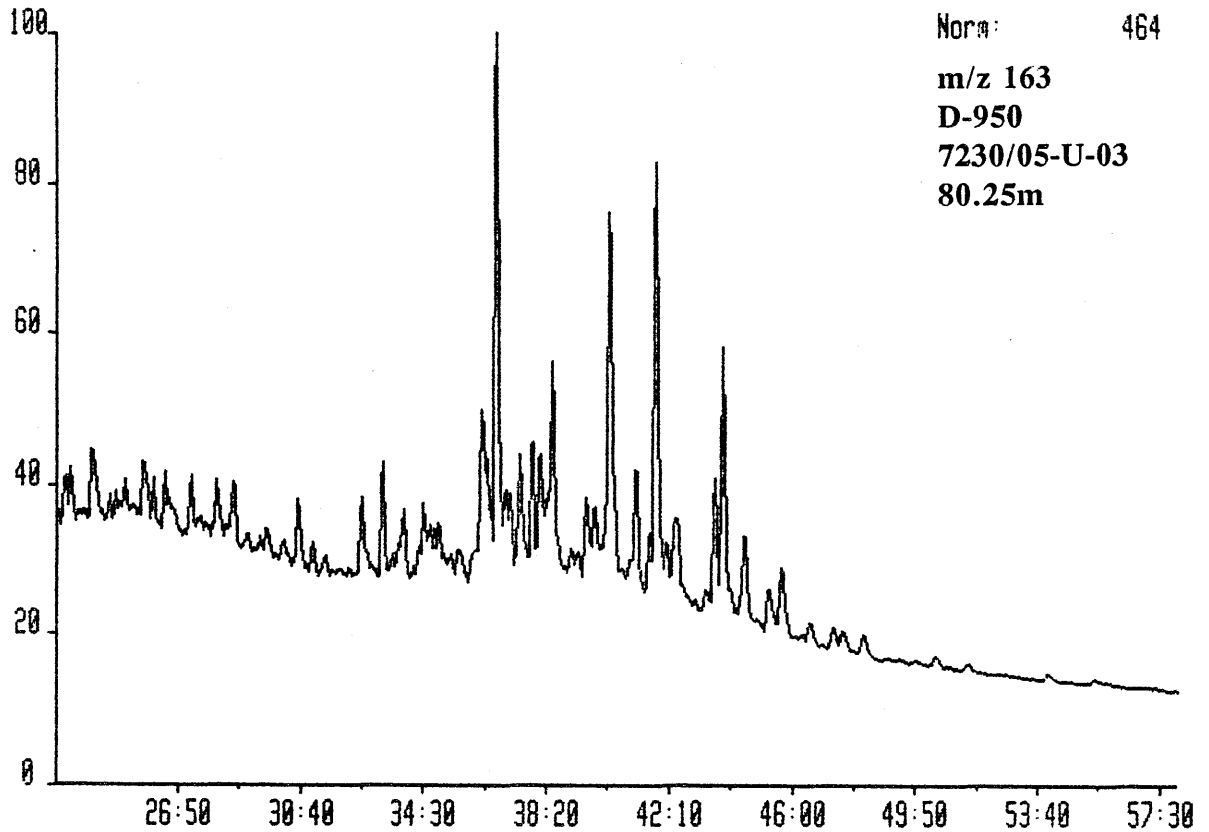
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Text:21.3427.23



0950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



0950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



0950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

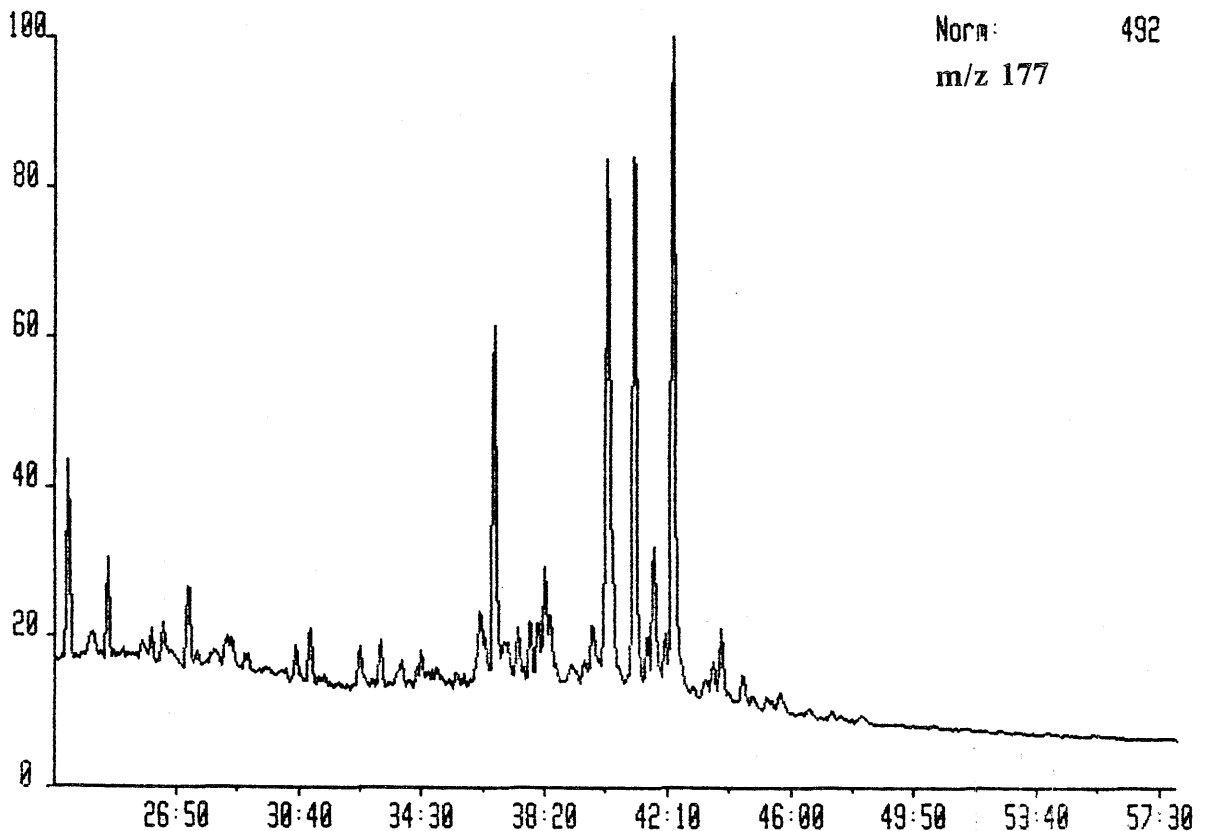
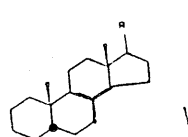
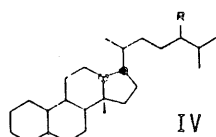
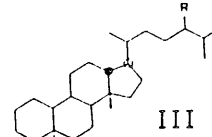
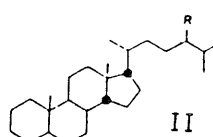
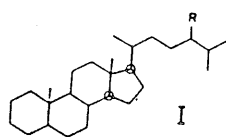


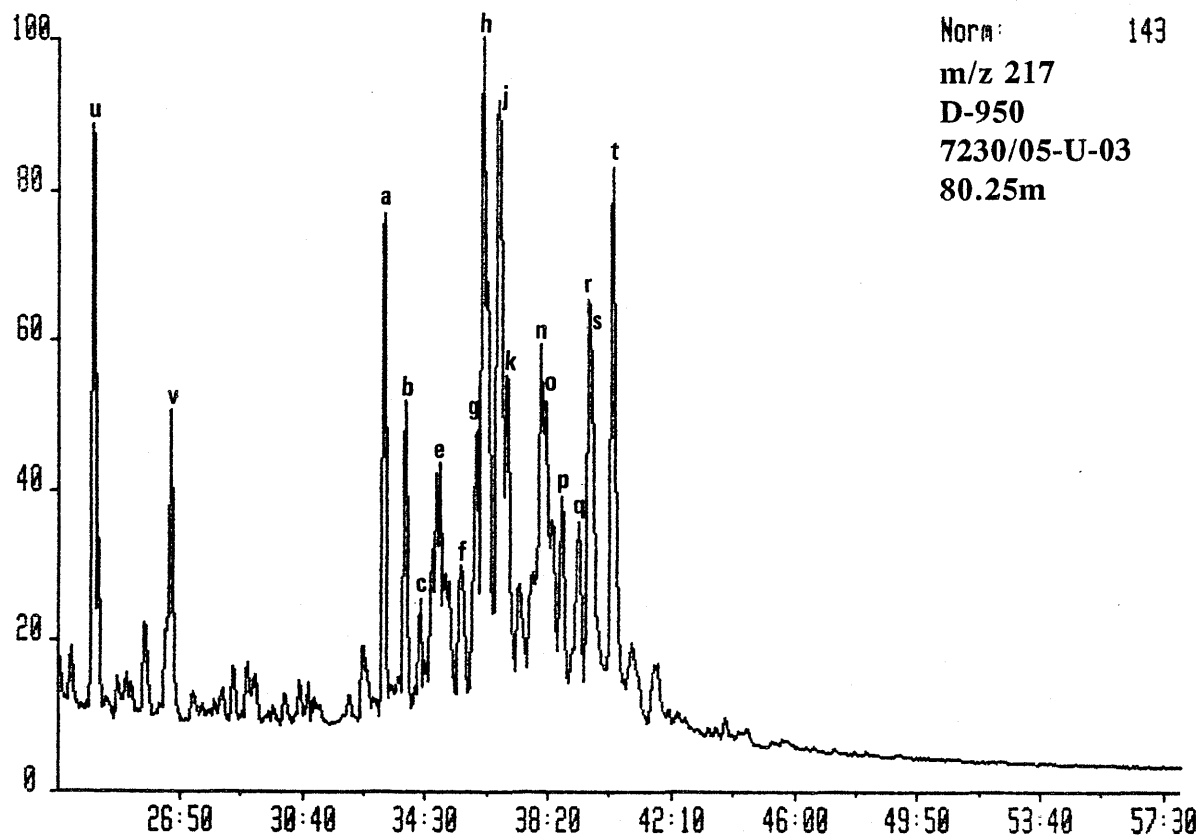
Figure A.II.7.5:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

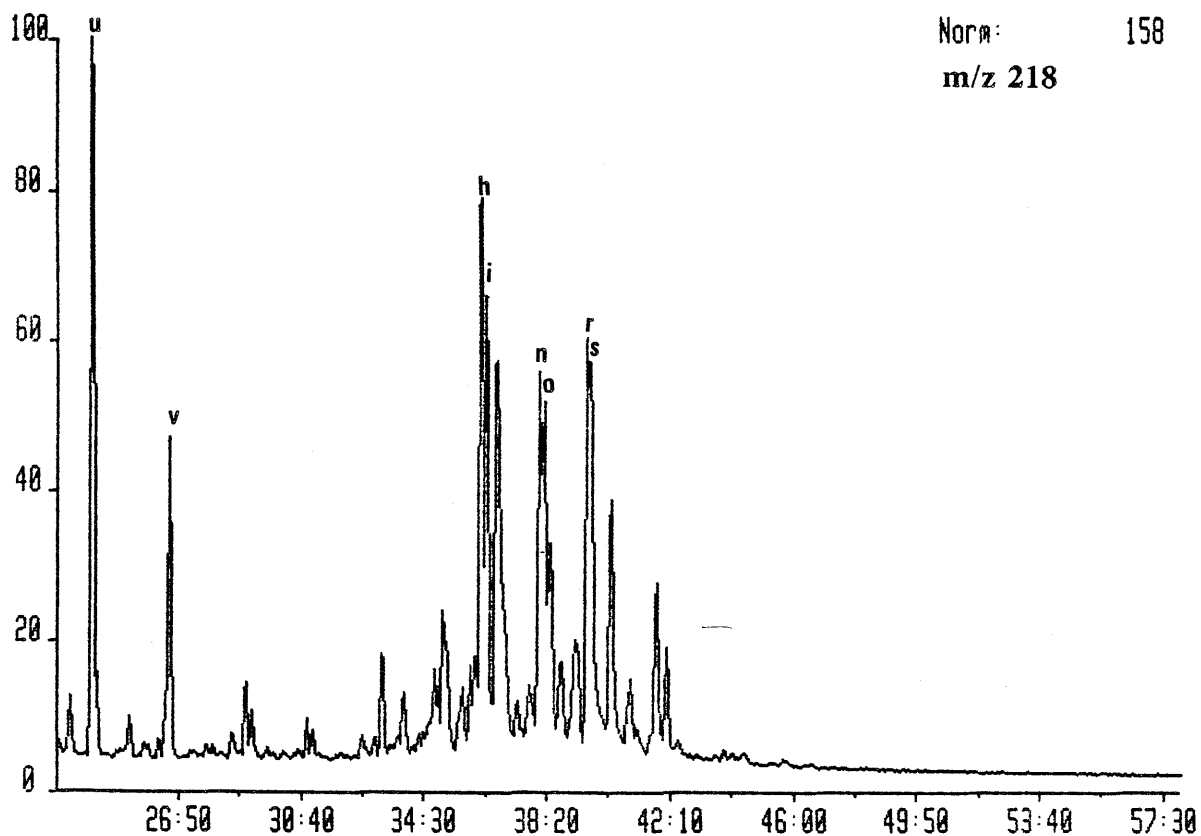
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V,R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V,R=C ₃ H ₇)
a	13 β (H),17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III,R=H)
b	13 β (H),17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III,R=H)
c	13 α (H),17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV,R=H)
d	13 α (H),17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV,R=H)
e	13 β (H),17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III,R=CH ₃)
f	13 β (H),17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III,R=CH ₃)
g	13 α (H),17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV,R=CH ₃)
	+ 14 α (H),17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I,R=H)
h	13 β (H),17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II,R=H)
i	14 β (H),17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II,R=H)
	+ 13 α (H),17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV,R=CH ₃)
j	14 α (H),17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I,R=H)
k	13 β (H),17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III,R=C ₂ H ₅)
l	13 α (H),17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
m	14 α (H),17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I,R=CH ₃)
n	13 α (H),17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV,R=C ₂ H ₅)
	+ 14 β (H),17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II,R=CH ₃)
o	14 β (H),17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II,R=CH ₃)
p	14 α (H),17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I,R=CH ₃)
q	14 α (H),17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)
r	14 β (H),17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H),17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II,R=C ₂ H ₅)
t	14 α (H),17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I,R=C ₂ H ₅)



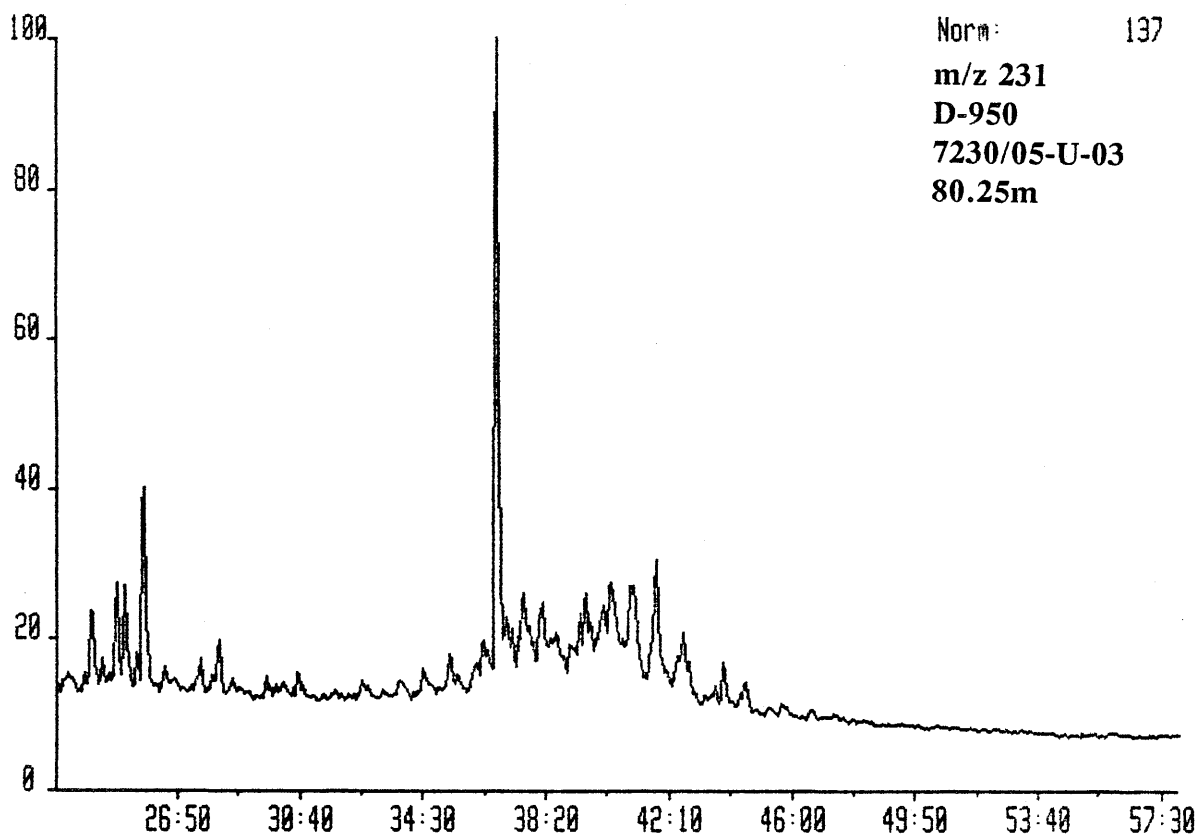
D950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



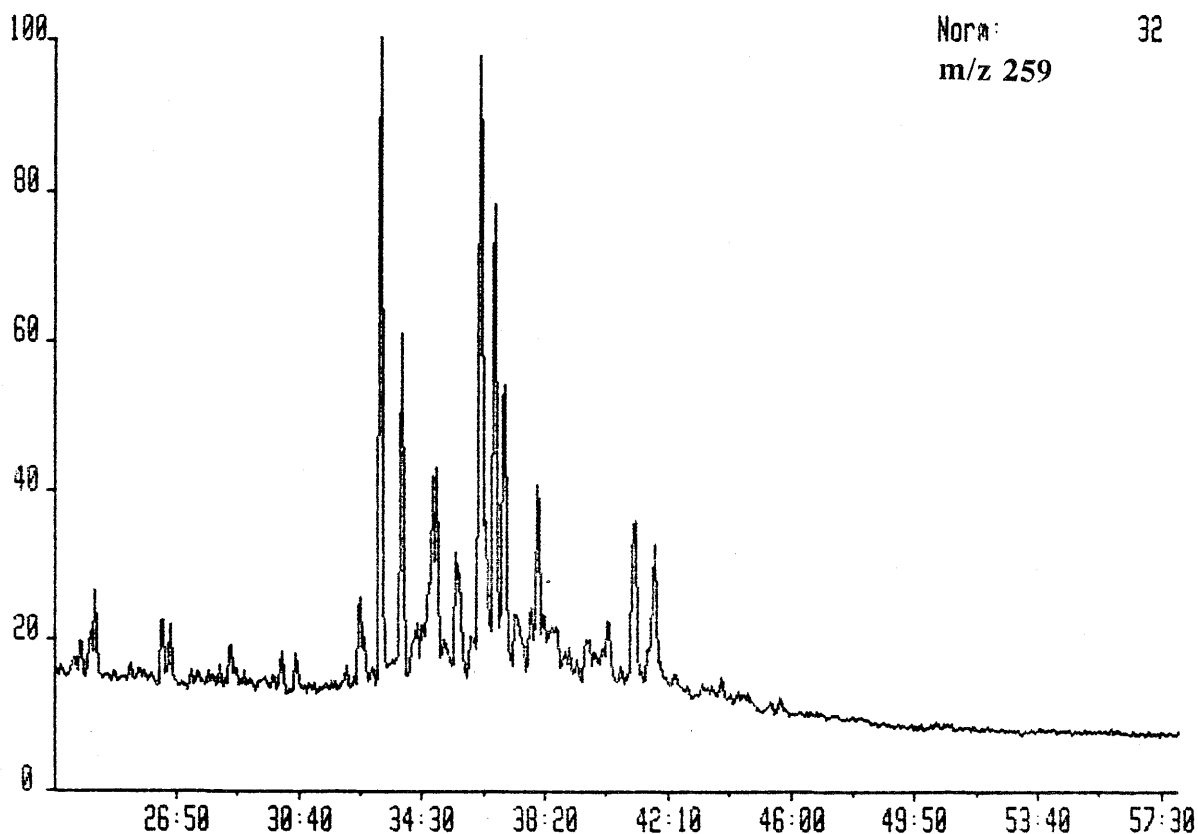
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Text:21.3427.23



D950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D950SAT 15-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



Figuré A.II.7.6: Vitrinite reflectance histograms.

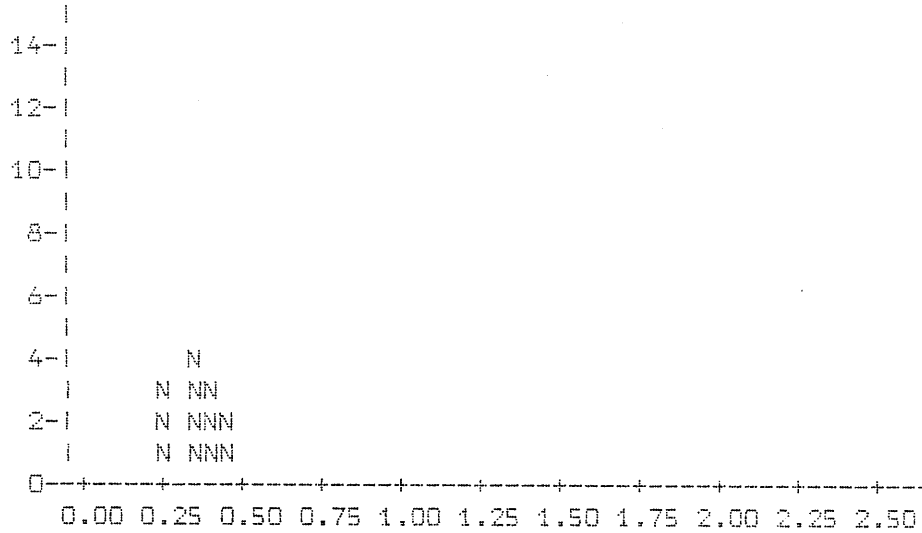
Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
PP	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

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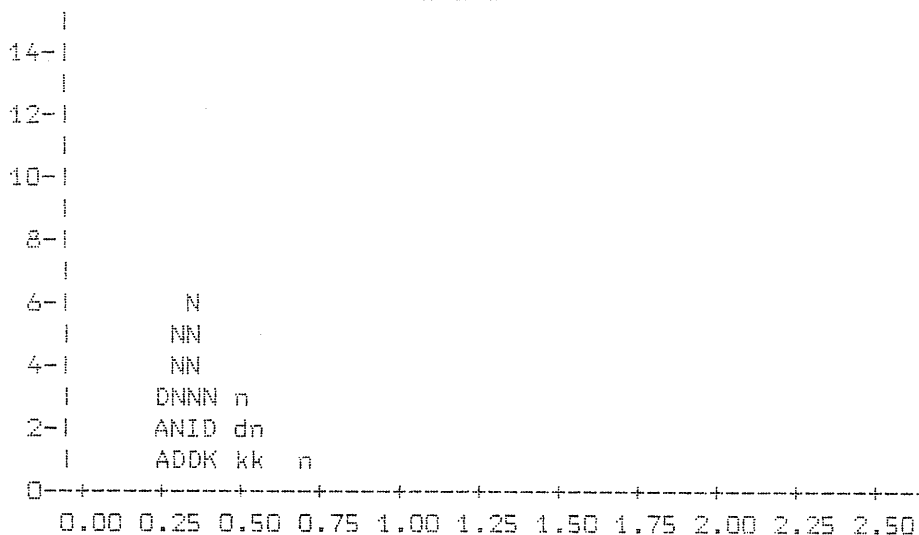


PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.25 0.47 ALL 12 0.37 0.08
 OVERALL 12 0.37 0.08

ORDERED VALUES FOLLOW:

0.25N 0.26N 0.26N 0.35N 0.36N 0.37N 0.39N 0.42N 0.42N 0.44N 0.46N
 0.46N

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PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.27	0.45	ALL	17	0.35	0.05
N	0.50	0.59	ALL	5	0.53	0.04
N	0.70	0.71	ALL	1	0.70	0.00
OVERALL				23	0.40	0.11

ORDERED VALUES FOLLOW:

0.27D 0.28A 0.29A 0.30D 0.31N 0.32N 0.33N 0.33N 0.36D 0.36N 0.36N
 0.38N 0.38N 0.39I 0.40D 0.42K 0.44N 0.50k 0.51d 0.51n 0.56k 0.58n
 0.70n

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Table A.II.8.1a

CORE 7230/05-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I													I
I	D 0002	29.65	113263	143	2				113409	146	0.13	*****	I
I	D 0012	33.59	216679	313	3	9	5	55	217009	330	0.15	1.81	I
I	D 0007	33.83	102844	211	2	29	8	20	103093	249	0.24	3.79	I
I	D 0011	36.07	166922	106					167028	106	0.06	*****	I
I	D 0014	36.47	301455	287	4	51	7	45	301803	348	0.12	7.44	I
I	D 0125	39.60	243588	161	4	7			243760	172	0.07	*****	I
I	D 0021	42.03	261091	174					261265	174	0.07	*****	I
I	D 0024	44.70	118837	130		30	12	40	119009	172	0.14	2.47	I
I	D 0027	46.03	251646	266	44	161	11	67	252129	483	0.19	14.14	I
I	D 0031	49.06	205299	82	3	27	8		205419	120	0.06	3.48	I
I	D 0035	52.06	2888	17	32	21	14	25	2972	84	2.84	1.45	I
I	D 0038	55.10	10058	151	151	41	24	29	10425	366	3.51	1.72	I
I	D 0041	58.02	13317	113	36	8	4	7	13478	161	1.19	1.89	I
I	D 0045	61.08	10195	239	109	33	19	41	10595	400	3.78	1.70	I
I	D 0050	63.99	4361	69	18	6	4	7	4458	97	2.18	1.60	I
I	D 0055	67.18	1676	74	34	17	8	28	1810	134	7.38	2.11	I
I	D 0056	69.01	2065	41	8	3			2116	51	2.43	*****	I
I	D 0058	70.58	896	24	2				922	26	2.83	*****	I
I	D 0062	73.59	109	15					124	15	12.26	*****	I
I	D 0066	76.58	79	9					88	9	9.86	*****	I
I	D 0069	79.63	32	1					34	1	3.86	*****	I
I	D 0126	82.68	39						39		0.00	*****	I
I	D 0076	85.73	33			3			35	3	7.14	*****	I

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Table A.II.8.1a (continued)

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN HEADSPACE GAS

I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I													I
I	D 0080	88.78	18						18		0.00	*****	I
I	D 0083	91.81	35	1					36	1	3.10	*****	I
I	D 0086	94.87	23						23		0.00	*****	I
I	D 0089	97.93	27						27		0.00	*****	I
I	D 0092	100.91	39						39		0.00	*****	I
I	D 0096	103.93	11						11		0.00	*****	I
I	D 0100	106.98	27						27		0.00	*****	I
I	D 0104	110.03	29						29		0.00	*****	I
I	D 0108	113.08	48						48		0.00	*****	I
I	D 0112	116.11	52	12					64	12	18.77	*****	I
I	D 0116	119.18	20		17		31		69	48	70.34	0.00	I
I	D 0120	122.23	39						39		0.00	*****	I
I	D 0124	125.28	23						23		0.00	*****	I

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Table A.II.8.1b

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
I	no.	m							C1-C4	C2-C4	NESS	-----	I
I											(%)	nC4	I
I													I
I													I
I	D 0002	29.65	28256	188	7				28451	195	0.69	*****	I
I	D 0012	33.59	66450	566	8	21	11	188	67056	606	0.90	2.00	I
I	D 0007	33.83	48173	323	10	72	3		48582	409	0.84	21.51	I
I	D 0011	36.07	62400	392	7	2		15	62801	401	0.64	*****	I
I	D 0014	36.47	36100	352	15	193	22	245	36682	582	1.59	8.62	I
I	D 0125	39.60	74223	490	22	36			74771	548	0.73	*****	I
I	D 0021	42.03	53750	410	9	2			54171	421	0.78	*****	I
I	D 0024	44.70	7375	90	2	104	49	244	7620	245	3.22	2.14	I
I	D 0027	46.03	31277	353	200	601	53	322	32485	1208	3.72	11.33	I
I	D 0031	49.06	66816	211	11	51	12	115	67101	285	0.42	4.20	I
I	D 0035	52.06	227	22	19	12	20	119	300	73	24.36	0.64	I
I	D 0038	55.10	235	42	151	57	54	198	539	304	56.37	1.06	I
I	D 0041	58.02	731	132	205	66	55	186	1188	457	38.50	1.20	I
I	D 0045	61.08	1255	100	149	59	49	200	1613	358	22.18	1.22	I
I	D 0050	63.99	2750	157	134	49	39	157	3129	379	12.12	1.25	I
I	D 0055	67.18	310	33	28	10	12	93	393	83	21.23	0.86	I
I	D 0056	69.01	1310	87	81	21	13	56	1512	201	13.32	1.65	I
I	D 0058	70.58	903	75	30			24	1008	105	10.42	*****	I
I	D 0062	73.59	518	58	25				601	83	13.81	*****	I
I	D 0066	76.58	484	39	25			7	547	64	11.64	*****	I
I	D 0069	79.63	656	32	17			23	704	48	6.85	*****	I
I	D 0126	82.68	999	53	43	23		71	1118	119	10.67	*****	I
I	D 0076	85.73	993	53	38			56	1084	91	8.40	*****	I

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS IN OCCLUDED GAS

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I													I
I	D 0080	88.78	660	48	37			37	745	85	11.41	*****	I
I	D 0083	91.81	794	45	27			42	866	72	8.28	*****	I
I	D 0086	94.87	636	41	27	14		9	718	82	11.39	*****	I
I	D 0089	97.93	1047	81	37	20		61	1185	138	11.64	*****	I
I	D 0092	100.91	787	33	17	8			845	58	6.91	*****	I
I	D 0096	103.93	615	32	20			14	667	52	7.81	*****	I
I	D 0100	106.98	1360	51	31	14		58	1456	96	6.59	*****	I
I	D 0104	110.03	1379	55	40	19		84	1493	114	7.63	*****	I
I	D 0108	113.08	1020	45	28	10			1103	83	7.48	*****	I
I	D 0112	116.11	1281	57	37			9	1375	94	6.84	*****	I
I	D 0116	119.18	376	30	19	3		23	428	52	12.08	*****	I
I	D 0120	122.23	873	67	41	17		78	997	124	12.44	*****	I
I	D 0124	125.28	539	43	32	11		32	625	86	13.81	*****	I

Table A.II.8.1c

CORE 7230/05-U-02

CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I	I	I	I	I	I	I	I	I	I	I	I	I	I
	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	SUM	SUM	WET-	iC4	I
	no.	m							C1-C4	C2-C4	NESS	-----	I
											(%)	nC4	I
I	D 0002	29.65	141519	331	9				141860	341	0.24	*****	I
I	D 0012	33.59	283129	879	12	30	16	244	284065	936	0.33	1.94	I
I	D 0007	33.83	151017	534	12	101	11	20	151675	658	0.43	9.25	I
I	D 0011	36.07	229323	498	7	2		15	229830	507	0.22	*****	I
I	D 0014	36.47	337556	639	19	243	29	289	338486	930	0.27	8.35	I
I	D 0125	39.60	317811	651	26	43			318531	720	0.23	*****	I
I	D 0021	42.03	314841	584	9	2			315435	595	0.19	*****	I
I	D 0024	44.70	126212	220	2	134	61	285	126629	417	0.33	2.20	I
I	D 0027	46.03	282923	620	244	763	64	390	284614	1691	0.59	11.83	I
I	D 0031	49.06	272115	293	14	78	20	115	272520	405	0.15	3.92	I
I	D 0035	52.06	3114	40	51	33	34	144	3272	157	4.81	0.98	I
I	D 0038	55.10	10293	192	302	98	78	226	10963	670	6.11	1.26	I
I	D 0041	58.02	14048	245	241	73	59	193	14666	618	4.22	1.25	I
I	D 0045	61.08	11450	339	258	92	68	240	12207	758	6.21	1.36	I
I	D 0050	63.99	7110	226	153	55	43	164	7587	476	6.28	1.28	I
I	D 0055	67.18	1986	107	62	28	20	120	2203	217	9.85	1.37	I
I	D 0056	69.01	3375	129	88	23	13	56	3628	253	6.97	1.85	I
I	D 0058	70.58	1799	99	32			24	1930	131	6.79	*****	I
I	D 0062	73.59	627	73	25				725	98	13.54	*****	I
I	D 0066	76.58	563	47	25			7	635	72	11.39	*****	I
I	D 0069	79.63	688	33	17			23	738	50	6.71	*****	I
I	D 0126	82.68	1038	53	43	23		71	1158	119	10.31	*****	I
I	D 0076	85.73	1025	53	38	3		56	1119	94	8.36	*****	I

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Table A.II.8.1c (continued)

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CONCENTRATION (ul Gas / kg dry Rock) OF C1 - C5+ HYDROCARBONS SUMMATION

I									SUM	SUM	WET-	iC4	I
I	IKU	DEPTH	C1	C2	C3	iC4	nC4	C5+	C1-C4	C2-C4	NESS	-----	I
I	no.	m									(%)	nC4	I
I													I
I	D 0080	88.78	678	48	37			37	763	85	11.14	*****	I
I	D 0083	91.81	829	46	27			42	902	73	8.07	*****	I
I	D 0086	94.87	659	41	27	14		9	741	82	11.03	*****	I
I	D 0089	97.93	1075	81	37	20		61	1213	138	11.38	*****	I
I	D 0092	100.91	826	33	17	8			884	58	6.61	*****	I
I	D 0096	103.93	626	32	20			14	678	52	7.69	*****	I
I	D 0100	106.98	1386	51	31	14		58	1482	96	6.47	*****	I
I	D 0104	110.03	1408	55	40	19		84	1522	114	7.48	*****	I
I	D 0108	113.08	1068	45	28	10			1150	83	7.17	*****	I
I	D 0112	116.11	1333	69	37			9	1439	106	7.37	*****	I
I	D 0116	119.18	396	30	36	3	31	23	497	100	20.16	0.10	I
I	D 0120	122.23	911	67	41	17		78	1035	124	11.98	*****	I
I	D 0124	125.28	562	43	32	11		32	649	86	13.31	*****	I

Table A.II.8.2

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DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)		(%)	(mg/g TOC)			S1+S2	S1+S2	(C)	I
I			:										I
I	D 131	29.29	:	1.00	31.19	1.25	10.39	300	12	32.19	0.03	411	I
I	D 2	29.65	:	****	****	****	8.67	*****	****	*****	*****	***	I
I	D 5	32.55	:	1.06	25.86	0.89	8.90	291	10	26.92	0.04	411	I
I	D 6	33.50	:	2.26	49.73	2.09	14.04	354	15	51.99	0.04	404	I
I	D 12	33.59	:	4.17	78.86	2.25	22.88	345	10	83.03	0.05	409	I
I	D 7	33.83	:	****	****	****	17.06	*****	****	*****	*****	***	I
I	D 8	34.19	:	1.73	37.77	1.15	12.91	293	9	39.50	0.04	404	I
I	D 9	35.27	:	2.91	54.09	1.68	16.41	330	10	57.00	0.05	402	I
I	D 4027	35.97	:	0.23	3.94	1.40	2.01	196	70	4.17	0.06	410	I
I	D 11	36.07	:	****	****	****	7.31	*****	****	*****	*****	***	I
I	D 13	36.29	:	1.87	41.09	1.20	14.00	293	9	42.96	0.04	404	I
I	D 14	36.47	:	****	****	****	17.36	*****	****	*****	*****	***	I
I	D 16	37.99	:	3.11	58.90	1.95	15.18	388	13	62.01	0.05	402	I
I	D 17	38.70	:	2.25	46.13	1.38	13.42	344	10	48.38	0.05	403	I
I	D 125	39.60	:	****	****	****	16.14	*****	****	*****	*****	***	I
I	D 18	39.94	:	2.34	46.47	1.42	11.85	392	12	48.81	0.05	401	I
I	D 19	40.93	:	2.26	53.33	2.18	13.94	383	16	55.59	0.04	404	I
I	D 21	42.03	:	****	****	****	20.73	*****	****	*****	*****	***	I
I	D 22	42.71	:	1.81	45.97	1.49	13.13	350	11	47.78	0.04	404	I
I	D 23	43.90	:	0.72	24.40	0.97	8.82	277	11	25.12	0.03	411	I
I	D 24	44.68	:	****	****	****	7.83	*****	****	*****	*****	***	I
I	D 26	45.95	:	0.76	29.78	1.12	9.01	331	12	30.54	0.02	413	I

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Table A.II.8.2 (continued)

Core 7230/05-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)			(%)	(mg/g TOC)		S1+S2	S1+S2	(C)	I
I			:										I
I	D	27	:	****	****	****	14.37	*****	****	*****	*****	***	I
I	D	28	:	2.26	46.35	1.31	13.14	353	10	48.61	0.05	403	I
I	D	29	:	1.77	48.16	1.06	12.83	375	8	49.93	0.04	407	I
I	D	30	:	2.38	46.96	2.76	14.37	327	19	49.34	0.05	406	I
I	D	31	:	****	****	****	22.88	*****	****	*****	*****	***	I
I	D	33	:	3.13	73.14	2.12	17.14	427	12	76.27	0.04	406	I
I	D	4028	:	****	****	****	1.54	*****	****	*****	*****	***	I
I	D	34	:	****	****	****	0.37	*****	****	*****	*****	***	I
I	D	35	:	****	****	****	0.45	*****	****	*****	*****	***	I
I	D	37	:	0.08	0.09	0.25	0.67	13	37	0.17	0.47	414	I
I	D	38	:	****	****	****	0.81	*****	****	*****	*****	***	I
I	D	40	:	0.11	0.10	0.21	0.82	12	26	0.21	0.52	(357)	I
I	D	41	:	****	****	****	0.62	*****	****	*****	*****	***	I
I	D	43	:	****	****	****	0.37	*****	****	*****	*****	***	I
I	D	44	:	0.05	0.08	0.08	0.62	13	13	0.13	0.38	(319)	I
I	D	45	:	****	****	****	0.66	*****	****	*****	*****	***	I
I	D	47	:	0.11	0.13	0.08	0.81	16	10	0.24	0.46	(359)	I
I	D	48	:	0.11	0.11	0.10	0.67	16	15	0.22	0.50	(330)	I
I	D	50	:	****	****	****	0.72	*****	****	*****	*****	***	I
I	D	52	:	0.09	0.11	0.12	0.87	13	14	0.20	0.45	(343)	I
I	D	54	:	0.08	0.13	0.13	0.67	19	19	0.21	0.38	426	I
I	D	55	:	****	****	****	0.44	*****	****	*****	*****	***	I

Bracketed Tmax values are artifacts (low S2).

DATE : 3 - 2 - 88.

Table A.II.8.2 (continued)

Core 7230/05-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	
I		m	:	(mg/g ROCK)	(%)	(mg/g TOC)				S1+S2	S1+S2	(C)
I	D	56	69.01	****	****	****	0.42	*****	****	*****	*****	***
I	D	57	69.71	0.08	0.11	0.00	0.66	17	0	0.19	0.42	(326)
I	D	58	70.58	****	****	****	0.42	*****	****	*****	*****	***
I	D	61	72.88	0.09	0.06	0.23	0.43	14	53	0.15	0.60	(334)
I	D	62	73.59	****	****	****	0.38	*****	****	*****	*****	***
I	D	64	75.06	0.10	0.03	3.11	0.43	7	723	0.13	0.77	(276)
I	D	66	76.58	****	****	****	0.28	*****	****	*****	*****	***
I	D	68	79.27	0.08	0.05	1.26	0.37	14	341	0.13	0.62	(326)
I	D	69	79.63	****	****	****	0.17	*****	****	*****	*****	***
I	D	70	81.30	****	****	****	0.34	*****	****	*****	*****	***
I	D	126	82.68	****	****	****	0.23	*****	****	*****	*****	***
I	D	74	84.55	****	****	****	0.31	*****	****	*****	*****	***
I	D	76	85.73	****	****	****	0.17	*****	****	*****	*****	***
I	D	4030	86.21	3.65	73.51	12.48	40.60	181	31	77.16	0.05	415
I	isol.plant frgmts.											
I	D	78	86.75	0.11	0.14	0.00	0.39	36	0	0.25	0.44	396
I	D	4031	86.82	0.23	5.80	0.70	2.17	267	32	6.03	0.04	431
I	dkgy siltstone											
I	D	79	88.33	****	****	****	0.36	*****	****	*****	*****	***
I	D	80	88.78	****	****	****	0.39	*****	****	*****	*****	***
I	D	4032	90.36	1.07	18.58	3.35	12.94	144	26	19.65	0.05	436
I	isol. roots											
I	D	83	91.81	****	****	****	0.31	*****	****	*****	*****	***
I	D	84	93.13	****	****	****	0.47	*****	****	*****	*****	***

Bracketed Tmax values are artifacts (low S2).

DATE : 3 - 2 - 88.

Table A.II.8.2 (continued)

Core 7230/05-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX	I
I	No.		:								S1		I
I		m	:	(mg/g ROCK)			(%)	(mg/g TOC)		S1+S2	S1+S2	(C)	I
I			:										I
I	D	86	:	****	****	****	0.64	*****	****	*****	*****	***	I
I	D	88	:	0.08	0.30	0.00	0.41	73	0	0.38	0.21	429	I
I	D	89	:	****	****	****	0.29	*****	****	*****	*****	***	I
I	D	90	:	0.12	1.90	0.10	1.19	160	8	2.02	0.06	429	I
I	D	92	:	****	****	****	0.23	*****	****	*****	*****	***	I
I	D	94	:	0.09	0.83	0.05	0.66	126	8	0.92	0.10	430	I
I	D	96	:	****	****	****	0.60	*****	****	*****	*****	***	I
I	D	97	:	0.08	1.04	0.00	0.82	127	0	1.12	0.07	430	I
I	D	98	:	0.06	0.10	0.00	0.35	29	0	0.16	0.38	423	I
I	D	100	:	****	****	****	0.70	*****	****	*****	*****	***	I
I	D	102	:	****	****	****	0.20	*****	****	*****	*****	***	I
I	D	104	:	****	****	****	0.10	*****	****	*****	*****	***	I
I	D	106	:	0.08	0.11	0.00	0.31	35	0	0.19	0.42	(365)	I
I	D	107	:	0.15	1.04	0.02	1.02	102	2	1.19	0.13	426	I
I	D	108	:	****	****	****	0.42	*****	****	*****	*****	***	I
I	D	110	:	0.15	1.87	0.05	1.44	130	3	2.02	0.07	426	I
I	D	112	:	****	****	****	1.17	*****	****	*****	*****	***	I
I	D	114	:	0.09	0.40	0.00	0.64	63	0	0.49	0.18	425	I
I	D	115b	:	****	****	****	2.59	*****	****	*****	*****	***	I
I	dark laminae	118.63	:										I
I	D	115a	:	0.08	0.38	0.00	0.49	78	0	0.46	0.17	424	I
I	light laminae	118.63	:										I
I			:										I

Bracketed Tmax values are artifacts (low S2).

DATE : 3 - 2 - 88.

Table A.II.8.2 (continued)

Core 7230/05-U-02

DATA FROM ROCK EVAL PYROLYSIS

I	I	I	I	I	I	I	I	I	I	I	I	I
I	IKU	DEPTH	:	S1	S2	S3	TOC	HYDR. INDEX	OXYGEN INDEX	PETROLEUM POTENTIAL	PROD. INDEX	TEMP. MAX
I	No.		:								S1	I
I			:									I
I		m	:	(mg/g ROCK)	(%)	(mg/g TOC)				S1+S2	S1+S2	(C)
I			:									I
I	D 4033	118.71	:	2.58	34.03	3.54	21.40	159	17	36.61	0.07	429
I	isol. plant frgmts.		:									I
I	D 116	119.18	:	****	****	****	1.16	*****	****	*****	*****	***
I	D 118	120.80	:	0.06	0.04	0.00	0.22	18	0	0.10	0.60	407
I	D 120	122.23	:	****	****	****	0.08	*****	****	*****	*****	***
I	D 4034	123.92	:	0.45	17.84	1.01	4.33	412	233	18.29	0.02	432
I	dark sltst.		:									I
I	D 4034	123.92	:	****	****	****	0.85	*****	****	*****	*****	***
I	light sltst.		:									I
I	D 122	124.04	:	0.12	2.02	0.00	0.86	235	0	2.14	0.06	433
I	D 123	124.94	:	0.05	0.15	0.00	0.44	34	0	0.20	0.25	426
I	D 124	125.28	:	****	****	****	0.10	*****	****	*****	*****	***
I			:									I

DATE : 3 - 2 - 88.

Table A.II.8.3

 Core number: 7230/05-U-02
 Reference number: 21.3427.23
 (1/1)

VITRINITE REFLECTANCE DATA

IKU NO	LOCATION	DEPTH (M)	VITRINITE REFLECTANCE	REL RAT	STANDARD DEVIATION	FLUORE- SCENCE
D-2003	-----	86.21	0.26 (21)	F?	0.04	1-4
D-2004	-----	90.33	0.26 (23)	F?	0.04	1?
D-2002	-----	95.74	0.26 (20)	F?	0.03	2-3
D-2001	-----	110.29	0.32 (12)	F	0.08	2-3
D-2001A	-----	110.29	0.25 (19)	F?	0.03	2-3
D-2000	-----	118.30	0.26 (20)	F?	0.04	3?

 REL RAT (Reliability Rating): G = Good; F = Fair; P = Poor
 S = Stained; R = Reworked.

 F?: Measurements not taken on vitrinite sensu strictu, but
 rather on the brown coal equivalents, textinite and
 ulminite.

Visual Kerogen Analysis

Table no.: A.II.8.4
Well no.: 7230/05-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 0131	29.29	Am: 80-85% Al: + Lm: 5% W: 5-10% C: 5%	F-M-L	Fair-Poor	3.0-3.5	Organic residue dominated by finely dispersed amorphous matter and larger amorphous aggregates, frequently specked with small brown/black woody/coaly fragments, pyrite and occasionally bacterial/fungal remains. Tasmanitids present.
D 0009	35.27	Am: 75-80% Lm: 5% W: 10-15% C: 5%	F-M-L	Fair-Poor	3.0-3.5	Similar to sample D 0131 (29.29 m) but with a somewhat increased fraction of dark woody phytoclasts.
D 0017	38.70	Am: 75-80% Lm: 5% W: 10-15% C: 5%	F-M-L	Fair-Poor	3.0-3.5	Comparable with sample D 0009 (35.27 m).

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.8.4
Well no.: 7230/05-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 0022	42.71	Am: 75-80% Lm: <5% W: 10-15% C: 5%	F-M-L	Poor	?3.0-3.5	Organic residue dominated by amorphous matter, occurring finely dispersed or in form of larger aggregates/clasts of variable size and thickness. The aggregates are frequently speckled with small woody/coaly fragments, pyrite and sometimes bacterial/fungal remains.
D 0029	47.67	Am: 75-80% Lm: 5% W: 10-15% C: 5%	F-M-L	Fair	3.0-3.5	Comparable with sample D 0022 (42.71 m).
D 0032	49.18	Am: 75-80% Lm: 5% W: 10-15% C: 5%	F-M-L	Fair-Good	3.0-3.5	Comparable with samples above.
	51.50	Am: <5% Lm: <5% W: <5% C: >90%	F-M-L	Poor	N.D.P.	Organic residue totally dominated by opaque coaly fragments, together with undissolved heavy minerals.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.8.4
Well no.: 7230/05-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
-	56.75	Am: 85-90% Lm: 5% W+C: 5-10%	F-M-L	Fair	3.0-3.5	Total organic residue dominated by finely dispersed amorphous matter. Sieved residue is highly enriched in dark woody/coaly phytoclasts and liptinitic material' (mainly palynomorphs).
-	66.50	Am: 80-85% Lm: 5% W+C: 10-15%	F-M-L	Fair	?3.0-3.5?	Comparable with sample 56.75m. Evidence of oxidation of the organic matter.
D 0064	75.06	Am: 80-85% Lm: 5-10% W: 5% C: <5%	F-M-L	Fair	3.0-3.5	Organic residue dominated by finely dispersed amorphous matter. Sieved residue rich in degraded liptinitic (mainly terrestrial) material.
D 0205	81.82	Am: 80-85% Lm: 5% W+C: 10-15%	F-M-L	Fair	3.0-3.5?	Total organic residue dominated by finely dispersed amorphous matter. Sieved residue is highly enriched in black/opaque woody/coaly fragments together with liptinitic material.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Visual Kerogen Analysis

Table no.: A.II.8.4
Well no.: 7230/05-U-02

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
D 0091	99.66	Am: 10-15% Al: 5% Lm: 5-10% W: 65-70% C: 5%	F-M-L	Good-Fair	-	Organic residue dominated by woody phytoclasts and liptinitic material (well preserved palynomorphs and cuticle sheets. Fresh-water algae present (i.e. Botryococcus).
D 0109	113.43	Am: 15% Lm: 10% W: 65-70% C: 5-10%	F-M-L	Fair	3.0-3.5	Organic residue is dominated by woody phytoclasts and liptinitic material.
D 0117	119.65	Am: 55-60% Lm: 10-15% W: 20% C: 5%	F-M-L	Fair-Good	3.0-3.5?	Sieved*) residue is dominated by finely dispersed amorphous matter, but contains also significant proportions of woody phytoclasts (small-medium sized) and liptinitic material.
D 0121	122.79	Am: 60-65% Lm: 5-10% W: 20% C: 5%	F-M-L	Fair	3.5-4.0?	Comparable with sample D 0117 (119.65 m), but with a decreased fraction of liptinitic material. *) Only sieved residue available.

Abbreviations

Am Amorphous

Al Algal material
Lm Liptinitic material

W Woody material
C Coaly fragments

F Fine
M Medium
L Large

Table A.II.8.5

AMOUNT OF ASPHALTENES AND POLARS IN SEDIMENT

Core 7230/05-U-02

I			:	Asphaltenes	:	Polars	I
I	IKU-No.	DEPTH	:		:		I
I		(m)	:	(mg)	:	(mg)	I
I			:		:		I
I	D 131	29.29	:	62.1	:	8.4	I
I			:		:		I
I	D 12	33.59	:	68.8	:	8.4	I
I			:		:		I
I	D 9	35.27	:	109.1	:	14.6	I
I			:		:		I
I	D 17	38.70	:	96.7	:	12.2	I
I			:		:		I
I	D 23	43.90	:	49.8	:	4.7	I
I			:		:		I
I	D 33	50.23	:	86.6	:	28.2	I
I			:		:		I
I	D 44	59.75	:	3.2	:	3.7	I
I			:		:		I
I	D 48	62.85	:	2.7	:	1.3	I
I			:		:		I
I	D 4029	76.37	:	1.9	:	2.4	I
I			:		:		I
I	D 90	98.09	:	19.5	:	2.6	I
I			:		:		I
I	D 110	114.68	:	22.1	:	2.6	I
I			:		:		I
I	D 116	119.18	:	12.4	:	3.0	I
I			:		:		I
I	D 4034	123.92	:	9.2	:	4.8	I
I			:		:		I

Table A.II.8.6

I			: Rock							
I	IKU-No		: Extr.	EOM	Sat.	Aro.	HC	Non HC	TOC	
I			:							
I		(m)	: (g)	(mg)	(mg)	(mg)	(mg)	(mg)	(%)	
I			:							
I	D 131	29.29	: 15.4	77.7	4.1	5.6	9.7	68.0	10.39	
I	D 12	33.59	: 4.7	85.6	1.2	5.0	6.2	79.4	22.88	
I	D 9	35.27	: 12.5	157.3	1.3	13.0	14.3	143.0	16.41	
I	D 17	38.70	: 12.5	128.0	1.2	12.5	13.7	114.3	13.42	
I	D 23	43.90	: 14.6	67.9	6.4	7.2	13.6	54.3	8.82	
I	D 33	50.23	: 11.7	133.0	17.6	12.7	30.3	102.7	17.14	
I	D 44	59.75	: 16.1	1.0	0.1	0.6	0.7	0.3	0.62	
I	D 48	62.85	: 20.0	3.7	0.1	0.6	0.7	3.0	0.67	
I	D 4029	76.37	: 119.2	11.1	0.7	1.9	2.6	8.5	n.d.	
I	D 90	98.09	: 11.2	25.4	0.2	1.7	1.9	23.5	1.19	
I	D 110	114.68	: 9.7	28.8	0.4	1.3	1.7	27.1	1.44	
I	D 116	119.18	: 18.0	18.2	0.5	1.0	1.5	16.7	1.14	
I	D 4034	123.92	: 14.2	16.9	1.4	3.2	4.6	12.3	2.93	

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Table A.II.8.7

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm of rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
D 131	29.29	5029	265	362	628	4401
D 12	33.59	18252	256	1066	1322	16930
D 9	35.27	12554	104	1038	1141	11413
D 17	38.70	10224	96	998	1094	9129
D 23	43.90	4644	438	492	930	3714
D 33	50.23	11368	1504	1085	2590	8778
D 44	59.75	62	6	37	44	19
D 48	62.85	185	5	30	35	150
D 4029	76.37	93	6	16	22	71
D 90	98.09	2264	18	152	169	2094
D 110	114.68	2972	41	134	175	2797
D 116	119.18	1014	28	56	84	930
D 4034	123.92	1189	99	225	324	866

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Table A.II.8.8

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

I	I	I	I	I	I	I	I	I	I
I	IKU-No	DEPTH	:	EOM	Sat.	Aro.	HC	Non HC	I
I		(m)	:						I
I			:						I
I	D 131	29.29	:	48.4	2.6	3.5	6.0	42.4	I
I	D 12	33.59	:	79.8	1.1	4.7	5.8	74.0	I
I	D 9	35.27	:	76.5	0.6	6.3	7.0	69.5	I
I	D 17	38.70	:	76.2	0.7	7.4	8.2	68.0	I
I	D 23	43.90	:	52.7	5.0	5.6	10.5	42.1	I
I	D 33	50.23	:	66.3	8.8	6.3	15.1	51.2	I
I	D 44	59.75	:	10.0	1.0	6.0	7.0	3.0	I
I	D 48	62.85	:	27.6	0.7	4.5	5.2	22.4	I
I	D 4029	76.37	:	n.d.	n.d.	n.d.	n.d.	n.d.	I
I	D 90	98.09	:	190.2	1.5	12.7	14.2	176.0	I
I	D 110	114.68	:	206.4	2.9	9.3	12.2	194.2	I
I	D 116	119.18	:	88.9	2.4	4.9	7.3	81.6	I
I	D 4034	123.92	:	40.6	3.4	7.7	11.0	29.5	I
I			:						I

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Table A.II.8.9

COMPOSITION OF MATERIAL EXTRACTED FROM THE ROCK

I	I	I	I	I	I	I	I	I	I	I
	IKU-No	DEPTH	:	Sat	Aro	HC	SAT	Non HC	HC	
		(m)	:	---	---	---	---	---	---	
			:	EOM	EOM	EOM	Aro	EOM	Non HC	
			:	%	%	%	x 100	%	x 100	
I	I	I	I	I	I	I	I	I	I	I
I	D 131	29.29	:	5.3	7.2	12.5	73.2	87.5	14.3	I
I	D 12	33.59	:	1.4	5.8	7.2	24.0	92.8	7.8	I
I	D 9	35.27	:	0.8	8.3	9.1	10.0	90.9	10.0	I
I	D 17	38.70	:	0.9	9.8	10.7	9.6	89.3	12.0	I
I	D 23	43.90	:	9.4	10.6	20.0	88.9	80.0	25.0	I
I	D 33	50.23	:	13.2	9.5	22.8	138.6	77.2	29.5	I
I	D 44	59.75	:	10.0	60.0	70.0	16.7	30.0	233.3*	I
I	D 48	62.85	:	2.7	16.2	18.9	16.7	81.1	23.3	I
I	D 4029	76.37	:	6.3	17.1	23.4	36.8	76.6	30.6	I
I	D 90	98.09	:	0.8	6.7	7.5	11.8	92.5	8.1	I
I	D 110	114.68	:	1.4	4.5	5.9	30.8	94.1	6.3	I
I	D 116	119.18	:	2.7	5.5	8.2	50.0	91.8	9.0	I
I	D 4034	123.92	:	8.3	18.9	27.2	43.8	72.8	37.4	I
I			:							I

* = unreliable (low fraction weights)

TABLE A.II.8.10

CORE 7230/05-U-02

TABULATION OF DATA FROM THE GASCHROMATOGRAMS

I	DEPTH	:	PRISTANE	PRISTANE	PHYTANE	A	n-C17			
I	IKU No.	:	-----	A =	B =	-----	-----	CPI	CPI	
I	(m)	:	PHYTANE	n-C17	n-C18	B	n-C27	1	2	
I		:								
I	D 131	:	0.7	2.9	5.2	0.6	0.6	1.9	2.2	
I		:								
I	D 12	:	0.7	3.6	5.8	0.6	0.7	1.7	1.8	
I		:								
I	D 9	:	0.8	3.2	5.2	0.6	1.3	1.4	1.2	
I		:								
I	D 17	:	0.9	2.7	3.7	0.7	0.7	1.6	1.7	
I		:								
I	D 23	:	1.0	2.6	3.0	0.9	0.5	1.7	1.8	
I		:								
I	D 33	:	0.6	4.4	9.9	0.4	0.5	1.7	1.7	
I		:								
I	D 44	:	1.3	0.6	0.4	1.4	0.3	1.5	1.5	
I		:								
I	D 48	:	4.0	0.6	0.2	4.1	0.5	1.5	1.4	
I		:								
I	D 4029	:	2.3	0.8	0.5	1.6	0.8	1.2	1.1	
I		:								
I	D 90	:	1.5	0.7	0.6	1.2	0.6	1.1	1.1	
I		:								
I	D 110	:	1.3	0.6	0.5	1.2	0.5	1.3	1.1	
I		:								
I	D 116	:	2.7	1.3	0.2	7.3	0.3	1.1	1.0	
I		:								
I	D 4034	:	3.5	2.4	0.5	4.4	0.1	1.9	1.9	
I		:								

DATE : 2 - 3 - 88.

Table A.II.8.11a:

Molecular ratios from sterane and terpane mass chromatograms.
 Maturity ratios.

Core 7230/05-U-02

IKU no.	Depth (m)	$\alpha\beta/\alpha\beta+\beta\alpha^1)$	%22S ²⁾	% $\beta\beta^3)$	%20S ⁴⁾
D-0012	33.59	0.76	34.5	69.7	15.1
D-0009	35.27	0.66	22.4	70.6	10.3
D-0017	38.70	0.66	18.9	63.9	3.2
D-0023	43.90	0.70	19.0	66.0	3.2
D-0033	50.23	0.66	14.5	66.2	4.3
D-4029	76.37	0.88	44.5	69.5	19.5
D-4034	123.92	0.75	14.3	64.0	6.8

1) E/(E+F) in m/z 191.

2) Average % distribution between first and second eluting isomers of extended hopanes.

3) $2(r+s)/(q+t+2(r+s))$ in m/z 217.

4) $q/(q+t)$ in m/z 217.

Table A.II.8.11b:

Molecular ratios from terpane and sterane mass chromatograms.
 Maturity and source characteristic ratios.

Core 7230/05-U-02

IKU no.	Depth (m)	Q/E ¹⁾	Tm/Ts ²⁾	X/E ³⁾	Z/E ⁴⁾	a/a+j ⁵⁾
D-0012	33.59	0.07	7.44		0.07	0.56
D-0009	35.27	0.05	15.00		0.03	0.60
D-0017	38.70	0.03	6.00			0.26
D-0023	43.90	0.02	7.57			0.19
D-0033	50.23	0.02	4.90		0.06	0.19
D-4029	76.37	0.34	1.64		0.27	0.52
D-4034	123.92	0.01	2.25		0.95	0.22

¹⁾ Relative abundance of tricyclic terpanes (Q/E in m/z 191).

²⁾ B/A in m/z 191.

³⁾ Relative abundance of unknown (X/E in m/z 191).

⁴⁾ Relative abundance of bisnorhopane (Z/E in m/z 191).

⁵⁾ Relative abundance of C₂₇ rearranged steranes (a/(a+j) in m/z 217).

Table A.II.8.12: Carbon isotope ratios for extract fractions.

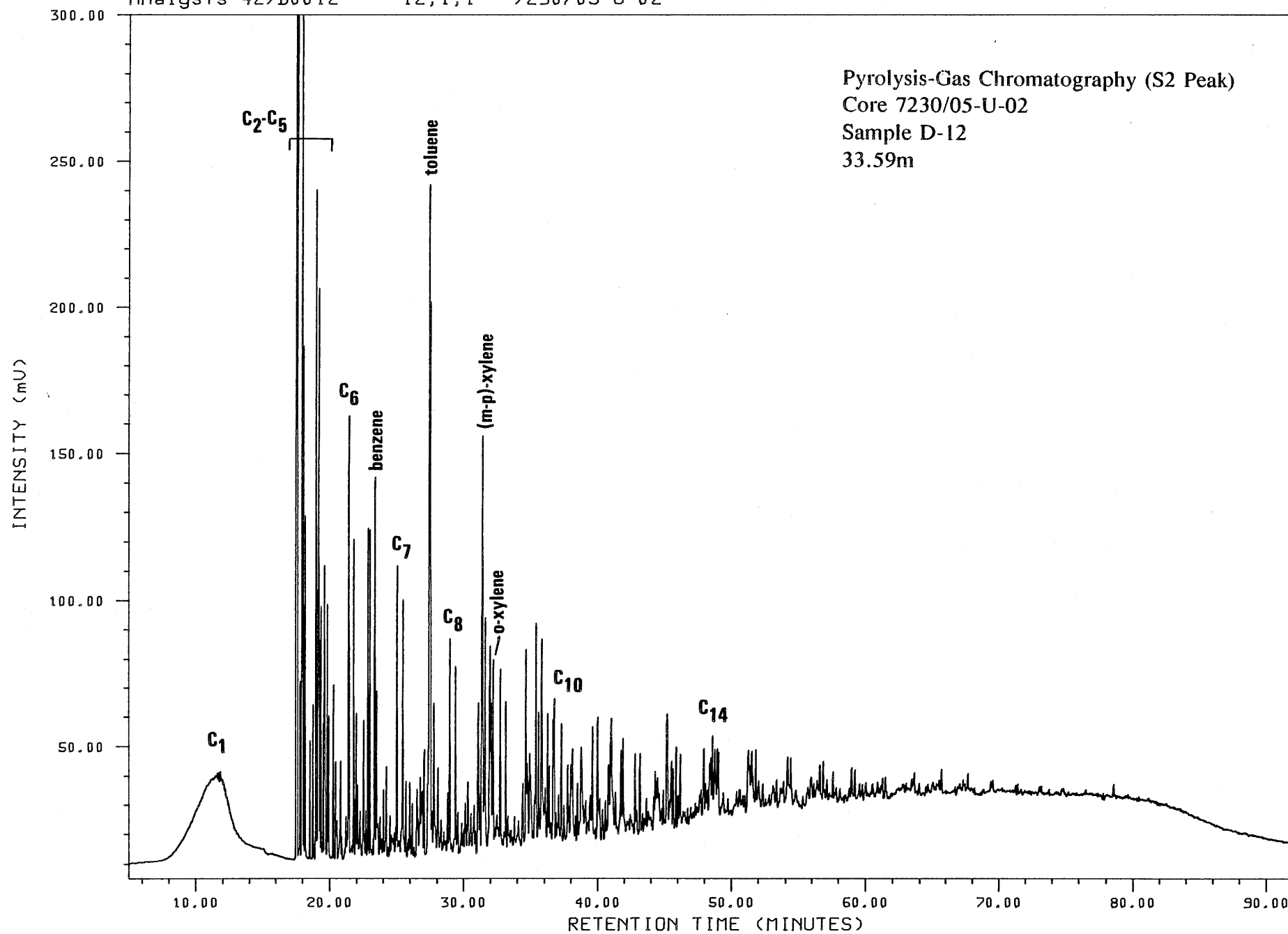
Core 7230/05-U-02

IKU no.	Depth (m)	SAT	d13C (0/00 PDB)		ASPH	EOM
			ARO	POL		
D0131	29.29	-29.97	-29.57	-29.32	-28.41	-28.67
D0023	43.90	-30.80	-29.28	-28.89	-28.4	-28.95
D0033	50.23	-29.85	-28.63	-29.42	-27.65	-27.7
D4029	76.37	-31.67	-27.11	-28.48	-28.73	n.d.

Figure A.II.8.1:

Pyrolysis-gas chromatograms (S2 peak)

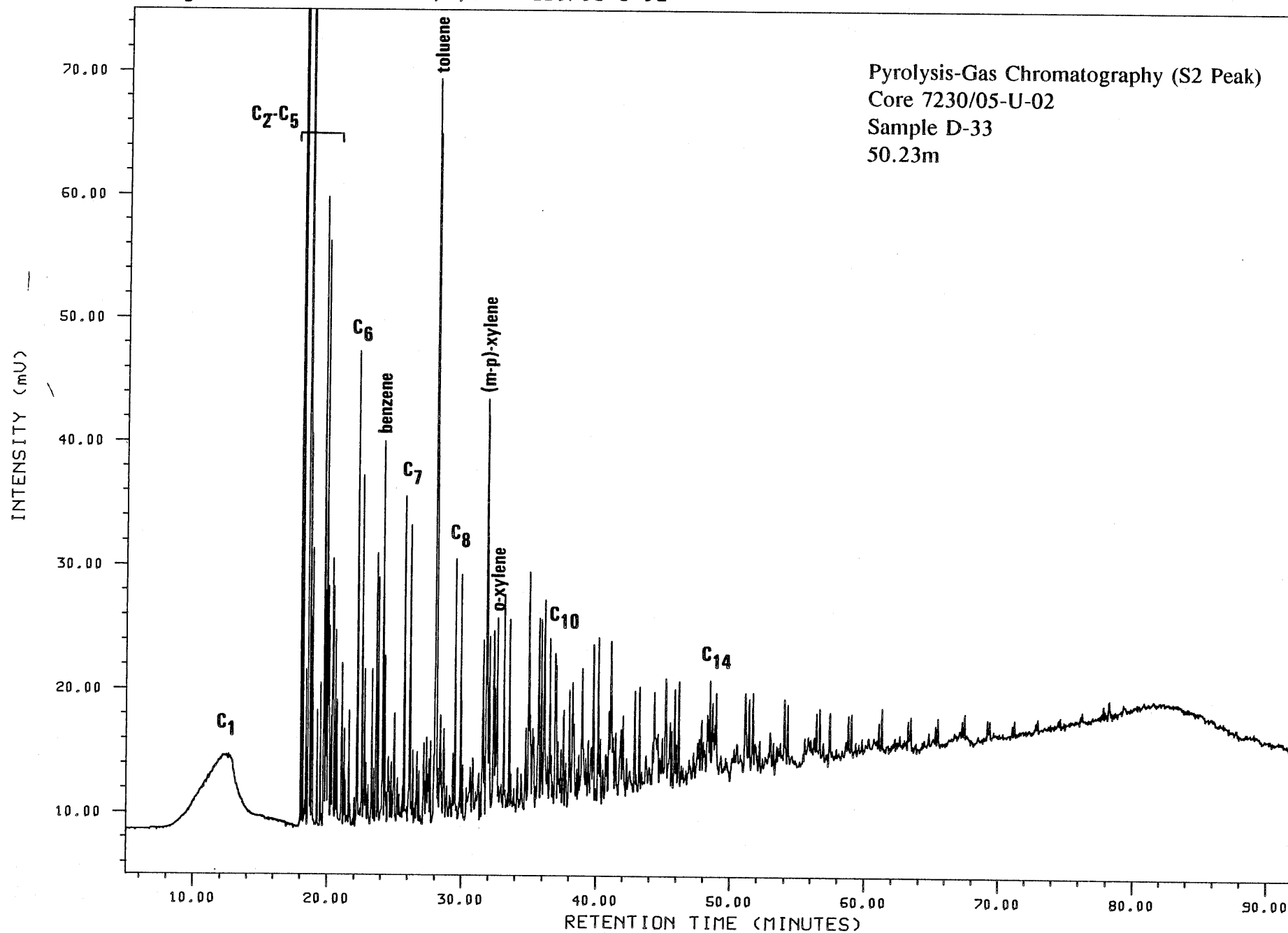
Analysis 427D0012 12,1,1 7230/05-U-02



Analysis 427D0033

12,1,1

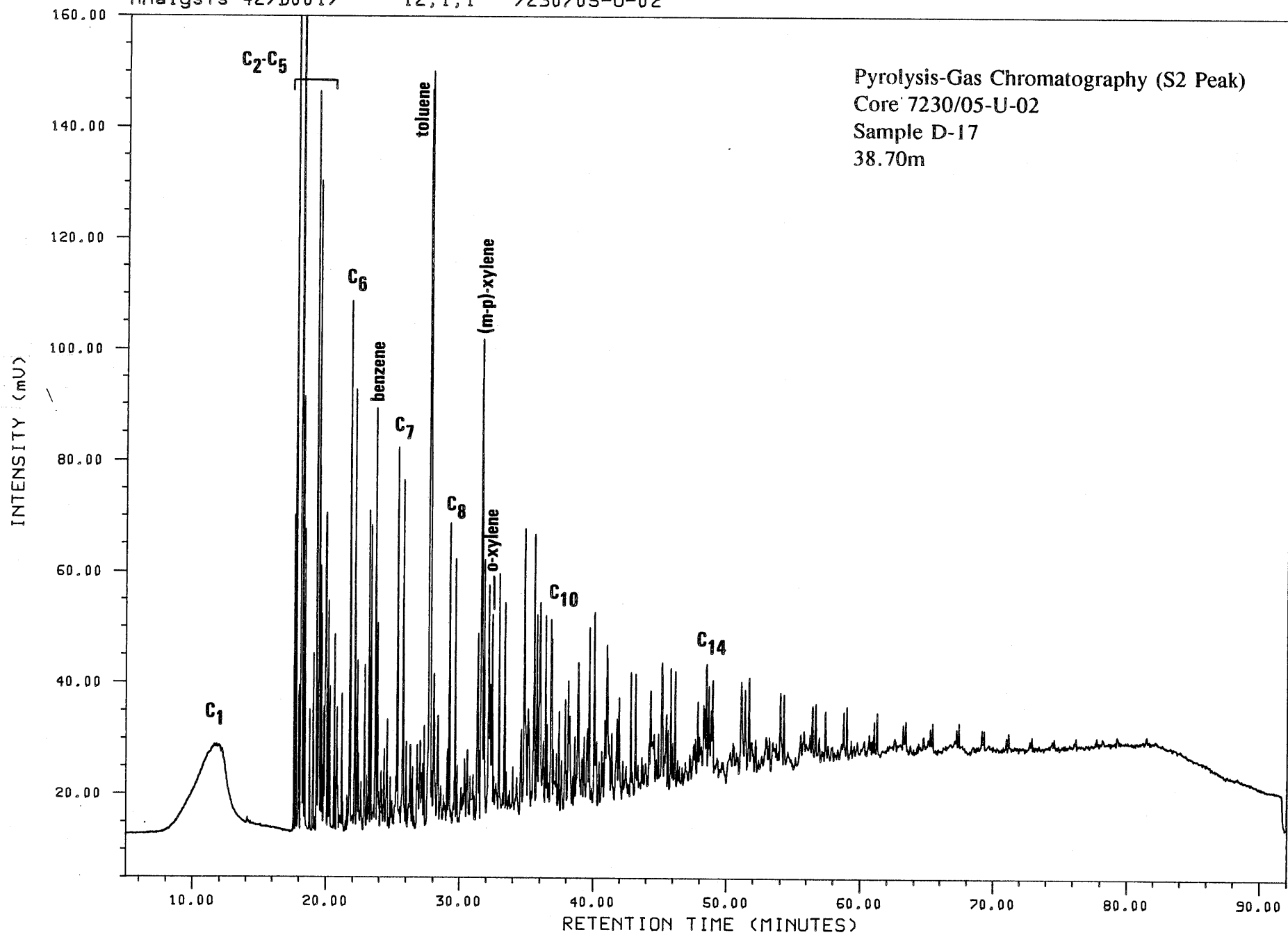
7230/05-U-02



Analysis 427D0017

12,1,1

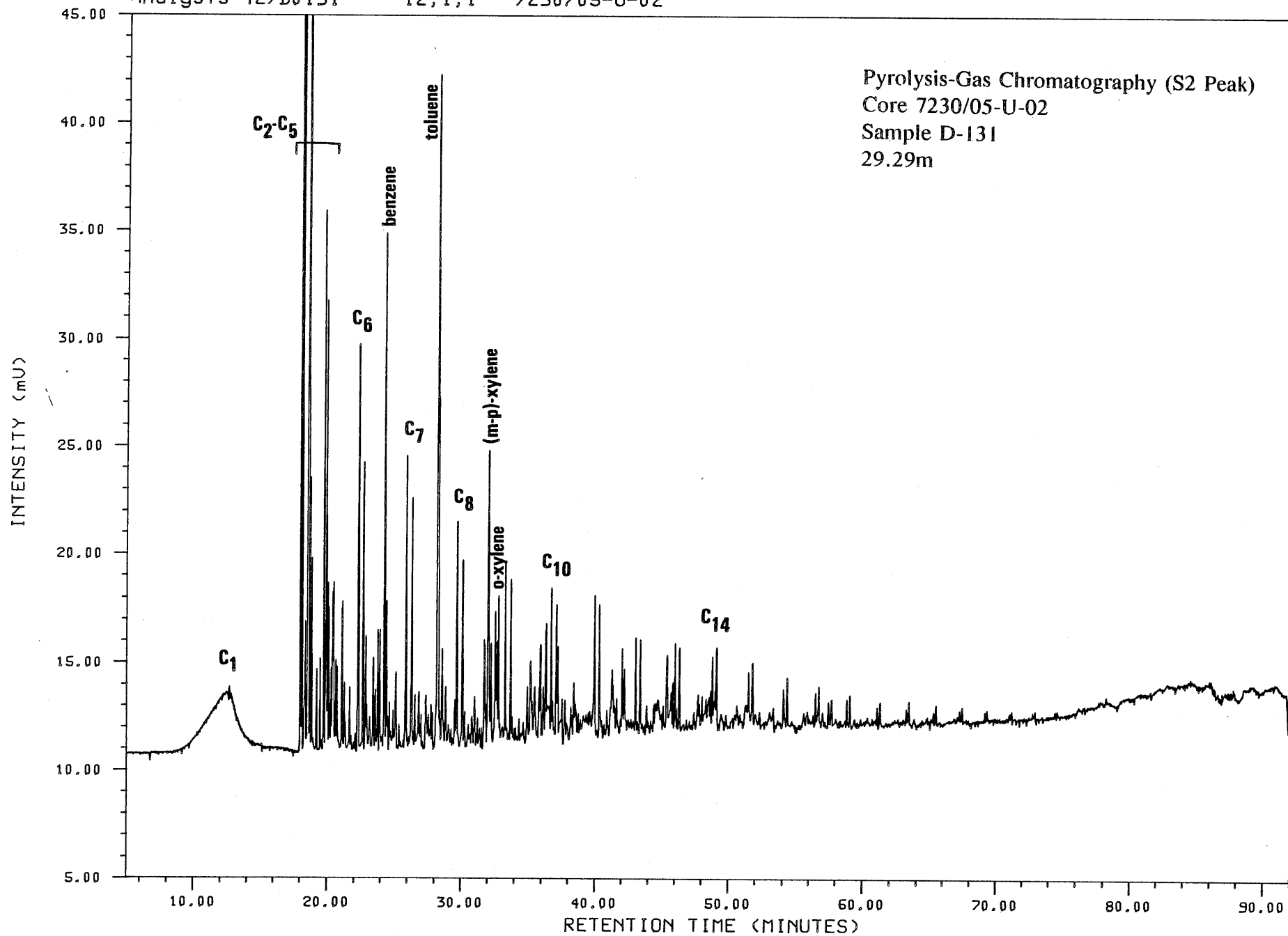
7230/05-U-02



Analysis 427D0131

12,1,1

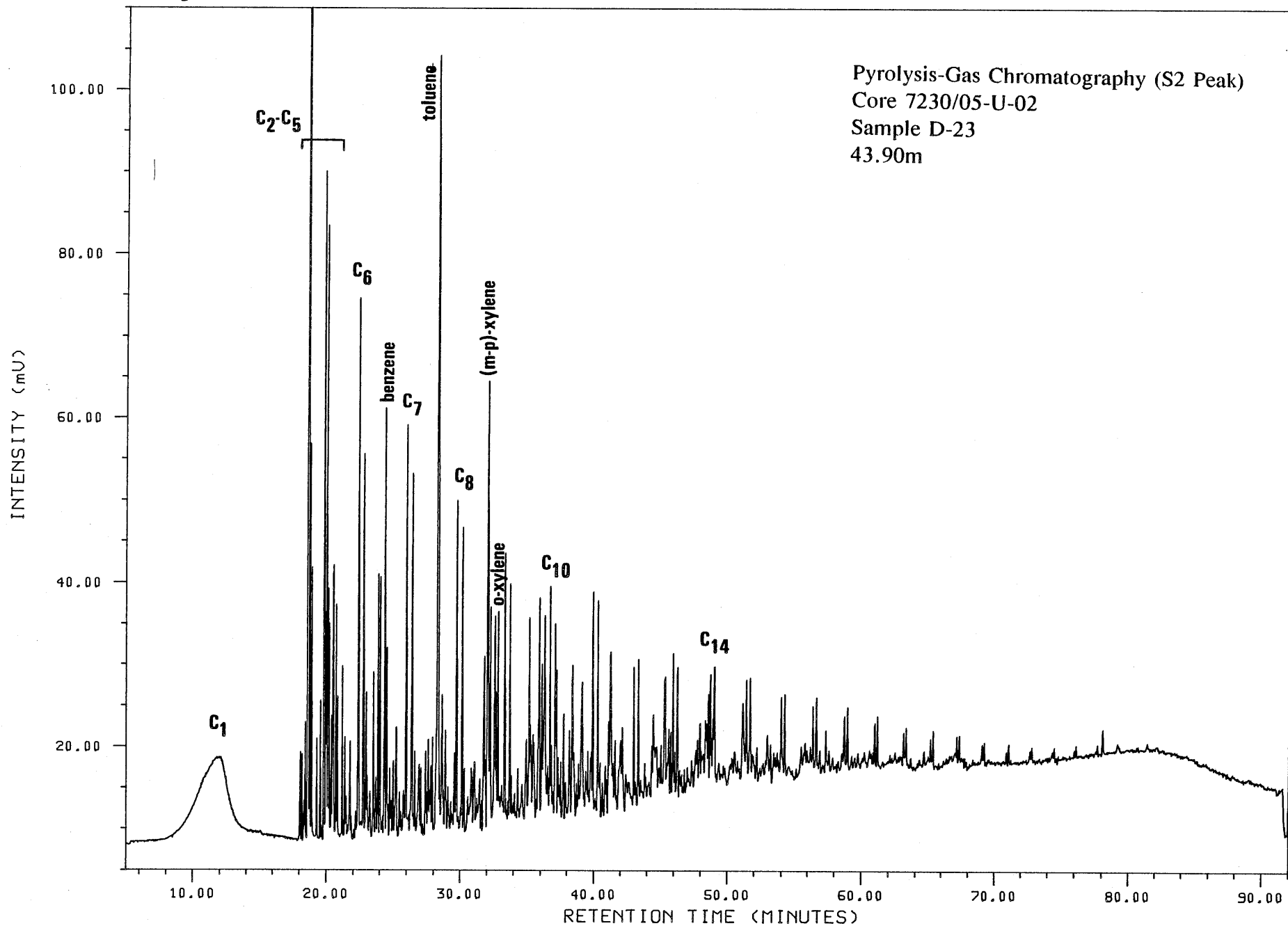
7230/05-U-02



Analysis 427D0023

12,1,1

7230/05-U-02



Analysis 427D0009

12,1,1

7230/05-U-02

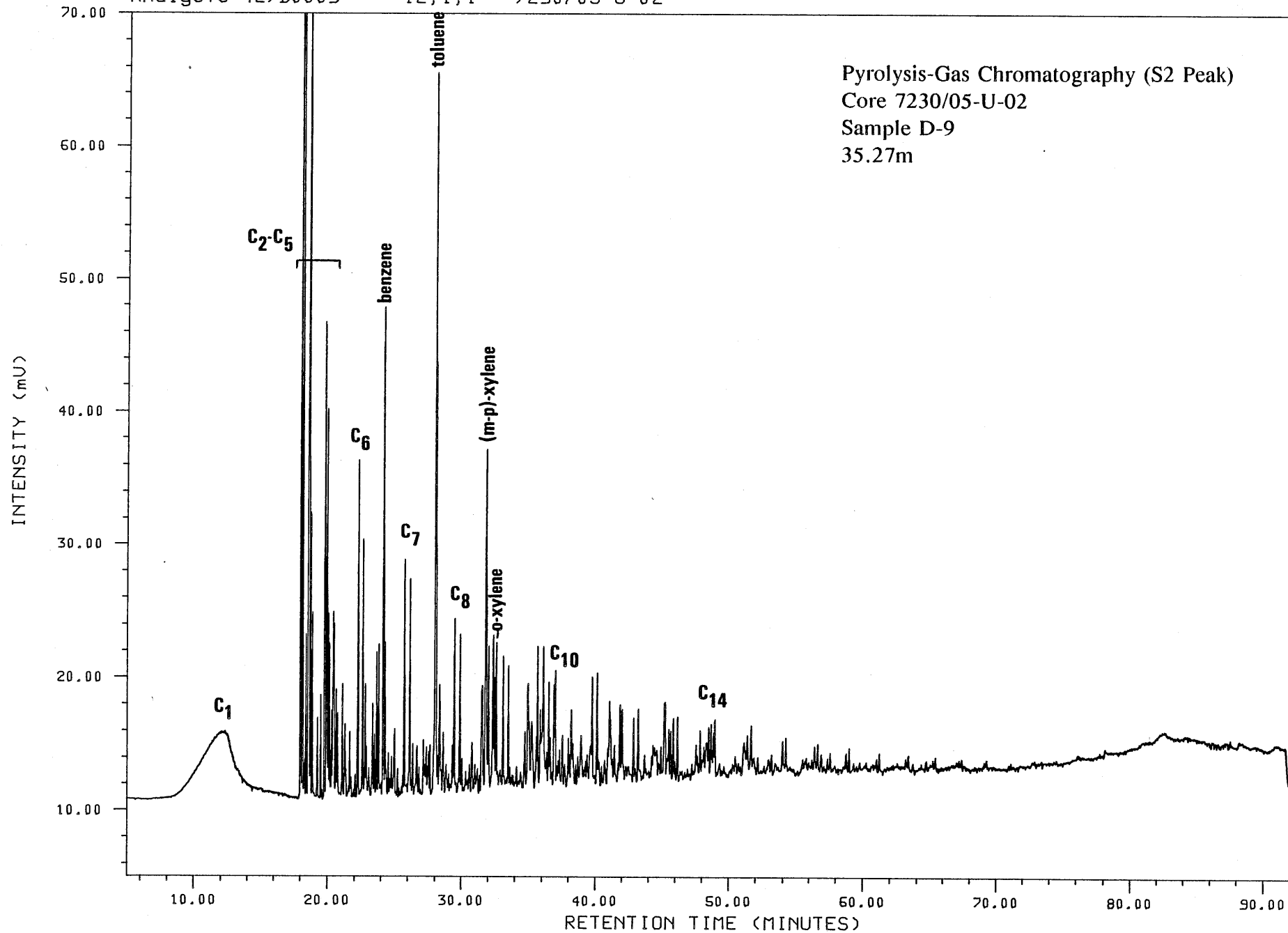


Figure A.II.8.2:

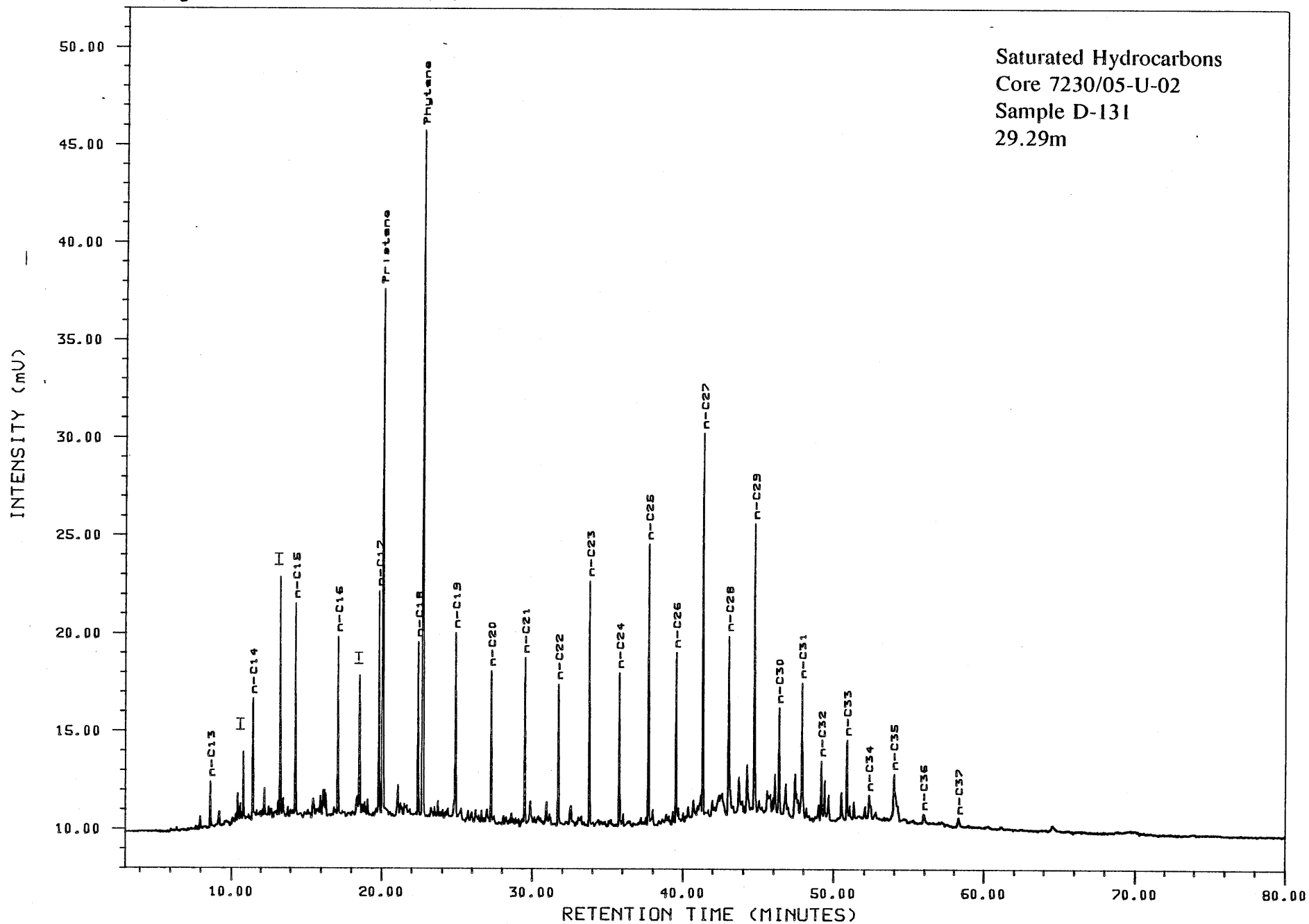
Saturated hydrocarbon gas chromatograms

n-C ₁₅ etc.	- n-alkanes
Pr	- pristane
Ph	- phytane
I	- other acyclic isoprenoids
*	- contamination

Analysis 427D0131

3,1,1

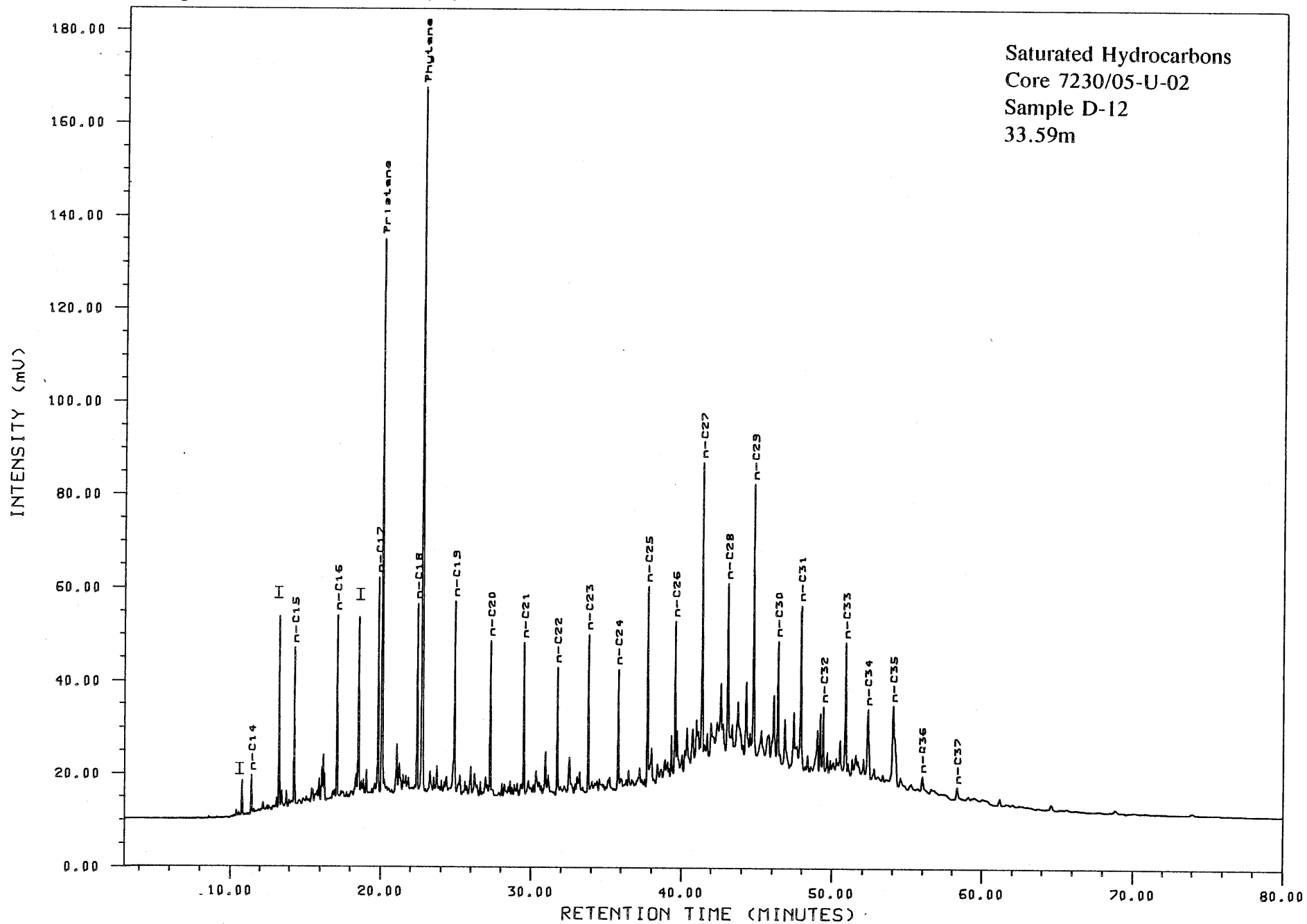
7230/05-U-02



Analysis 427D0012S

3,1,1

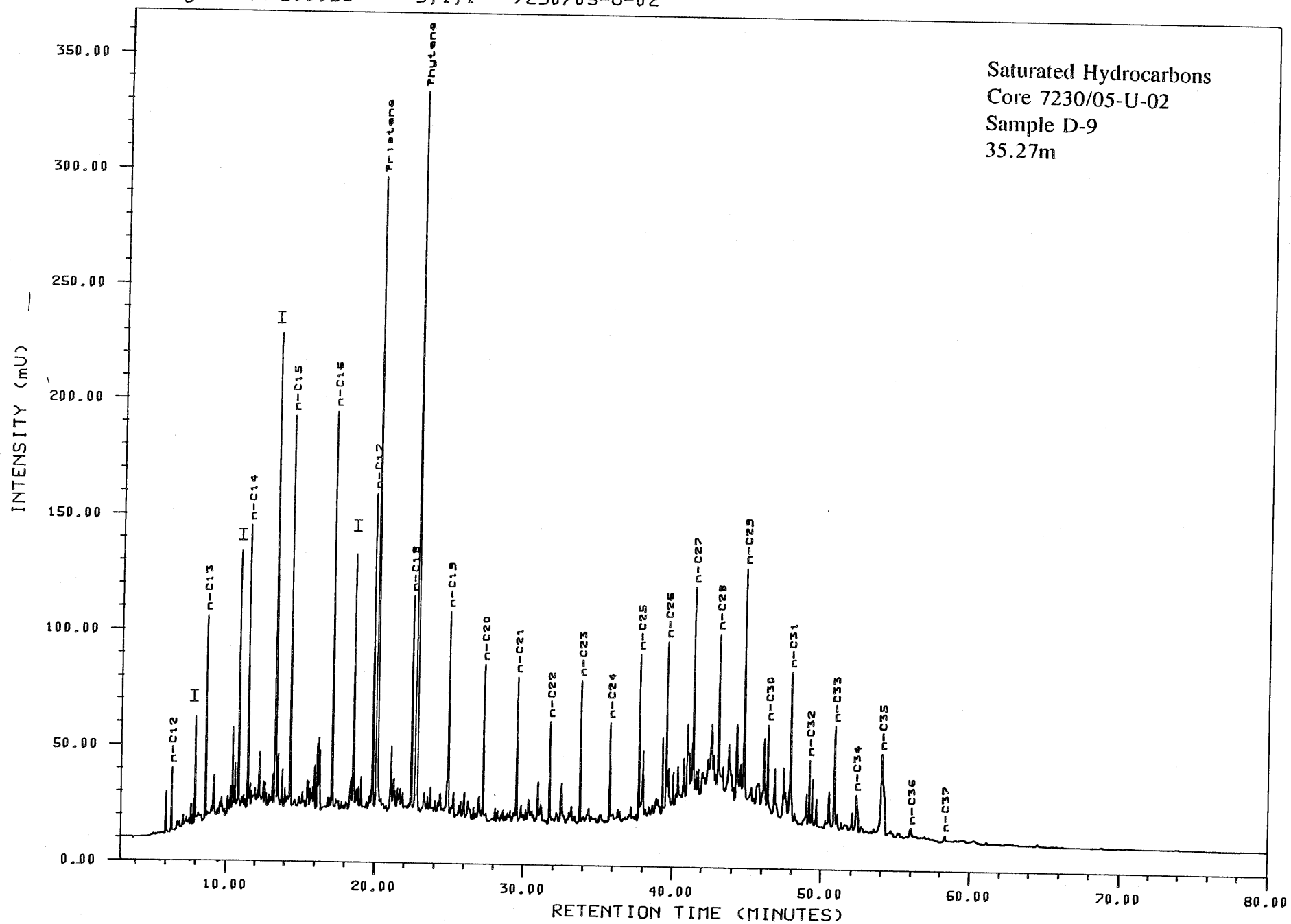
7230/05-U-02



Analysis 427D0009S

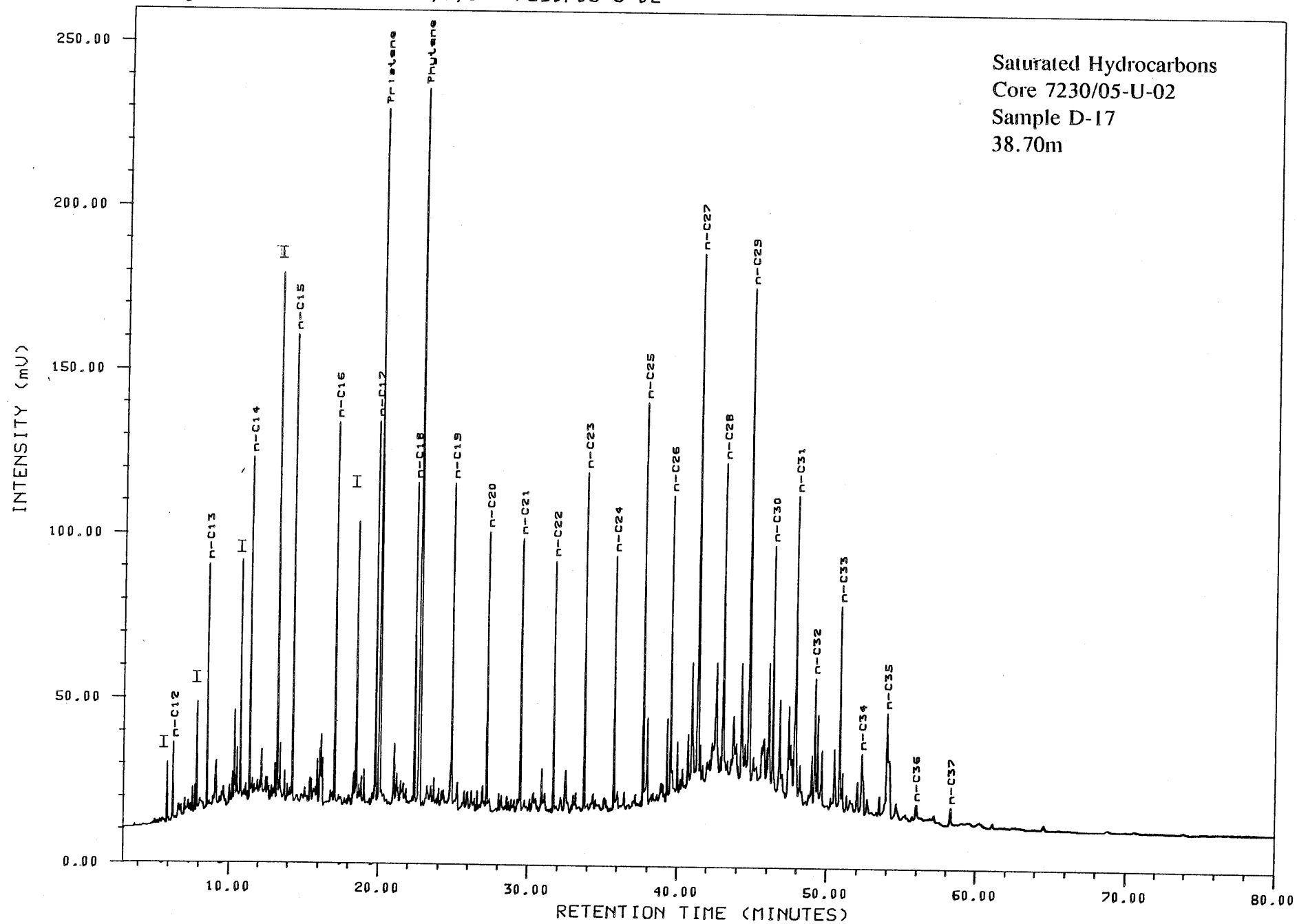
3,1,1

7230/05-U-02



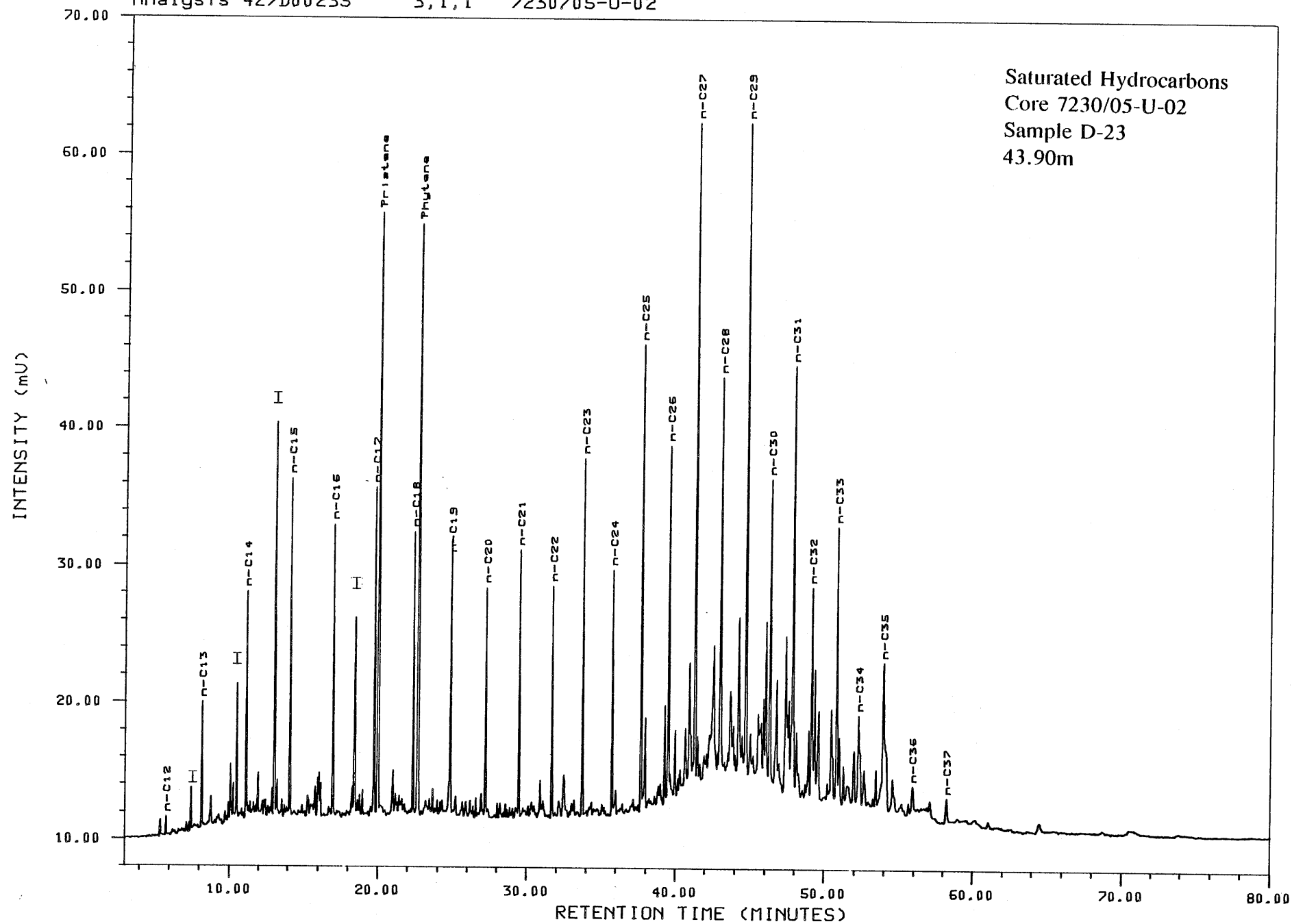
Analysis 427D0017S

3,1,1 7230/05-U-02



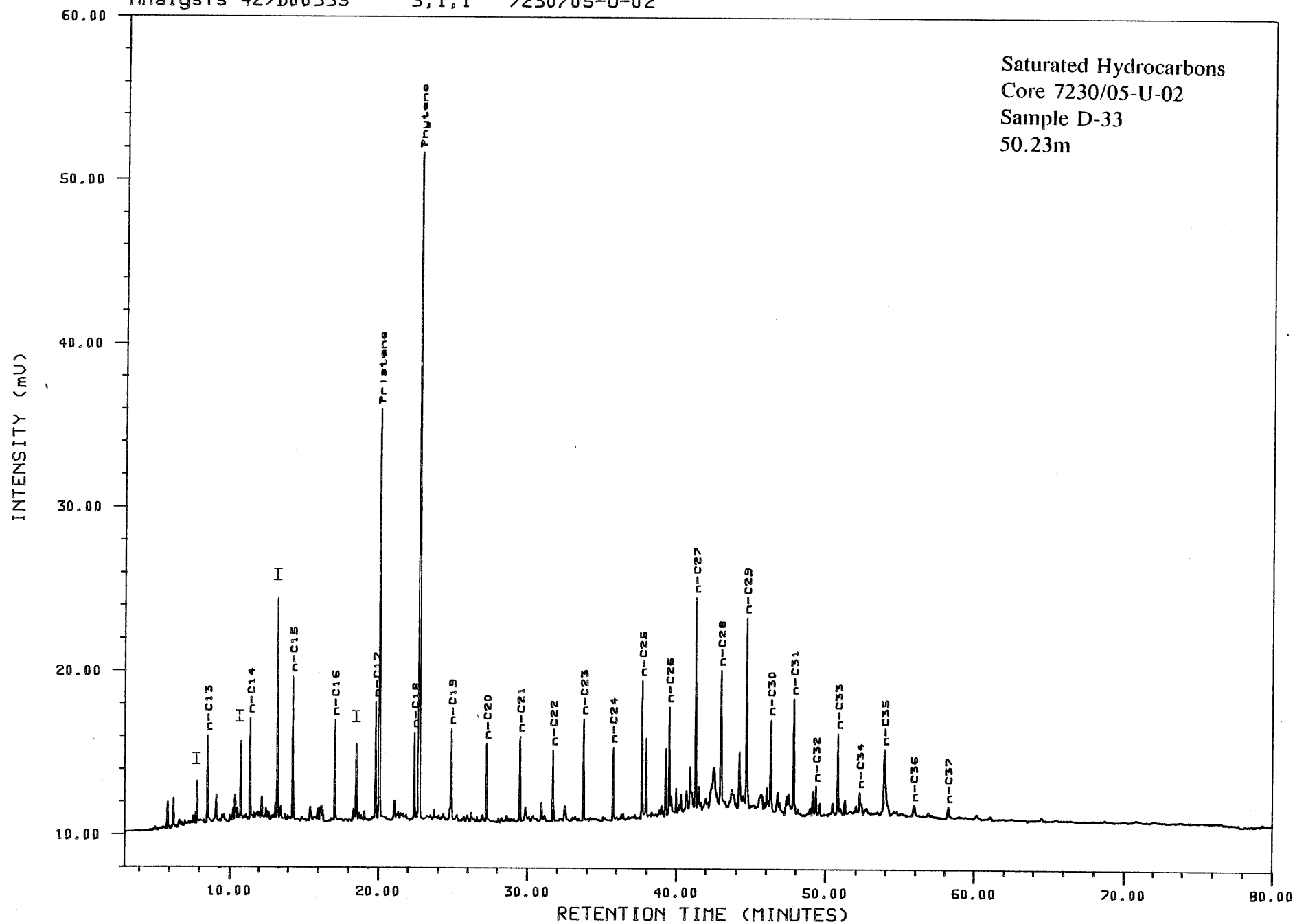
Analysis 427D0023S

3,1,1 7230/05-U-02



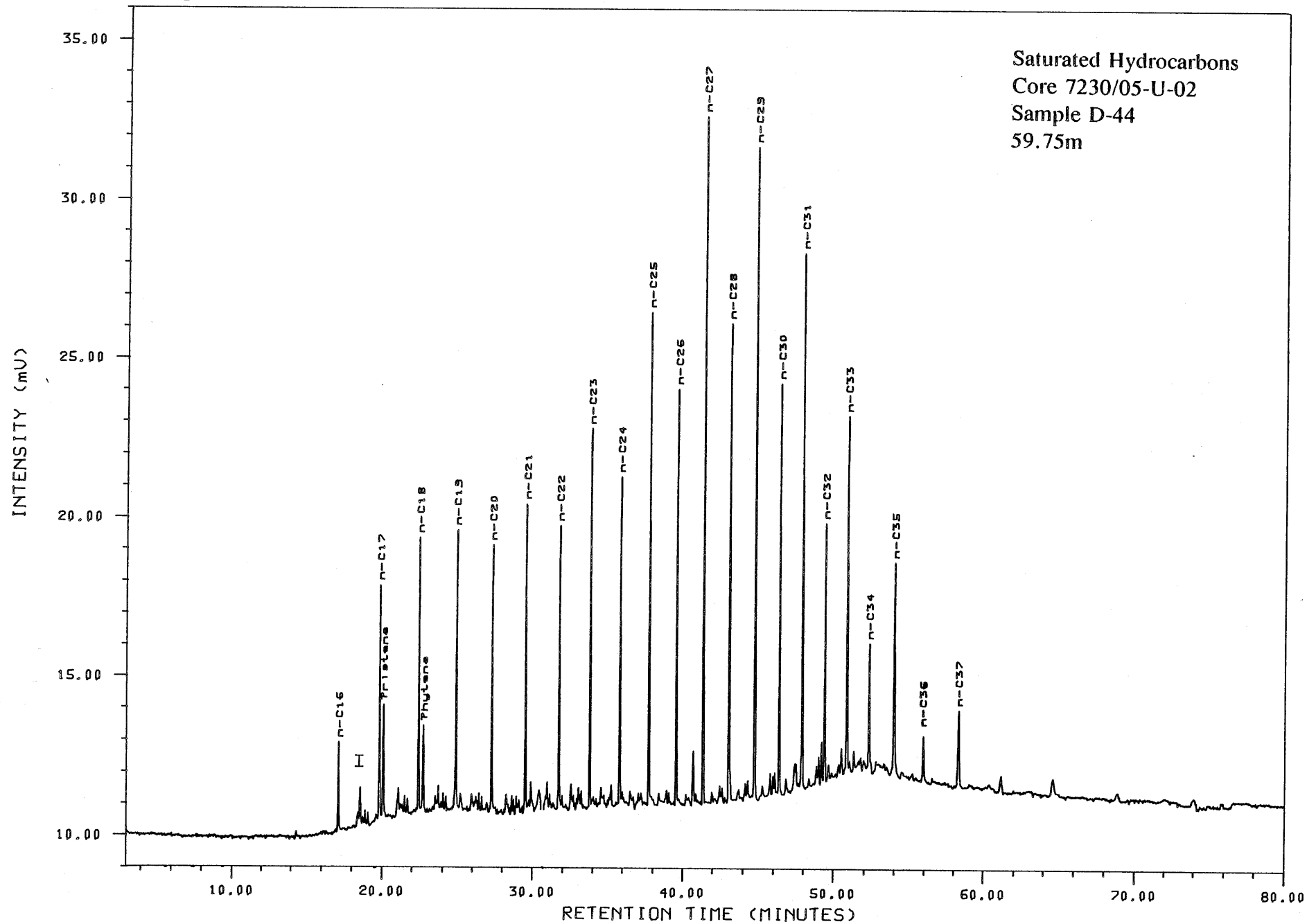
Analysis 427D0033S

3,1,1 7230/05-U-02



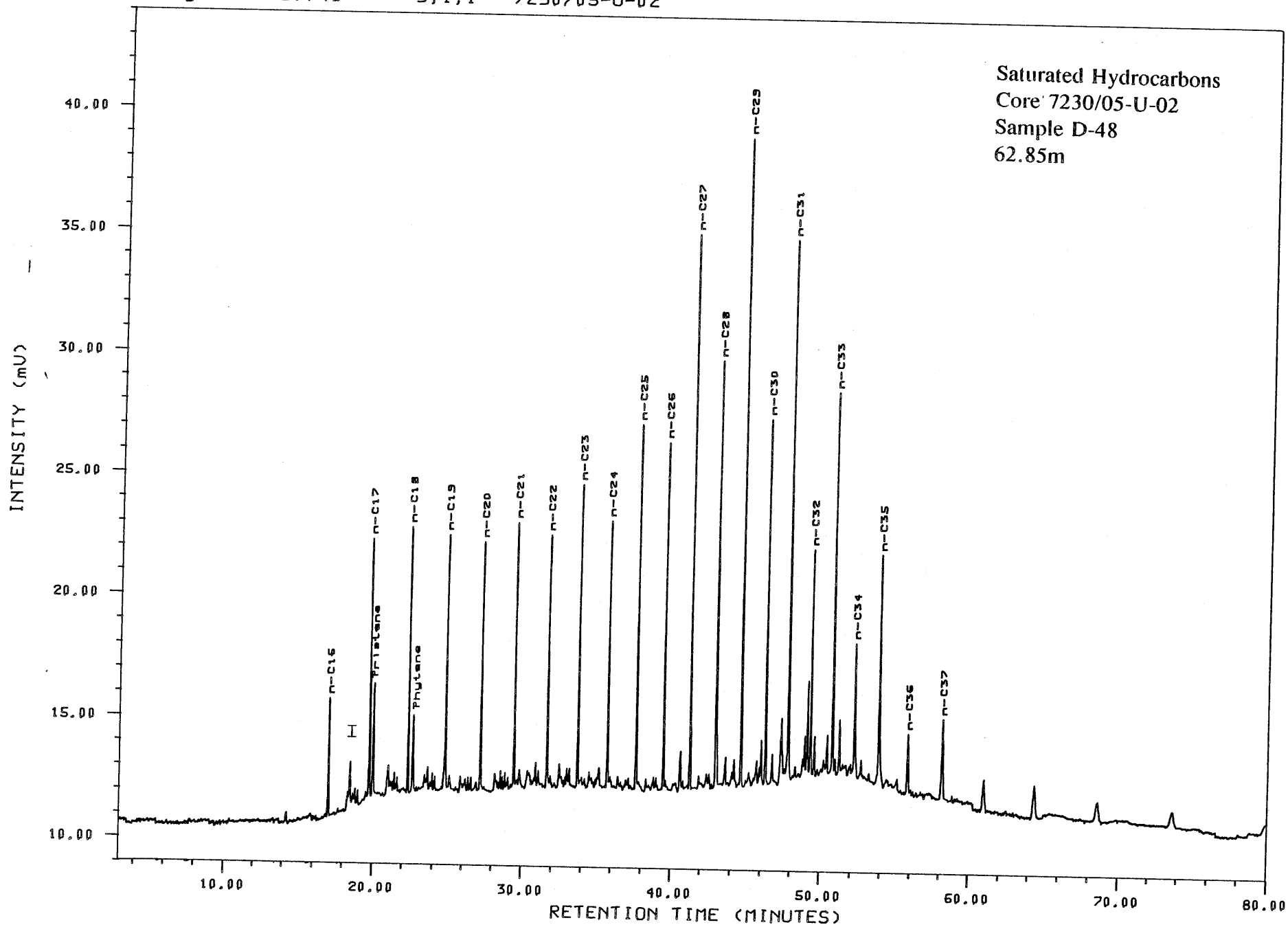
Analysis 427D0044S

3,1,1 7230/05-U-02



Analysis 427D0048

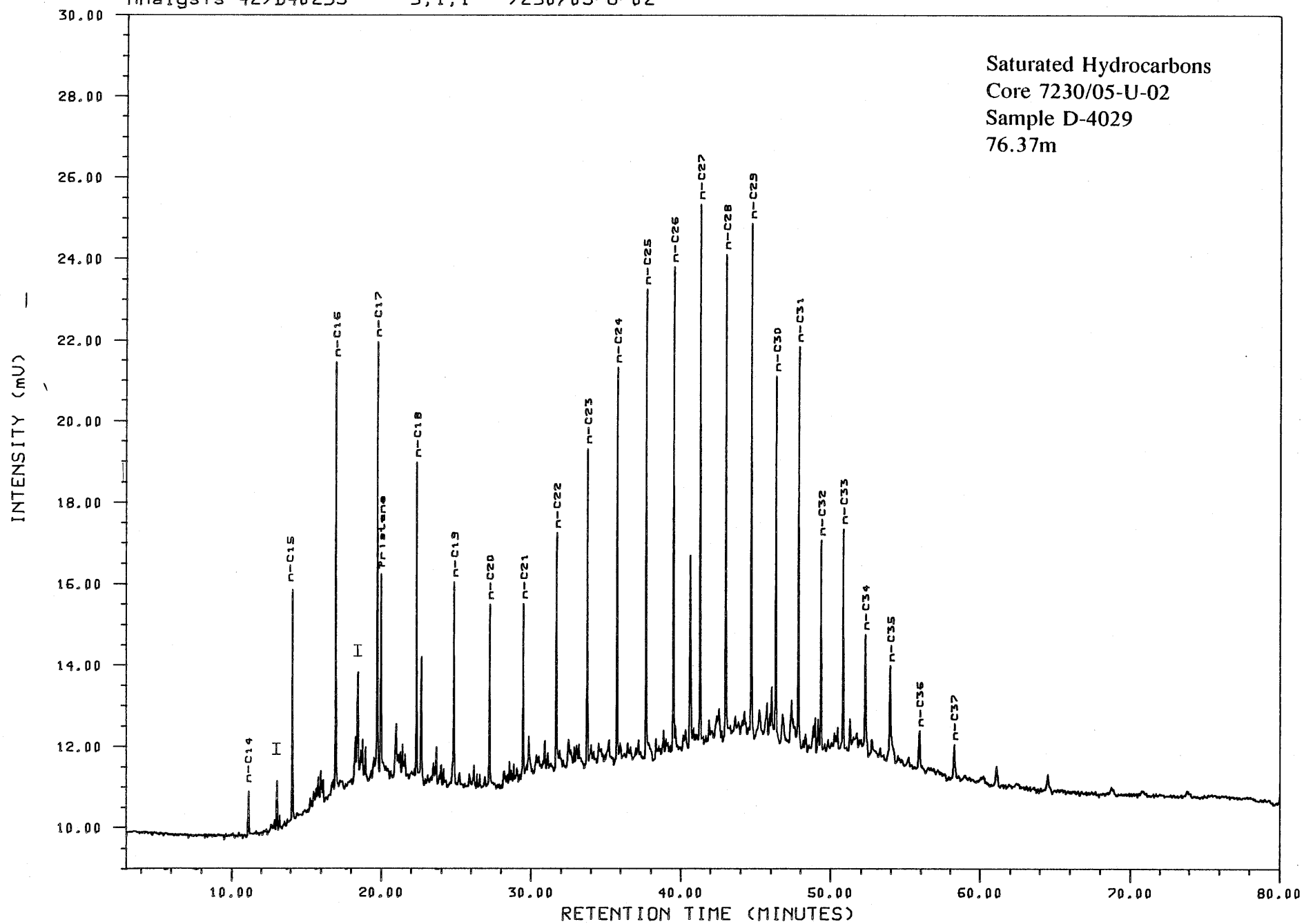
3,1,1 7230/05-U-02



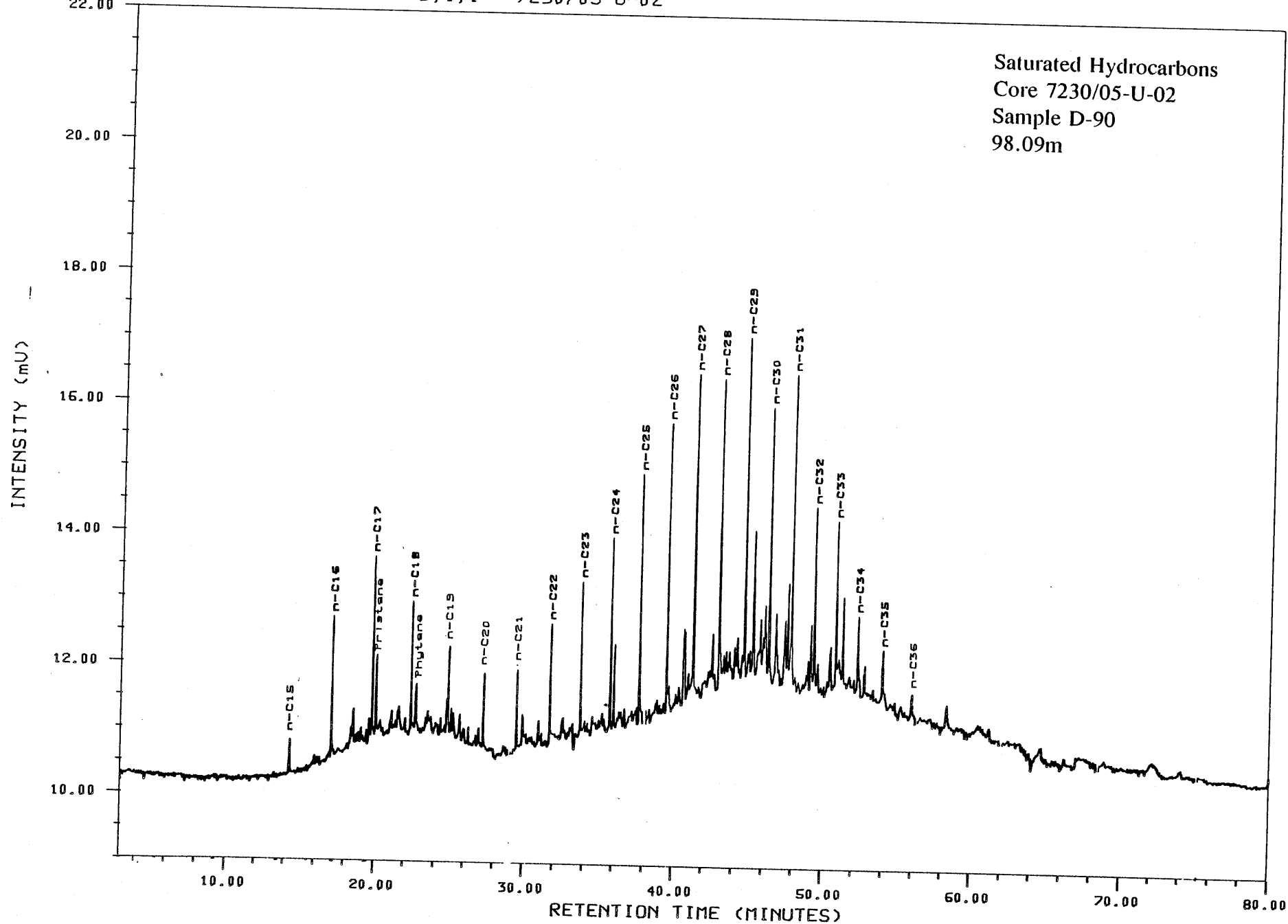
Analysis 427D4029S

3,1,1

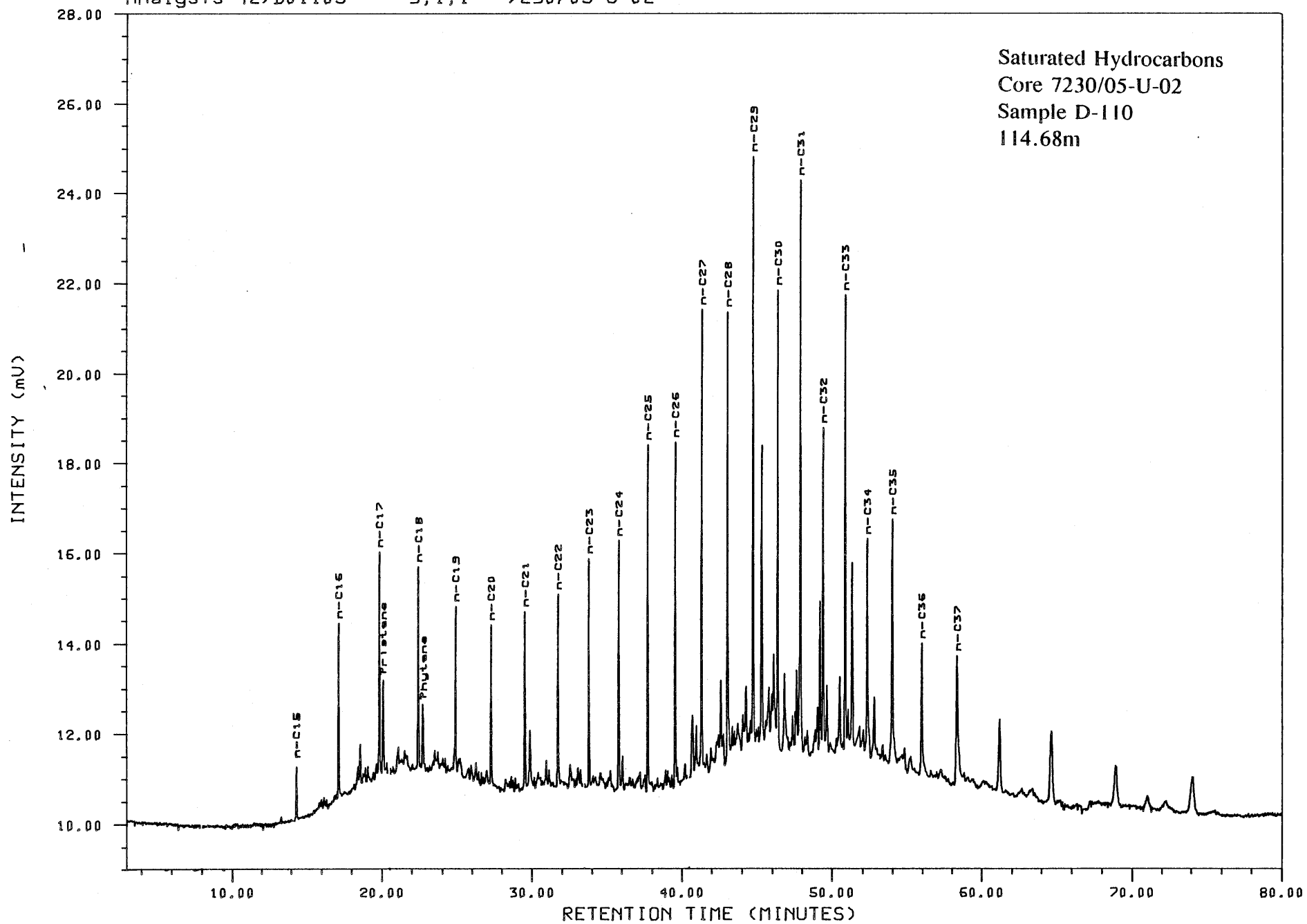
7230/05-U-02



Analysis 427D0090S 3,1,1 7230/05-U-02



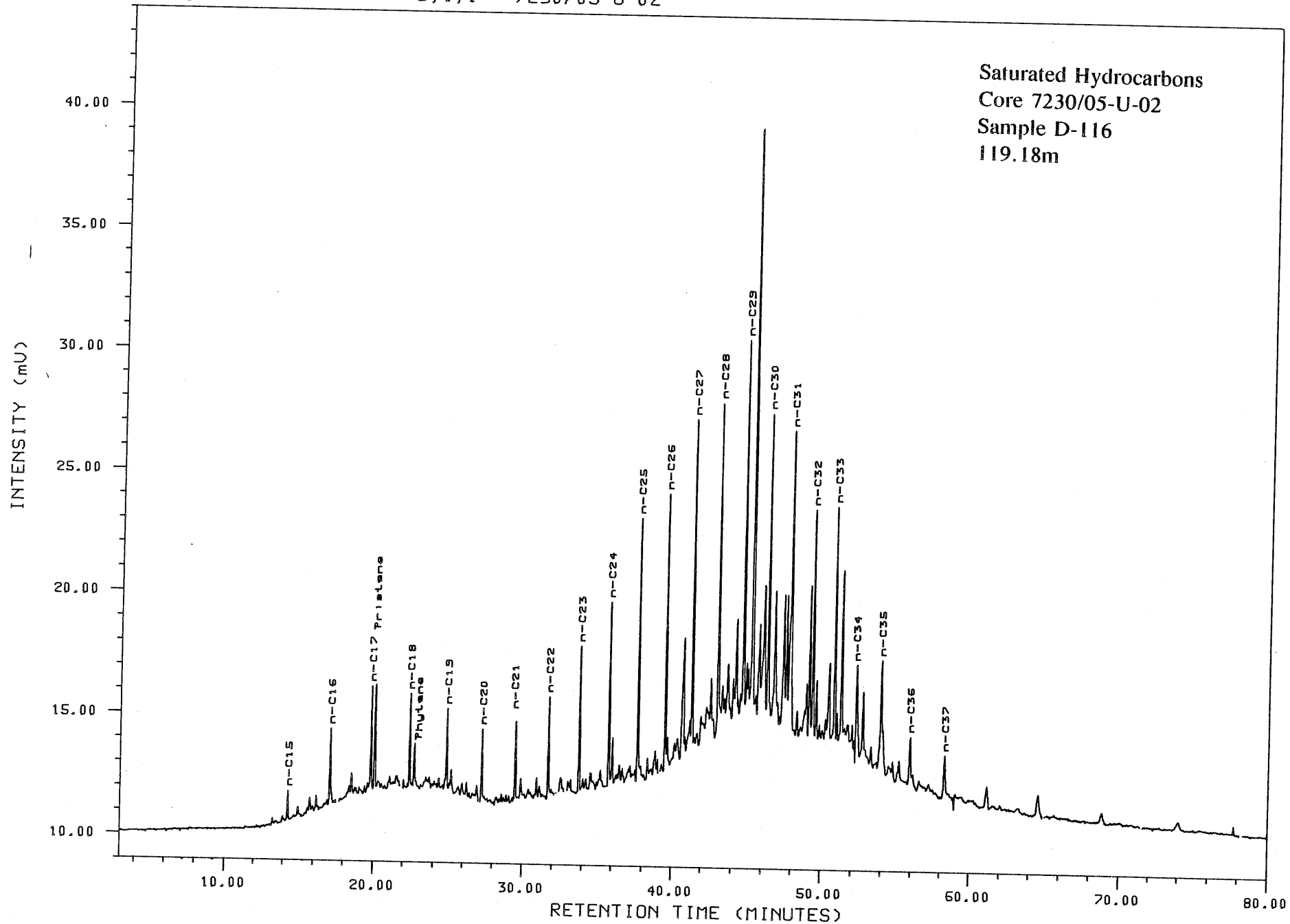
Analysis 427D0110S 3,1,1 7230/05-U-02



Analysis 427D0116S

3,1,1

7230/05-U-02



Analysis 427D4034S

3,1,1

7230/05-U-02

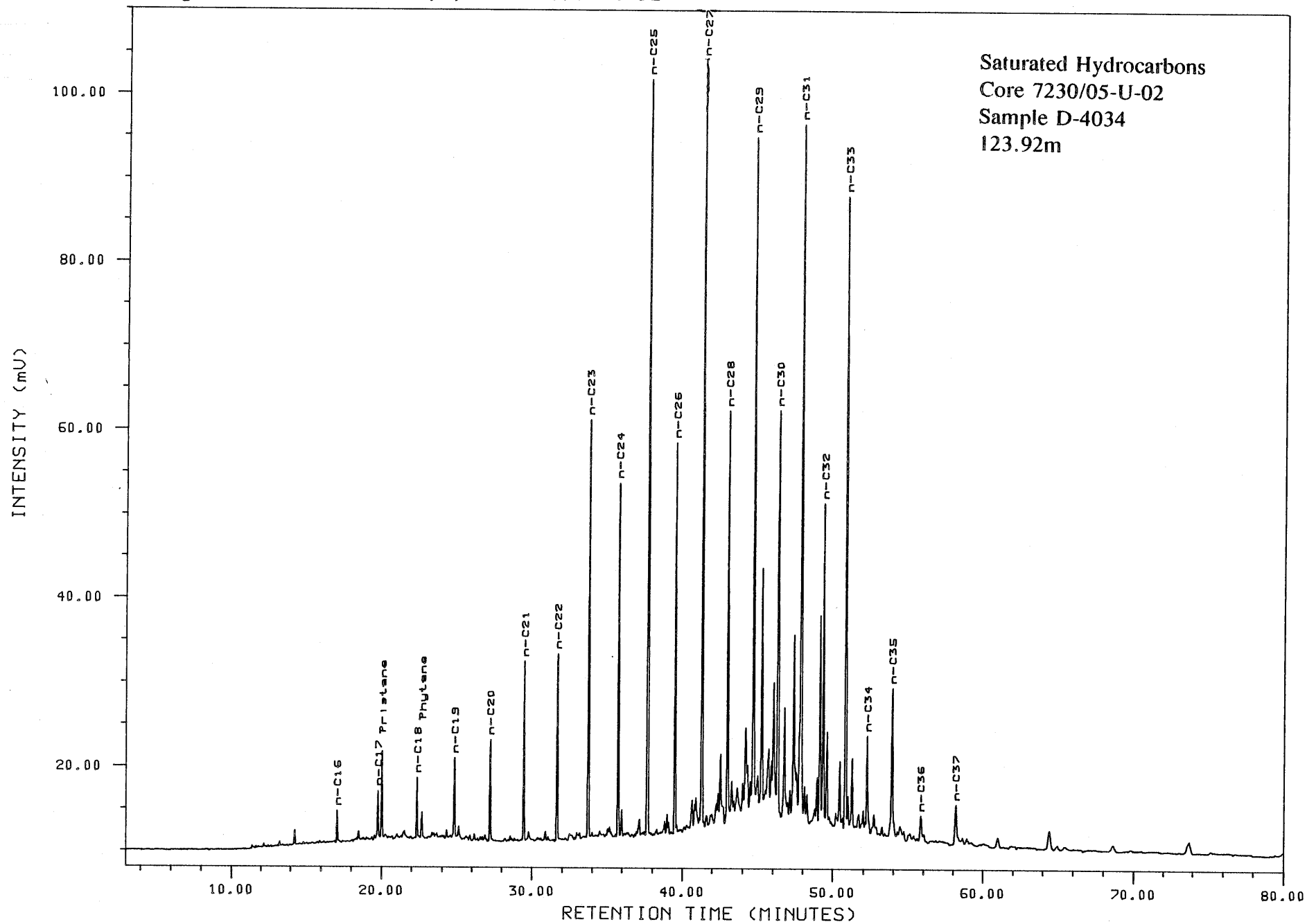


Figure A.II.8.3:

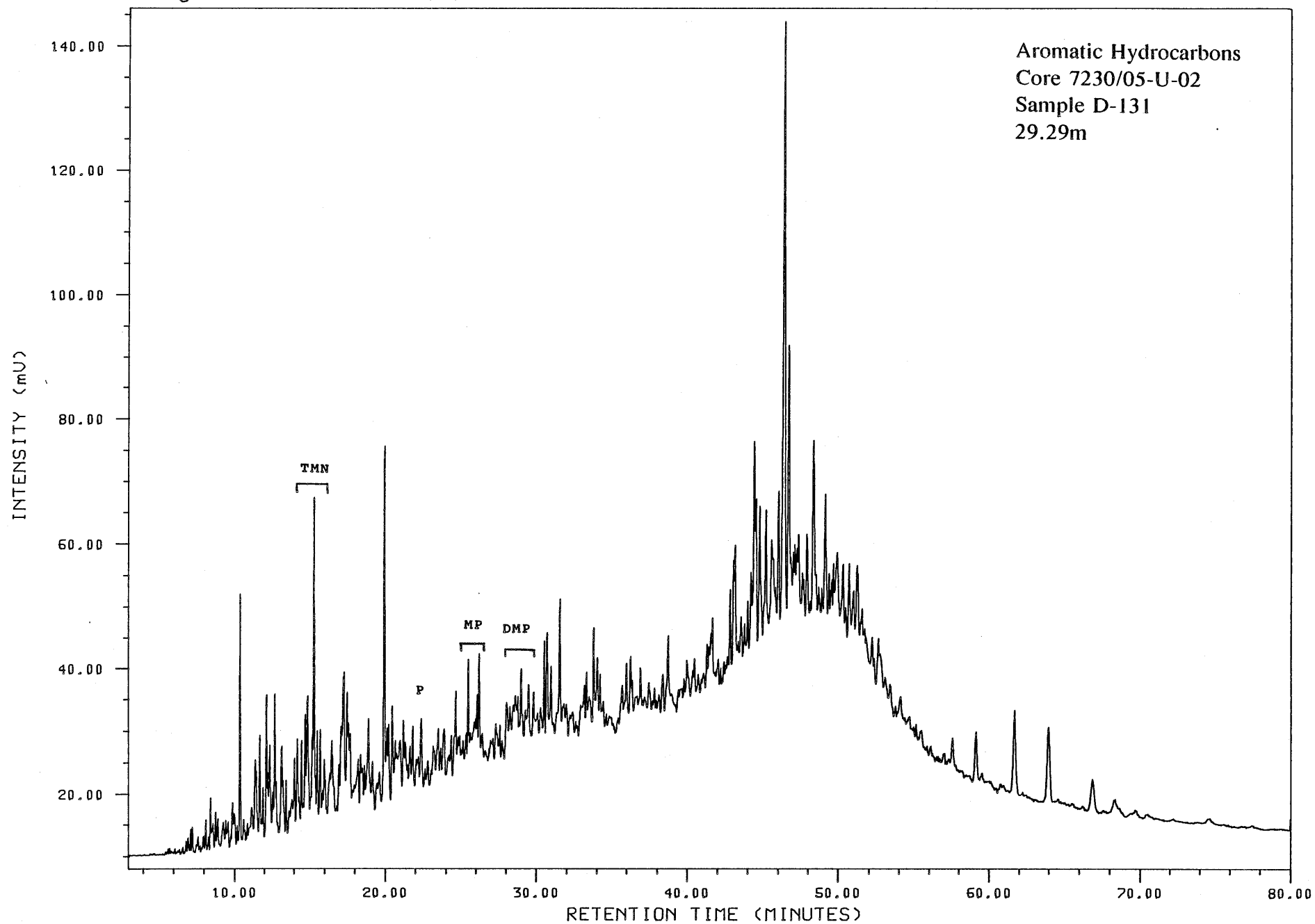
Aromatic hydrocarbon gas chromatograms

N	- Naphthalene
MN	- Methylnaphthalenes
DMN	- Dimethylnaphthalenes
TMN	- C ₃ -naphthalenes
P	- Phenanthrene
PN	- Methylphenanthrenes
DMP	- Dimethylphenanthrenes

Analysis 427D0131A

2,1,1

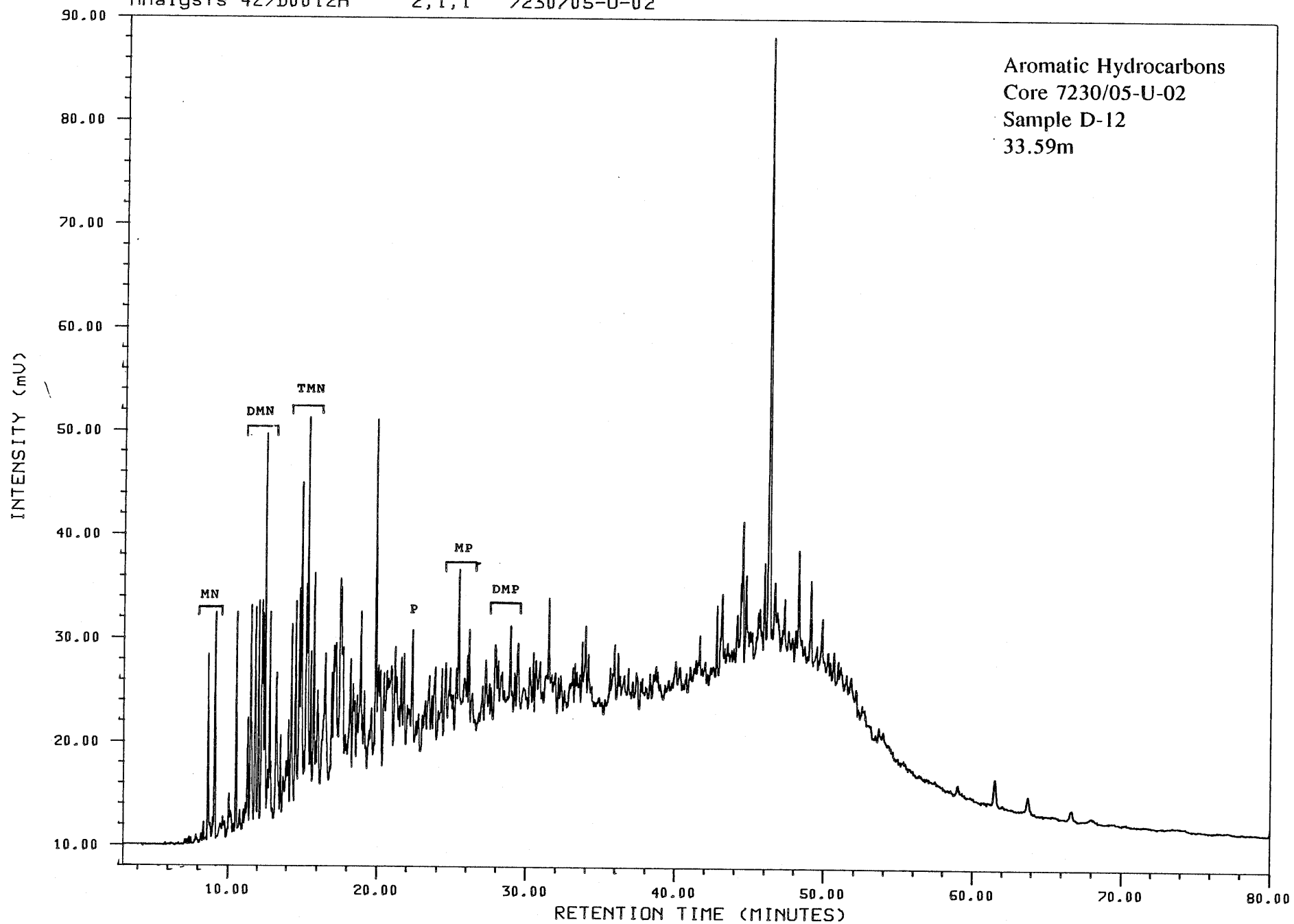
7230/05-U-02



Analysis 427D0012A

2,1,1

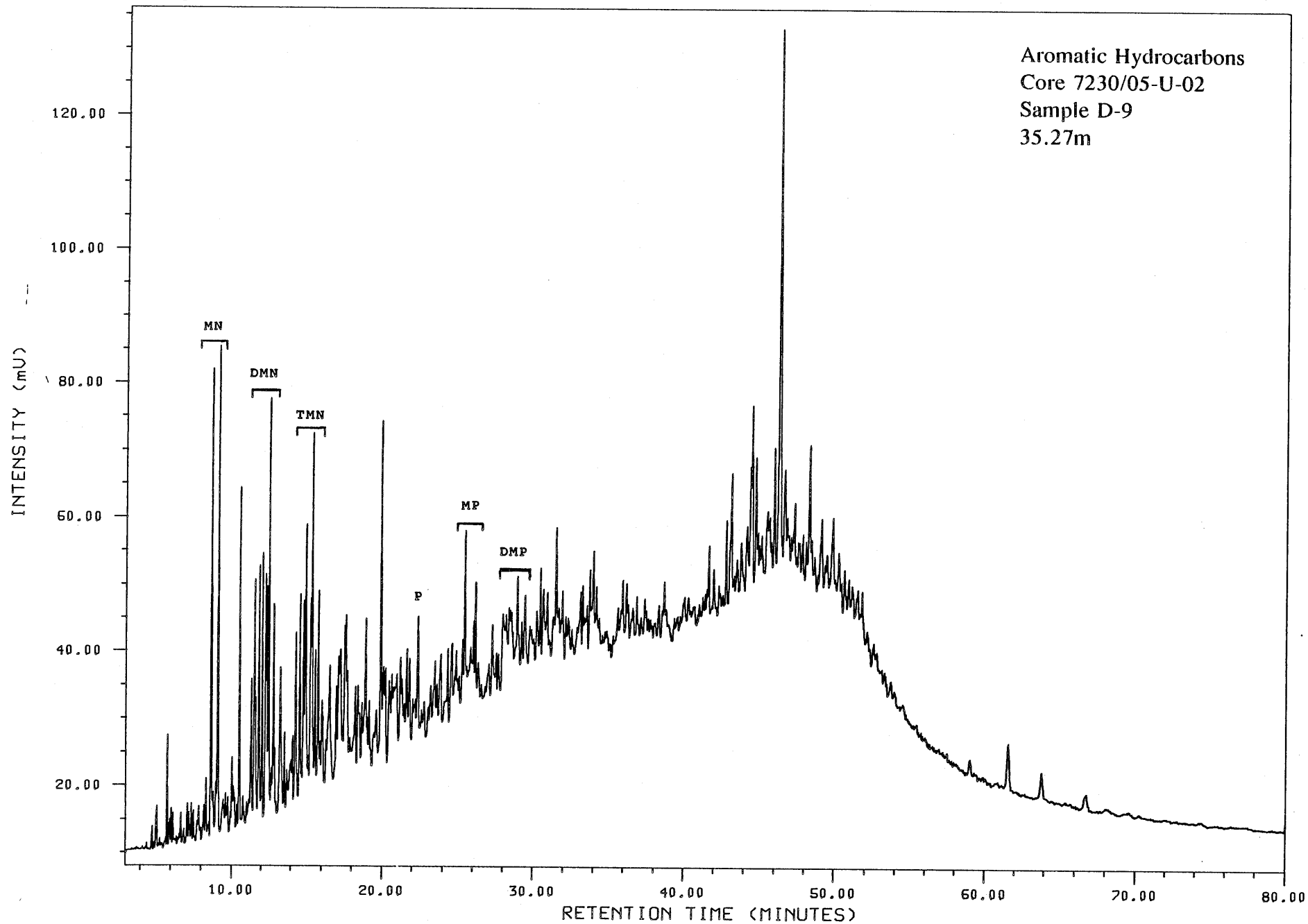
7230/05-U-02



Analysis 427D0009A

2,1,1

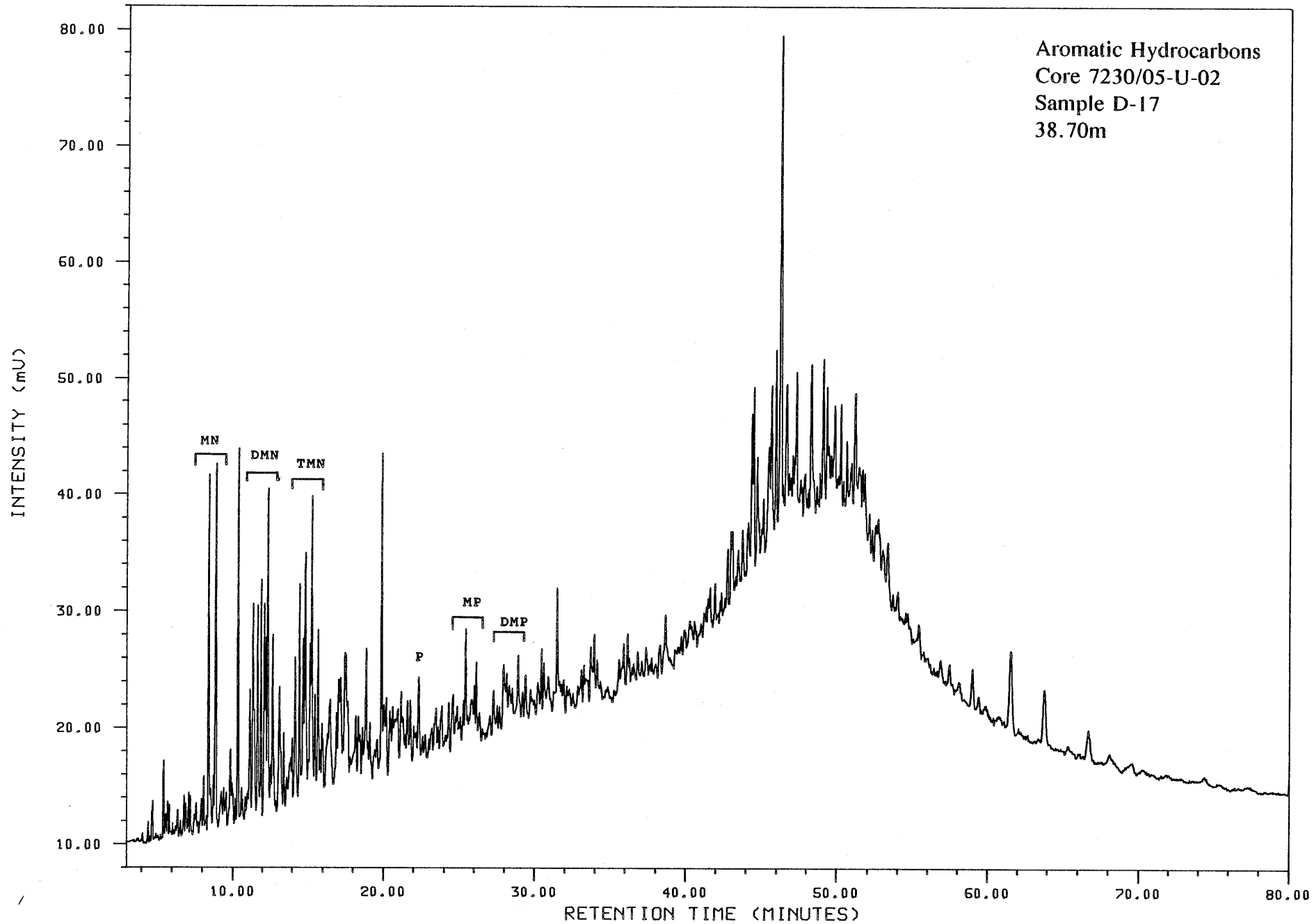
7230/05-U-02



Analysis 427D0017A

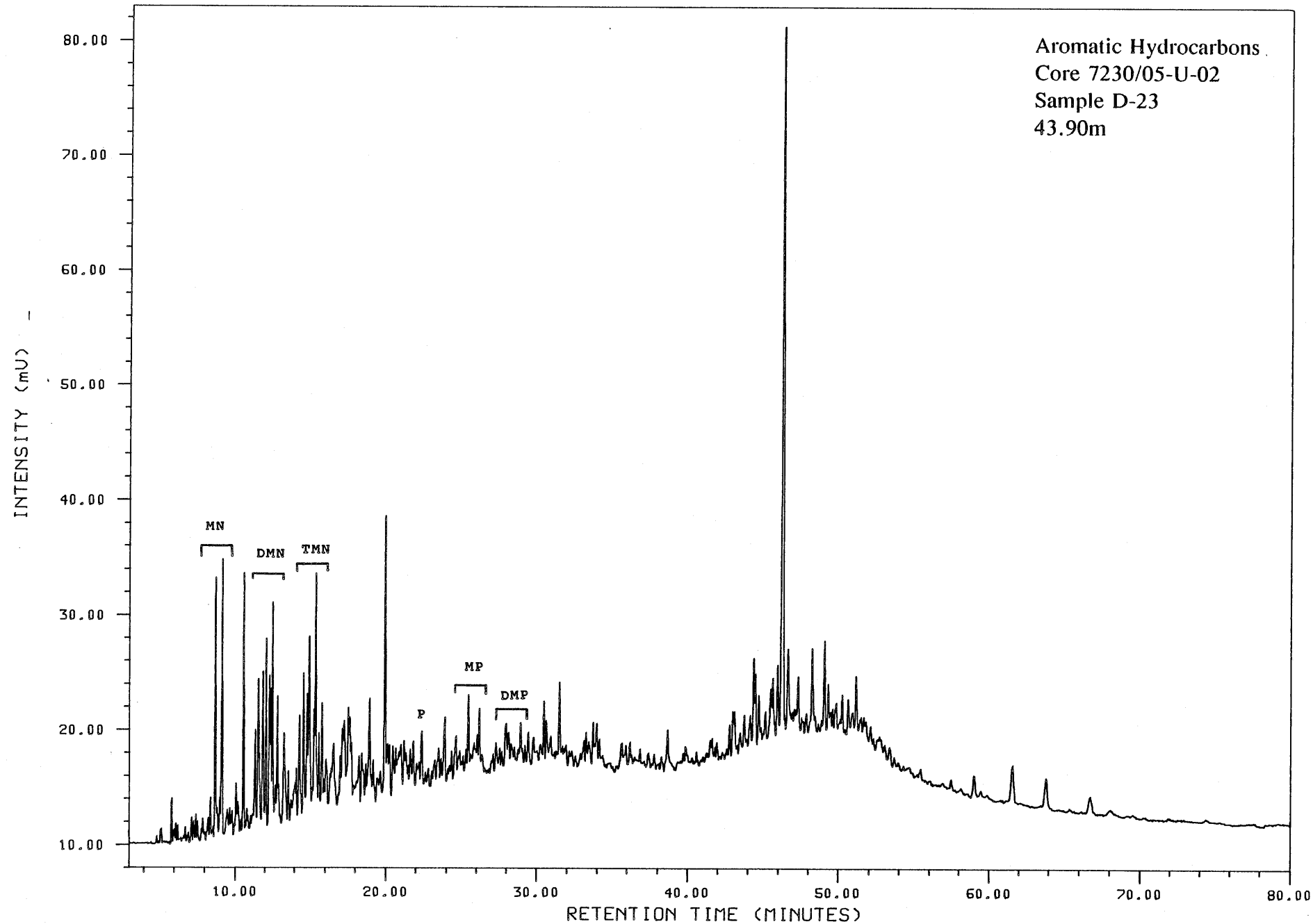
2,1,1

7230/05-U-02



Analysis 427D0023A

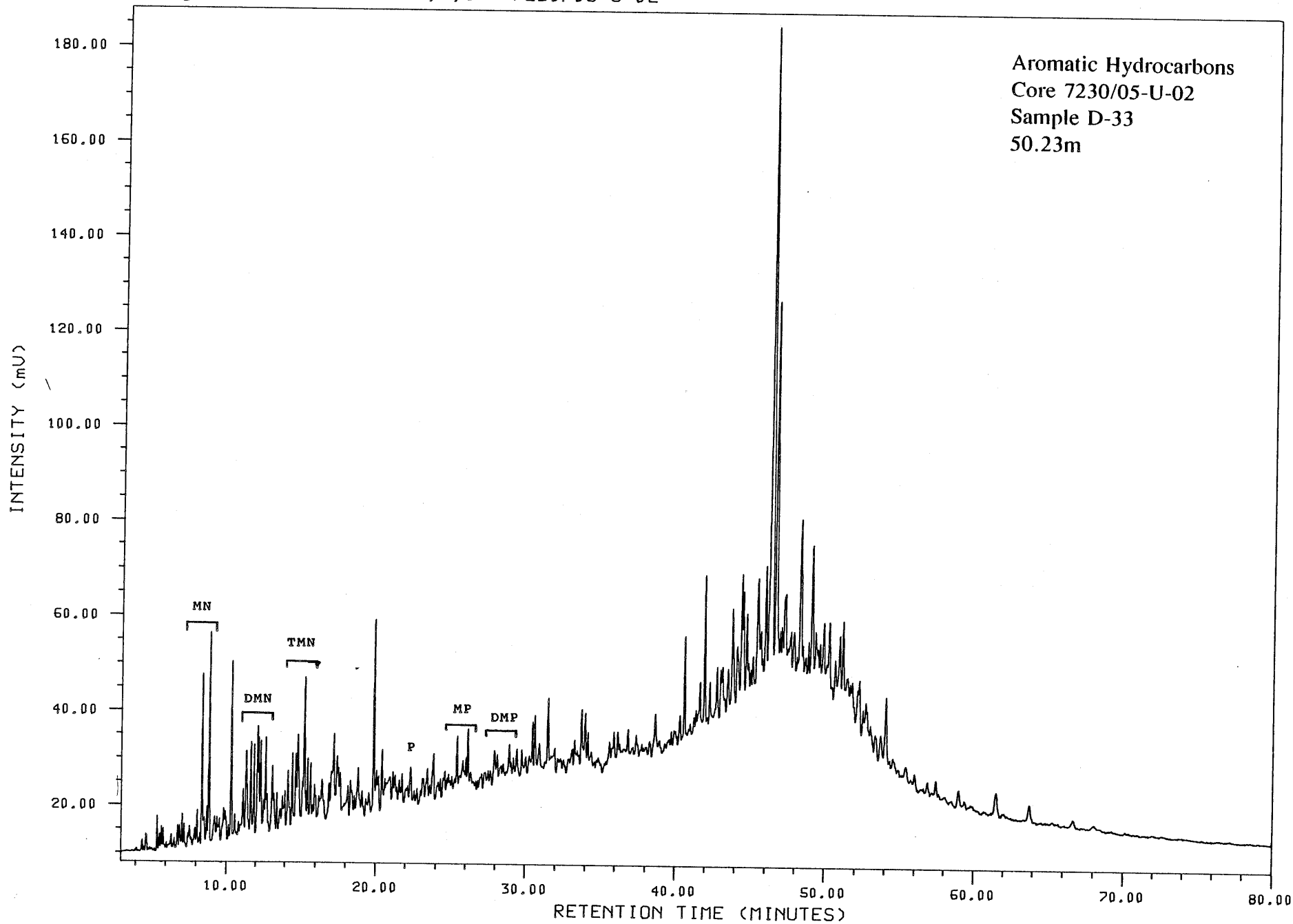
2,1,1 7230/05-U-02



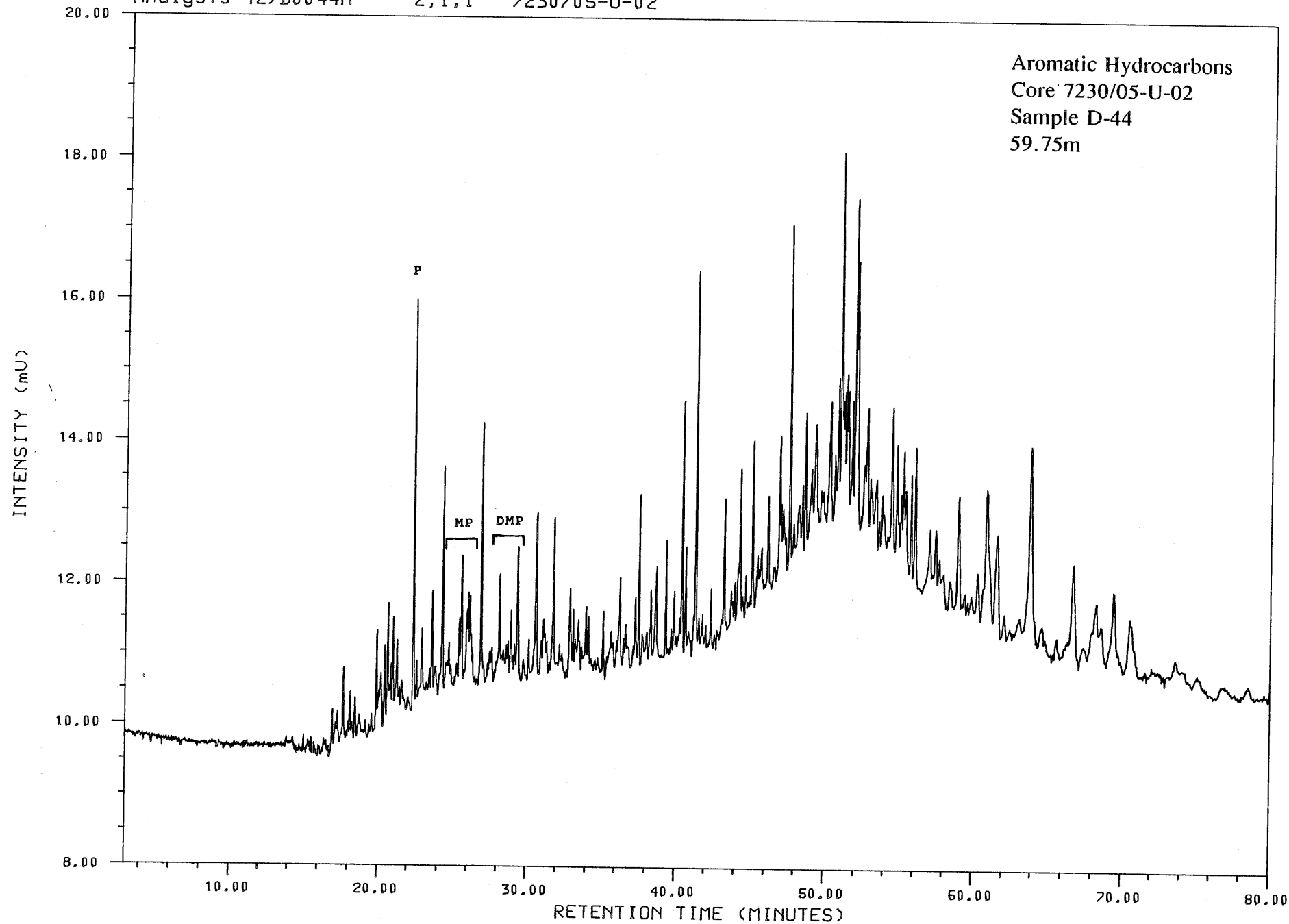
Analysis 427D0033A

2,1,1

7230/05-U-02



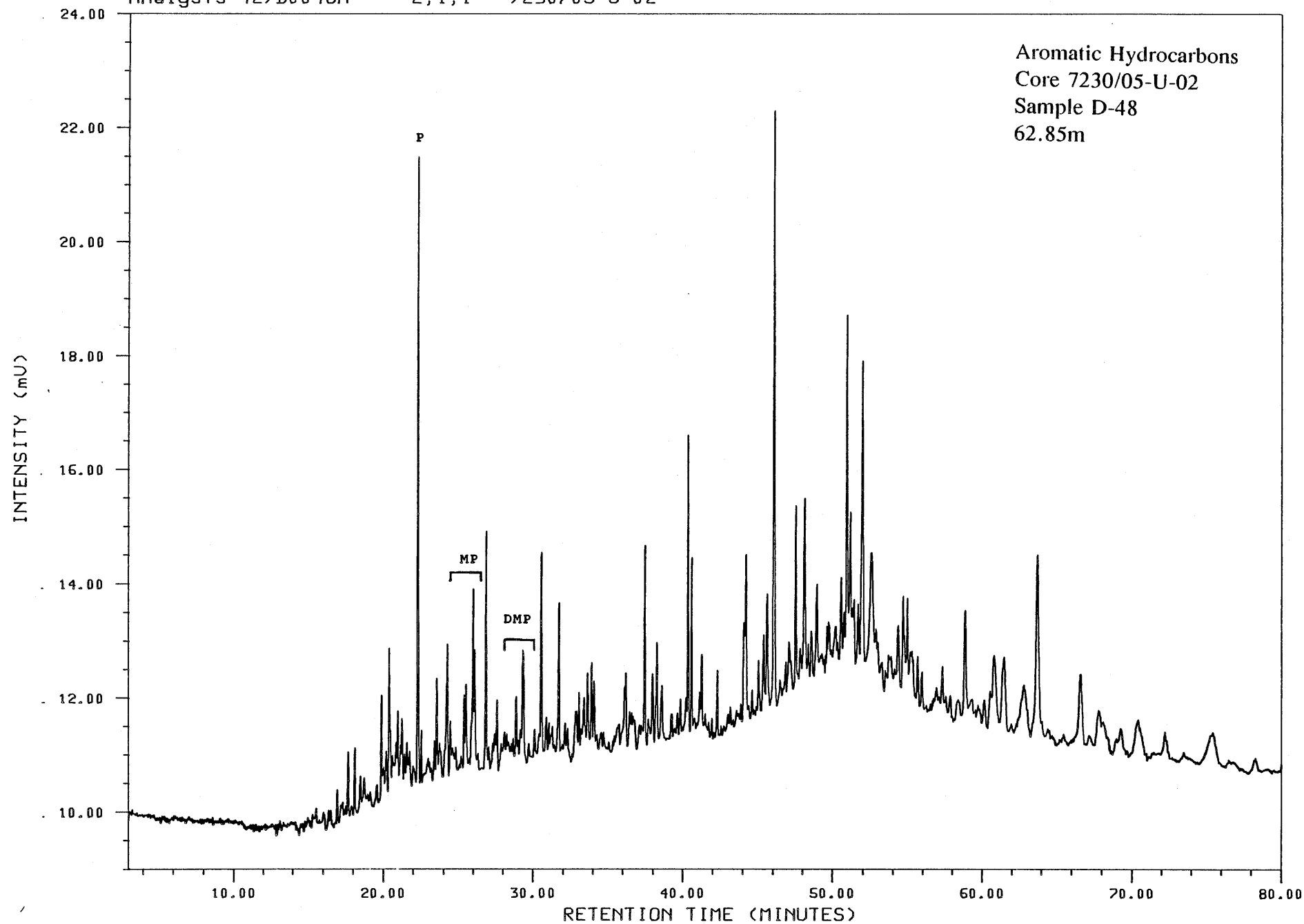
Analysis 427D0044A 2,1,1 7230/05-U-02



Analysis 427D0048A

2,1,1

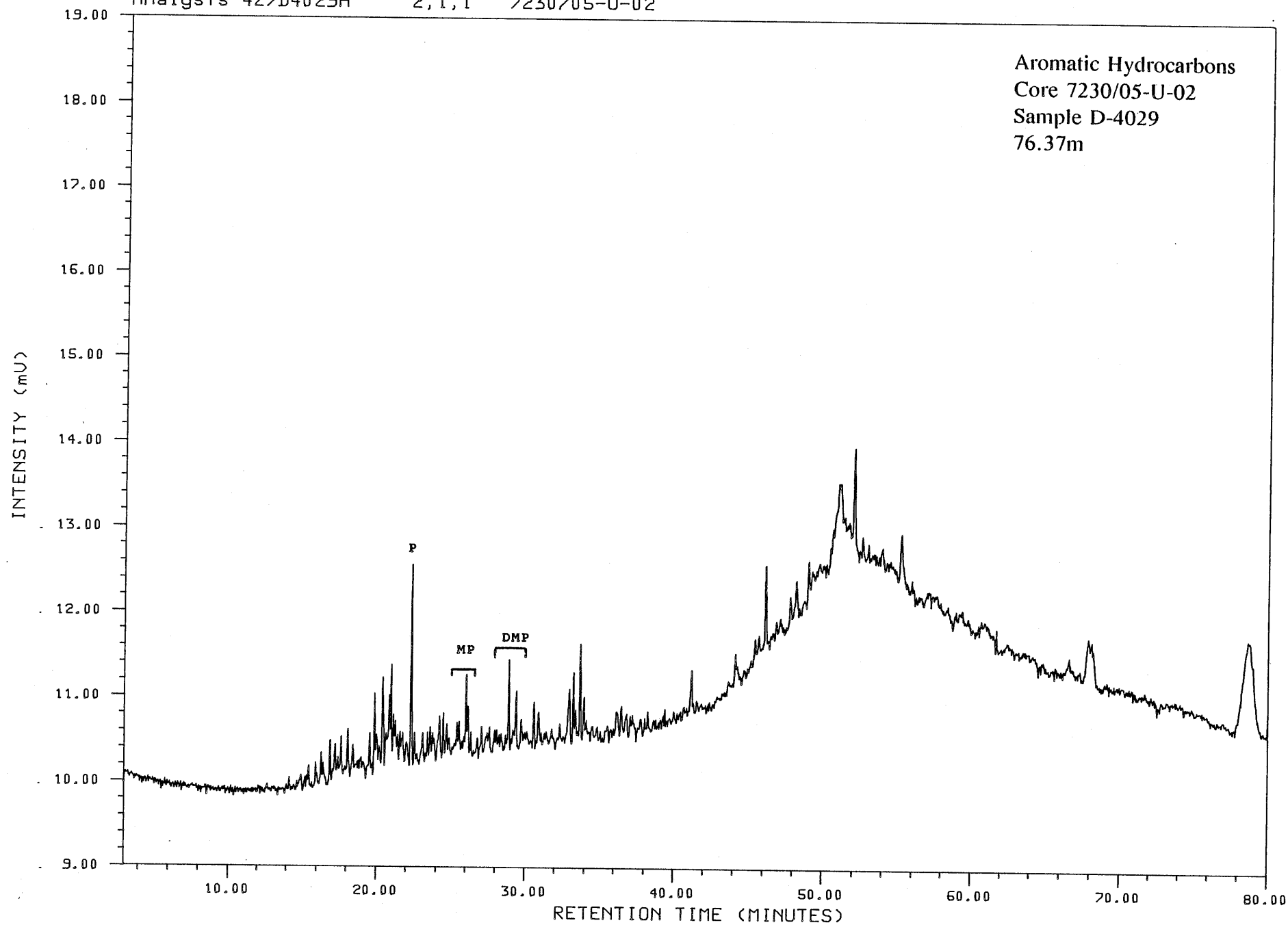
7230/05-U-02



Analysis 427D4029A

2,1,1

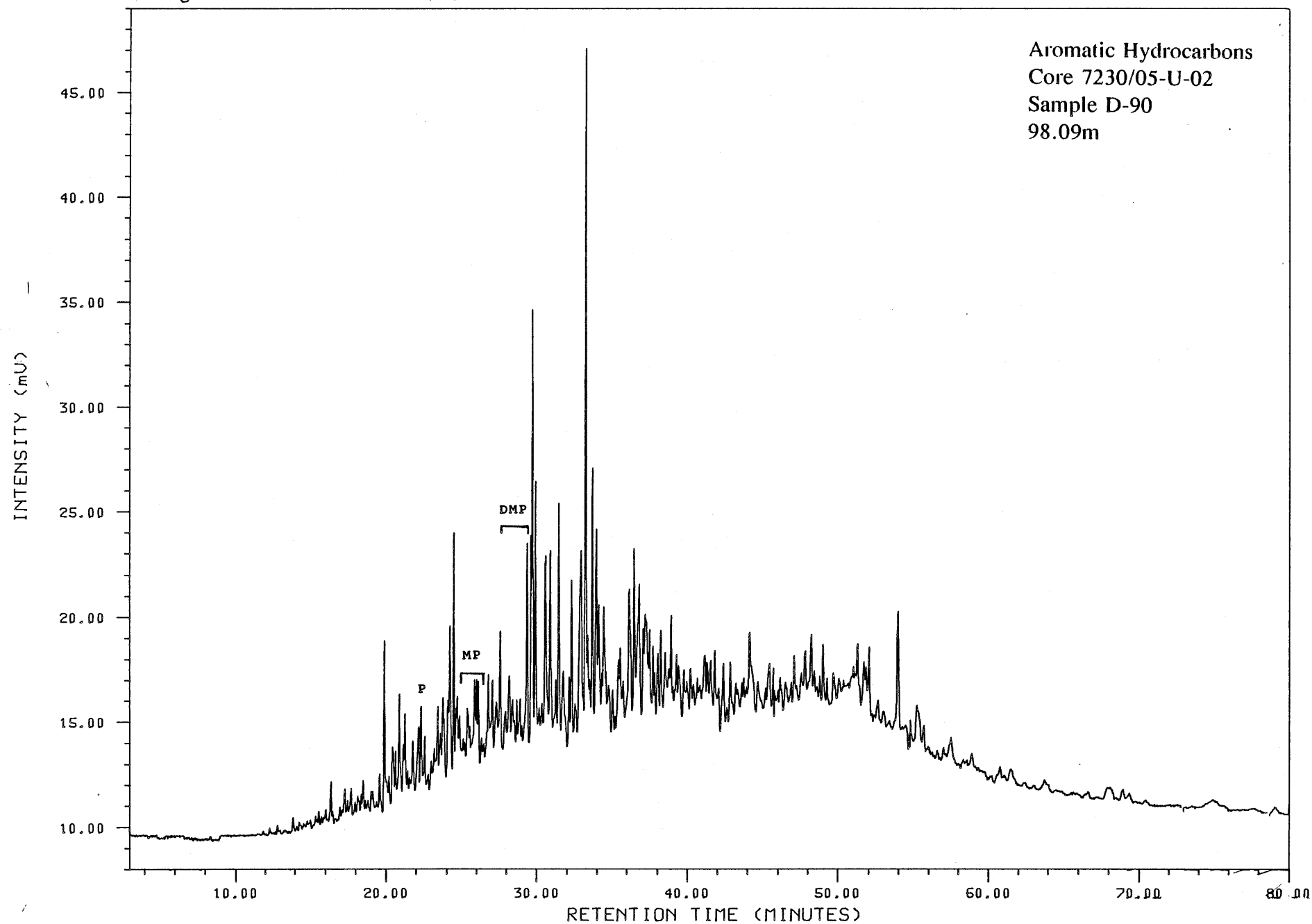
7230/05-U-02



Analysis 427D0090A

2,1,1

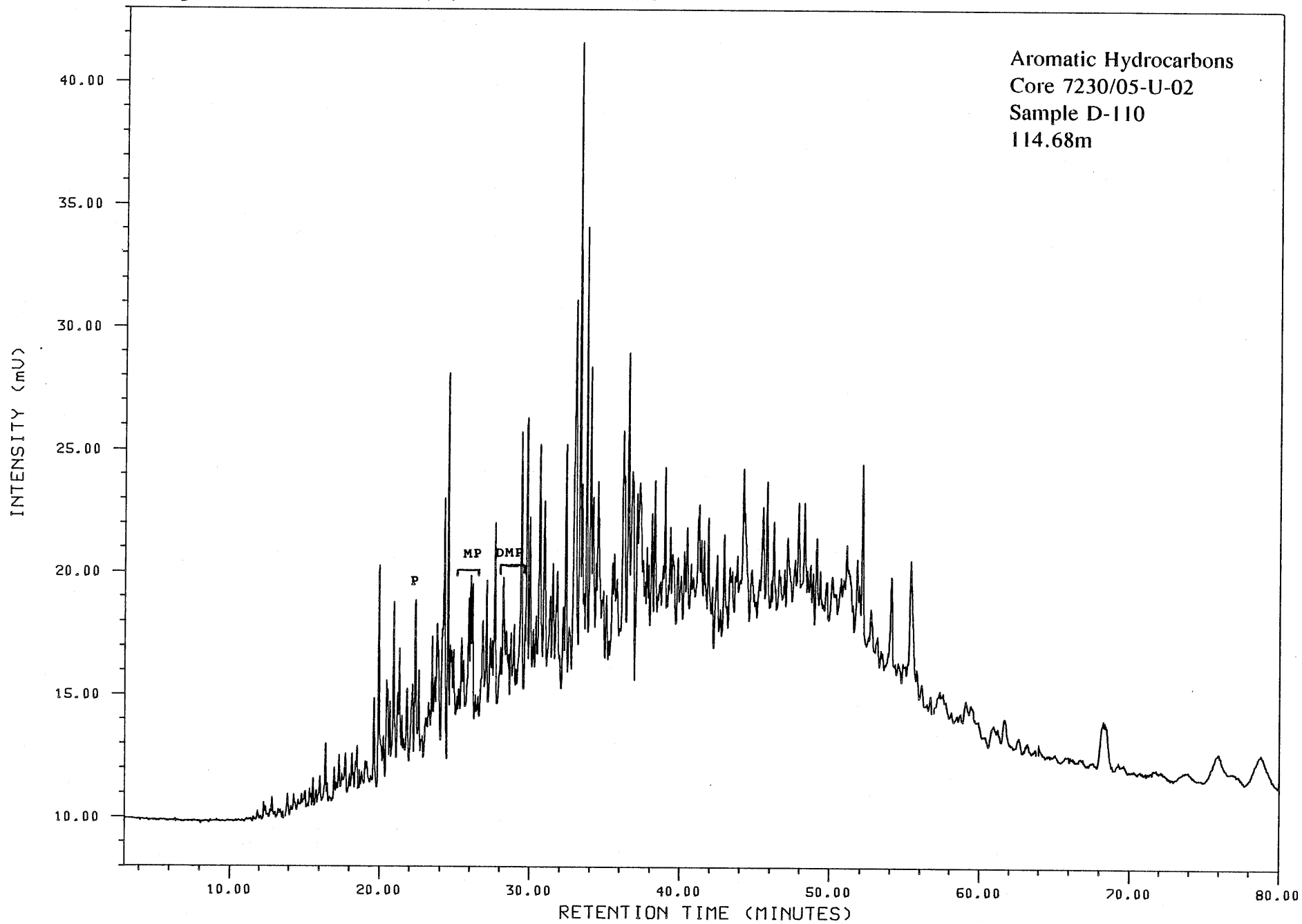
7230/05-U-02



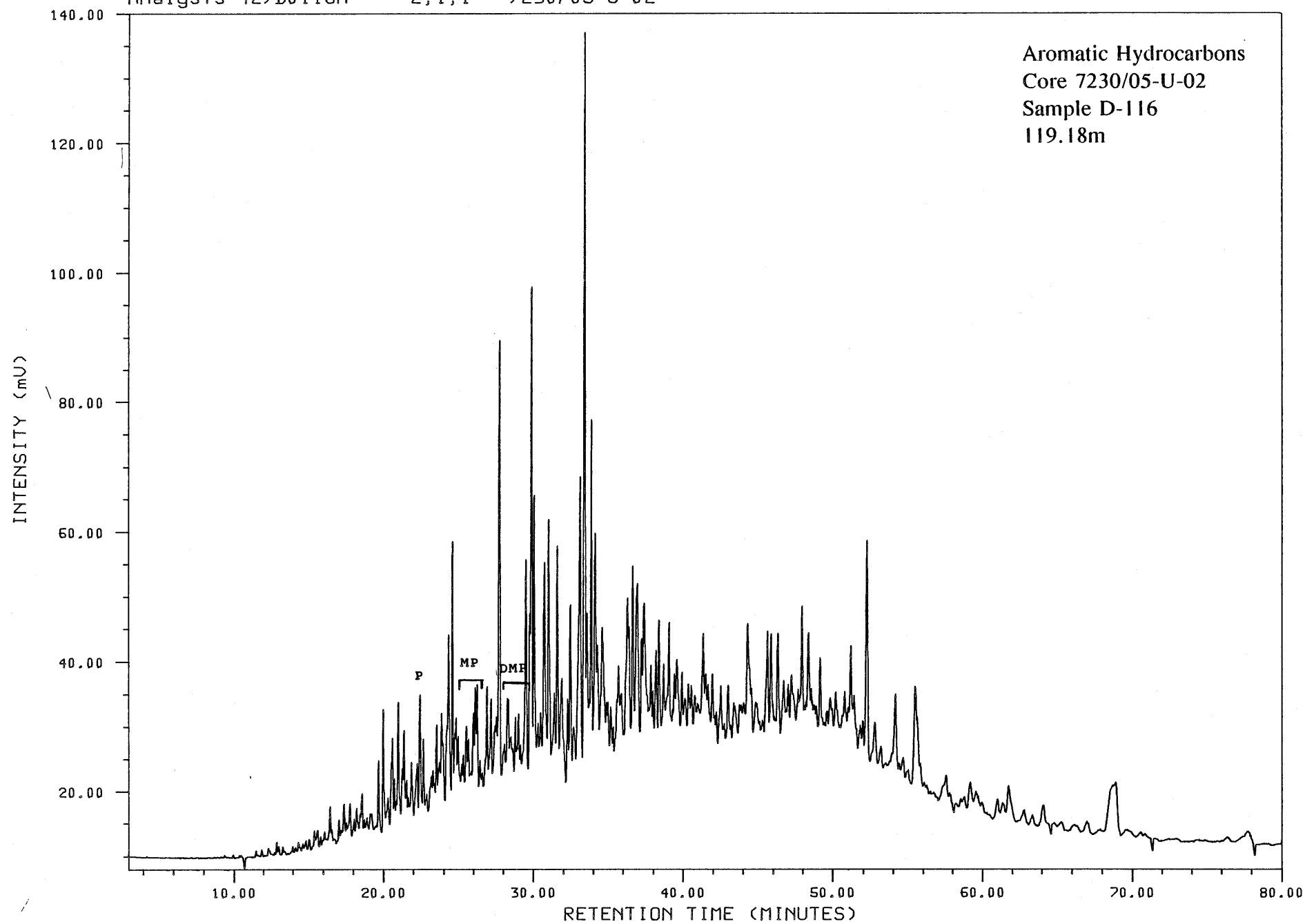
Analysis 427D0110A

2,1,1

7230/05-U-02



Analysis 427D0116A 2,1,1 7230/05-U-02



Analysis 427D4034A 2,1,1 7230/05-U-02

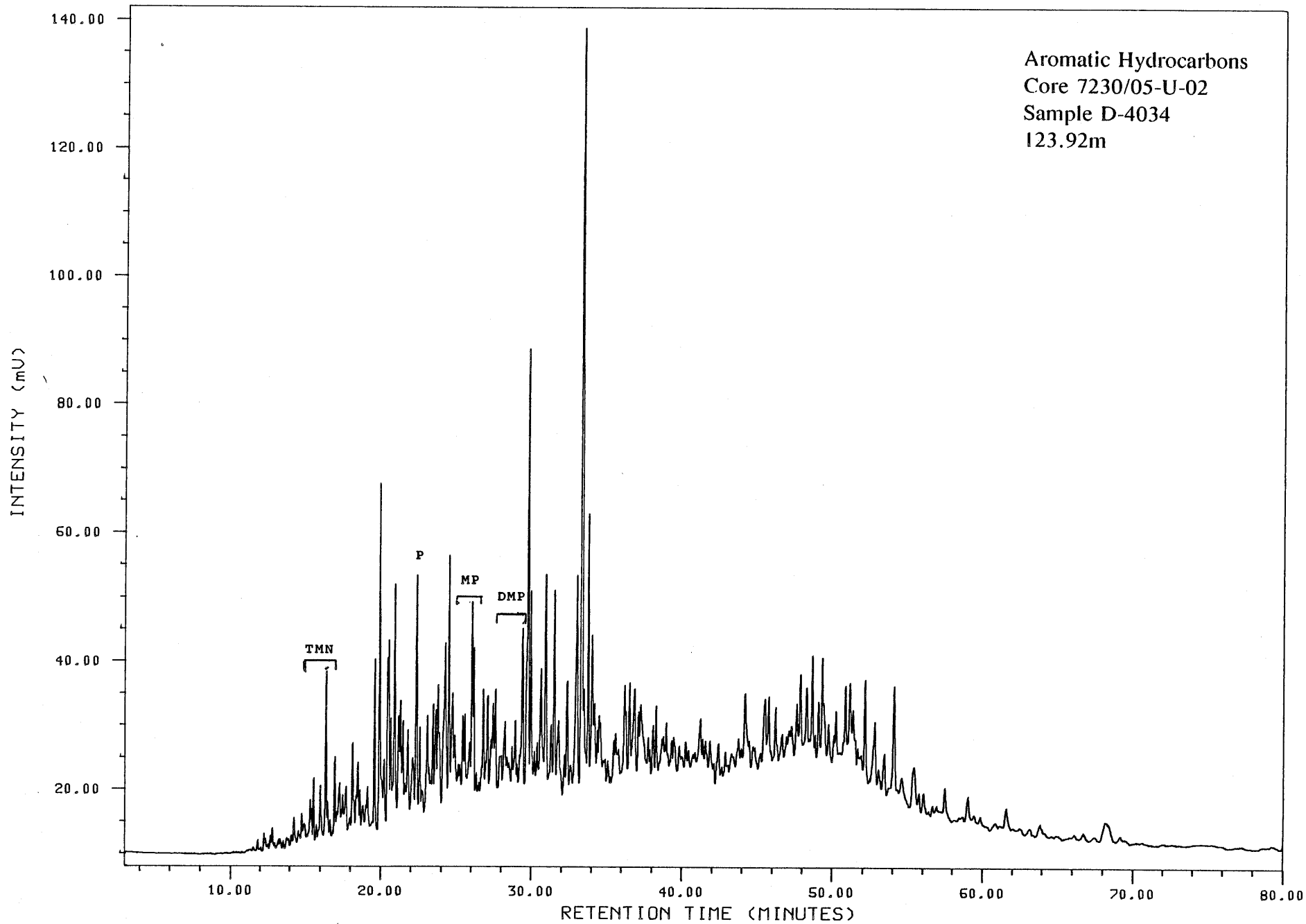
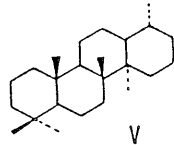
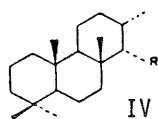
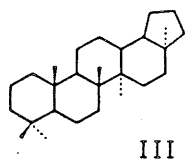
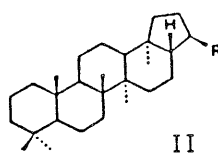
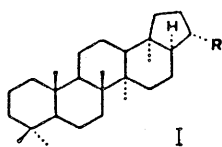


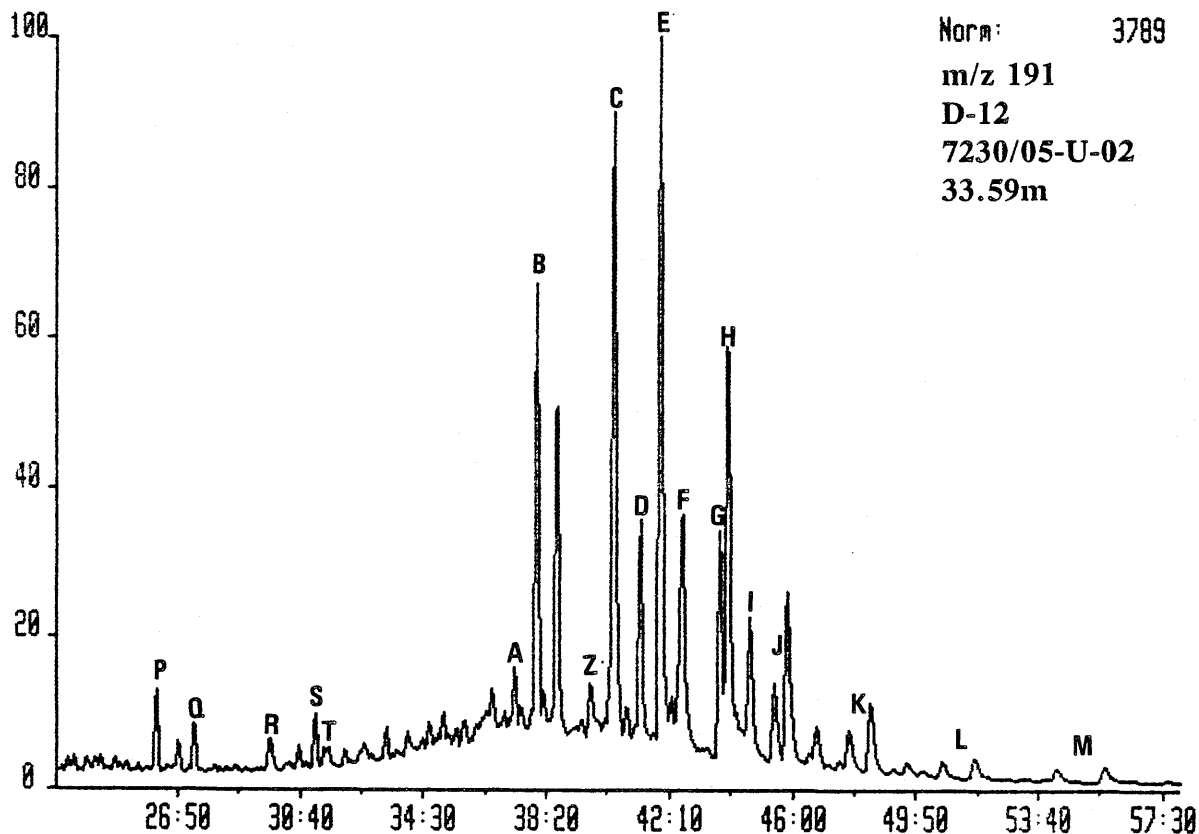
Figure A.II.8.4:

Mass fragmentograms of m/z 191, 205, 163, 177 (terpanes).

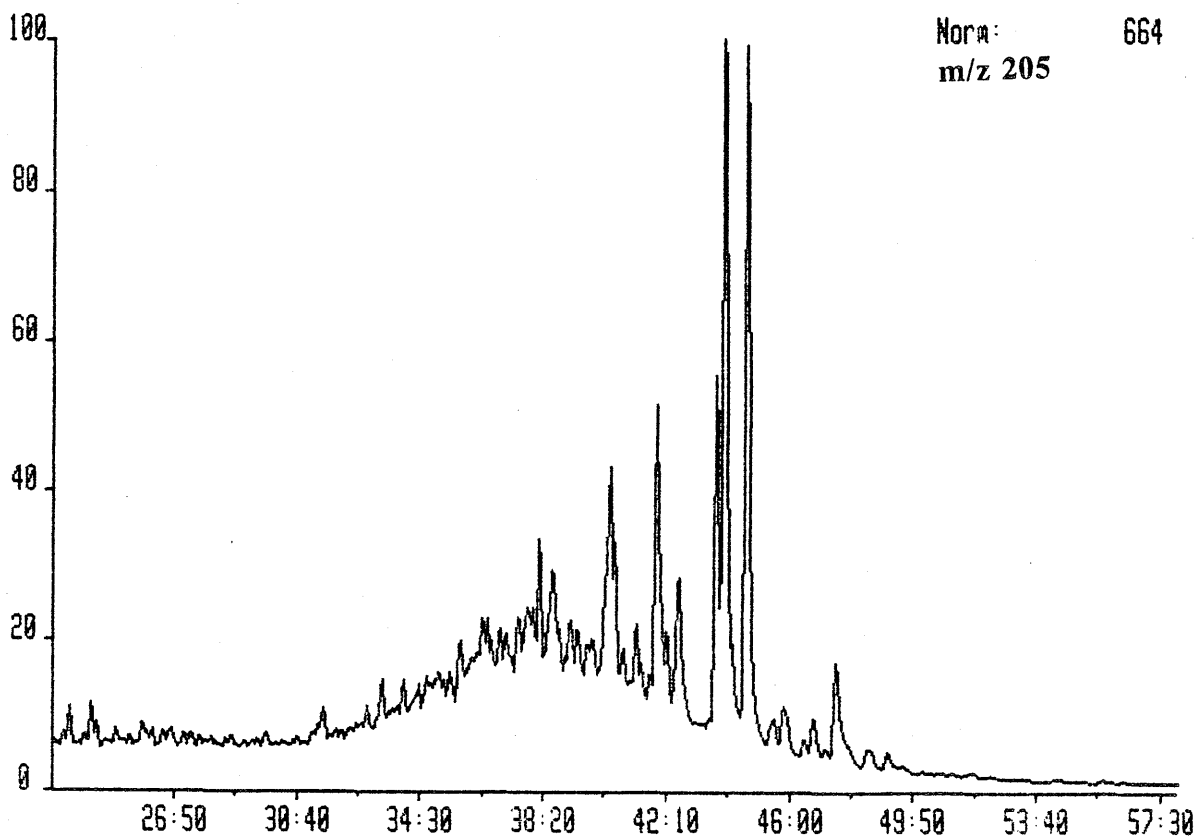
P	tricyclic terpane	$C_{23}H_{42}$	(IV, R= C_4H_9)
Q	tricyclic terpane	$C_{24}H_{44}$	(IV, R= C_5H_{11})
R	tricyclic terpane (17R,17S)	$C_{25}H_{46}$	(IV, R= C_6H_{13})
S	tetracyclic terpane	$C_{24}H_{42}$	(V)
T	tricyclic terpane (17R,17S)	$C_{26}H_{48}$	(IV, R= C_7H_{15})
A	T_s , 18 α (H)-trishomohopane	$C_{27}H_{46}$	(III)
B	T_m , 17 α (H)-trishomohopane	$C_{27}H_{46}$	(I, R=H)
Z	bishomohopane	$C_{28}H_{48}$	
C	17 α (H)-norhopane	$C_{29}H_{50}$	(I, R= C_2H_5)
X	unknown triterpane	$C_{30}H_{52}$	
D	17 β (H)-normoretane	$C_{29}H_{50}$	(II, R= C_2H_5)
E	17 α (H)-hopane	$C_{30}H_{52}$	(I, R= C_3H_7)
F	17 β (H)-moretane	$C_{30}H_{52}$	(II, R= C_3H_7)
G	17 α (H)-homohopane (22S)	$C_{31}H_{54}$	(I, R= C_4H_9)
H	17 α (H)-homohopane (22R)	$C_{31}H_{54}$	(I, R= C_4H_9)
	+ unknown triterpane (gammacerane?)		
I	17 β (H)-homomoretane	$C_{31}H_{54}$	(II, R= C_4H_9)
J	17 α (H)-bishomohopane (22S,22R)	$C_{32}H_{56}$	(I, R= C_5H_{11})
K	17 α (H)-trishomohopane (22S,22R)	$C_{33}H_{58}$	(I, R= C_6H_{13})
L	17 α (H)-tetrakishomohopane (22S,22R)	$C_{34}H_{60}$	(I, R= C_7H_{15})
M	17 α (H)-pentakishomohopane (22S,22R)	$C_{35}H_{62}$	(I, R= C_8H_{17})



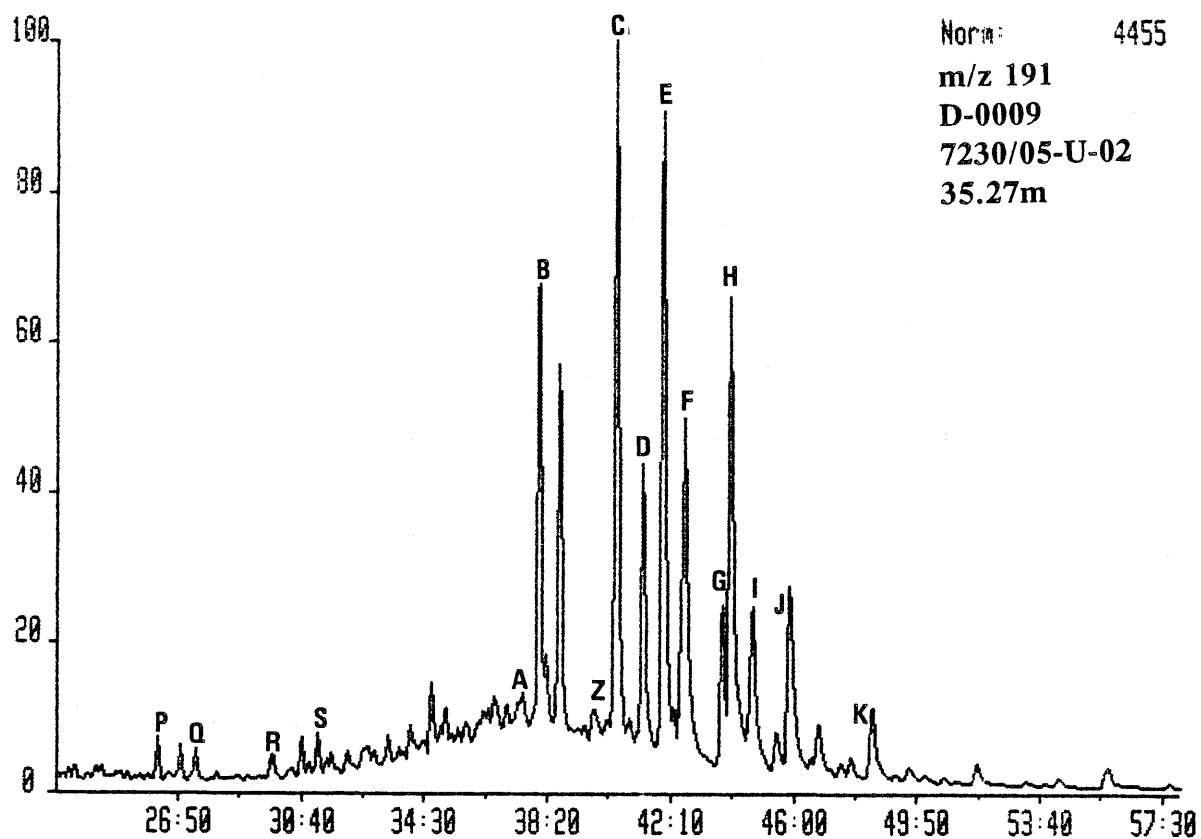
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



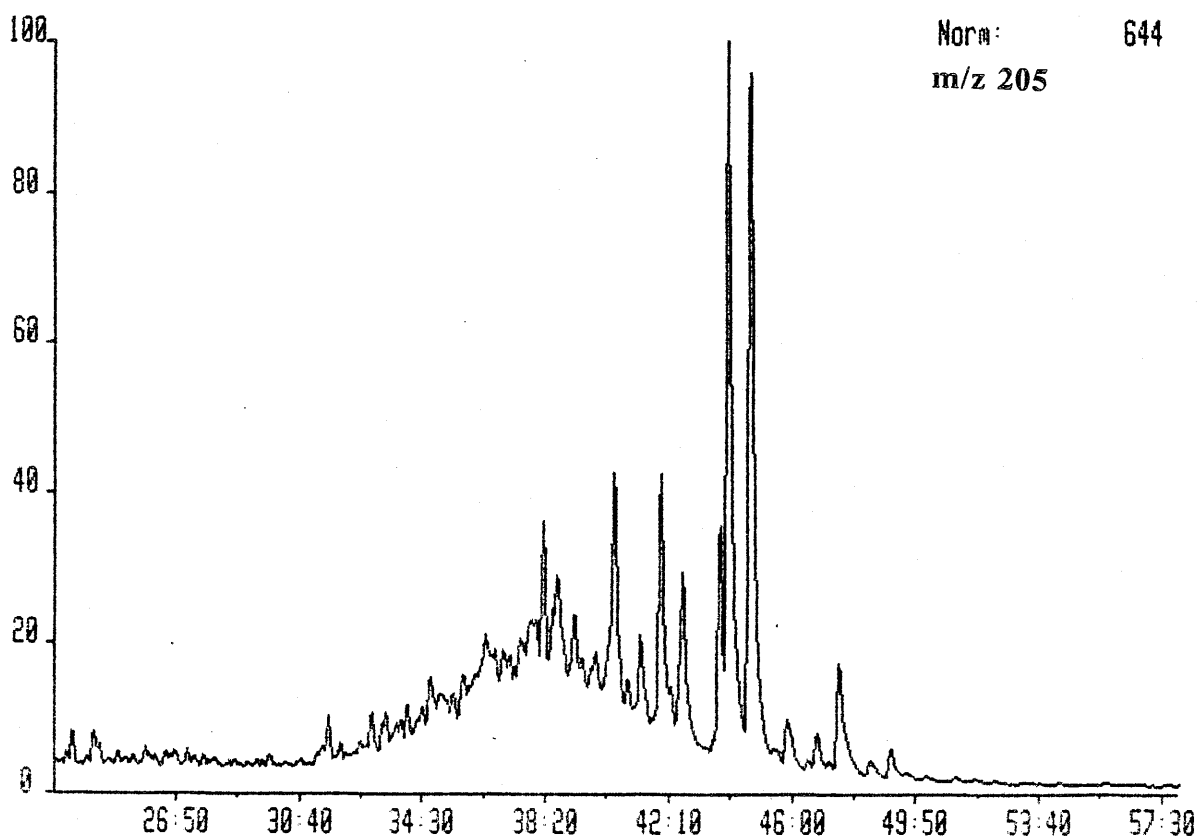
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



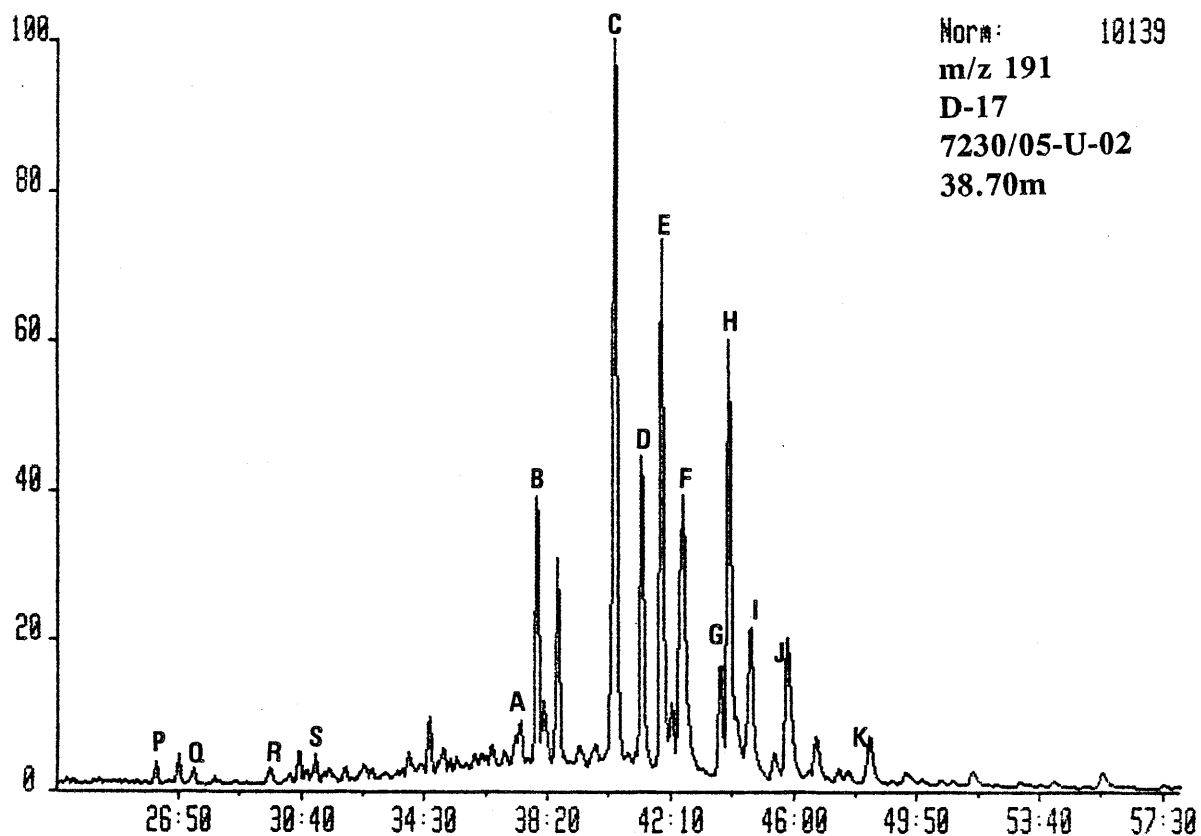
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



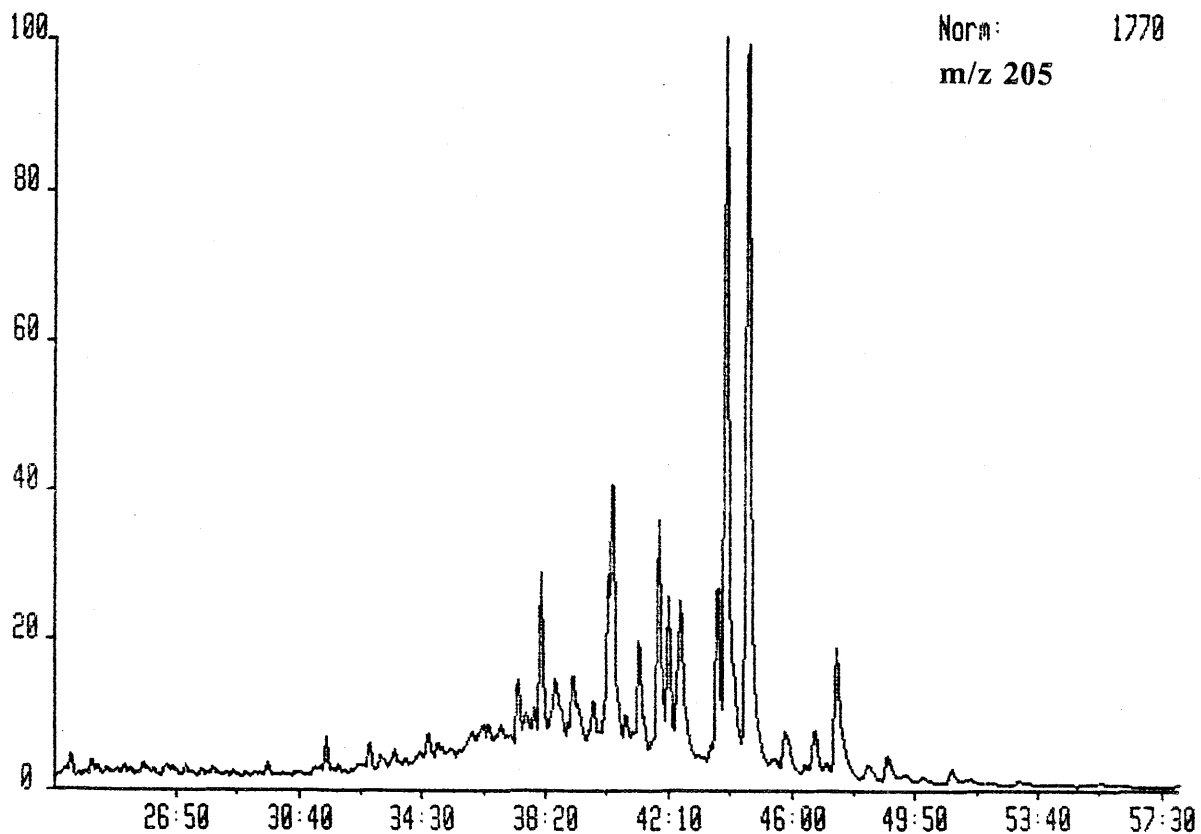
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



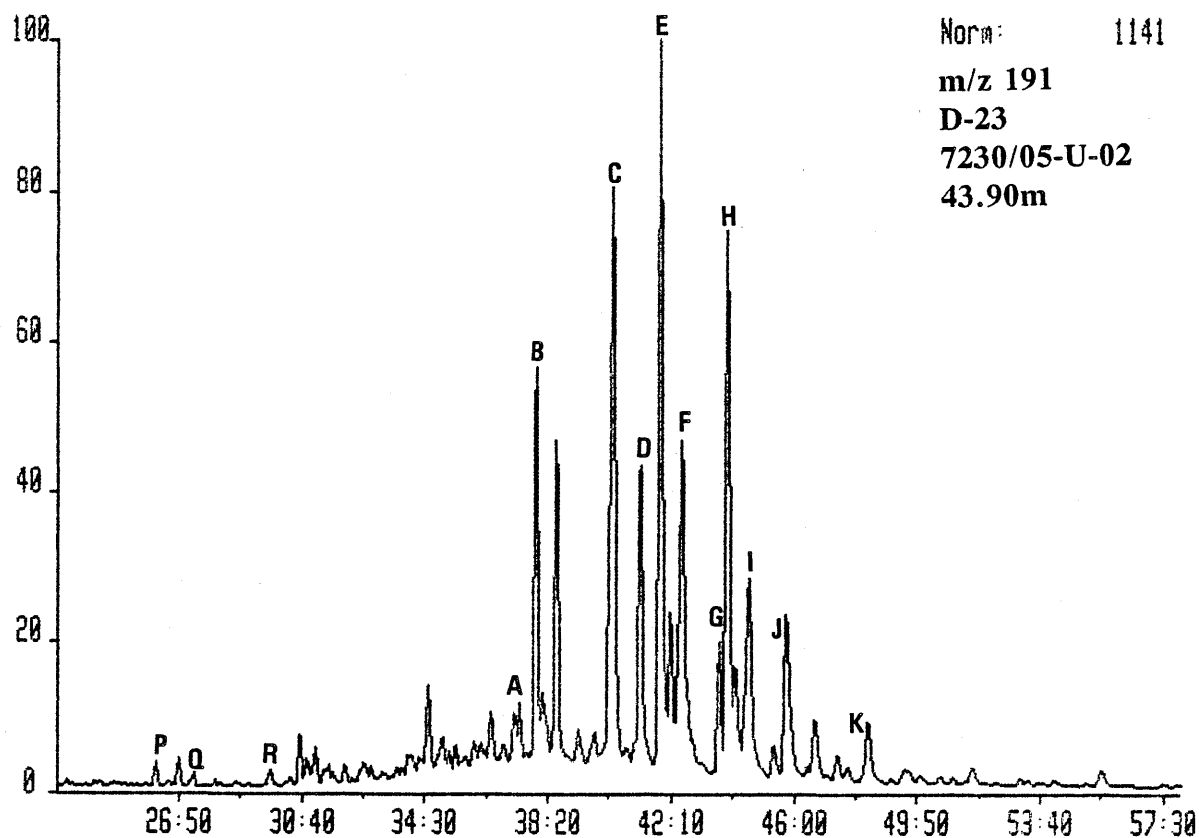
D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



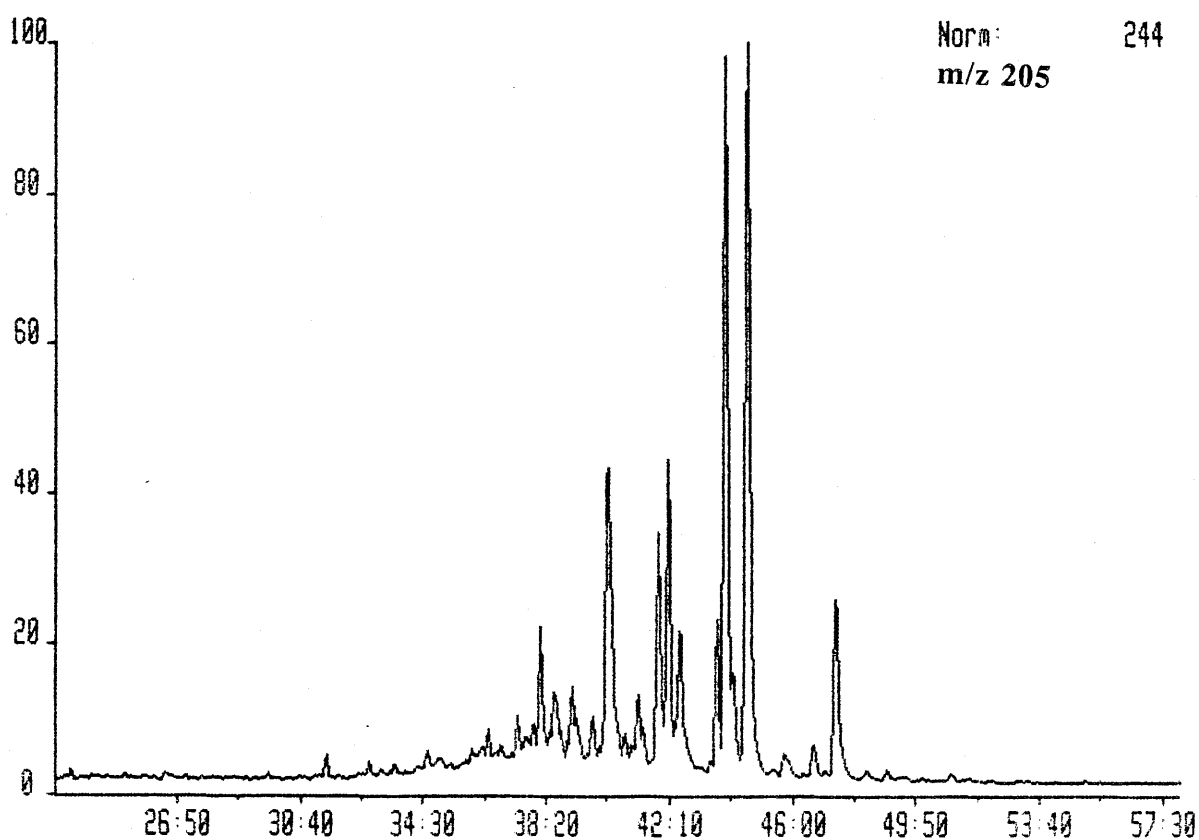
D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



023SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



023SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23





IKU
SINTEF-GRUPPEN

- 506 -

D33SAT 17-FEB-88

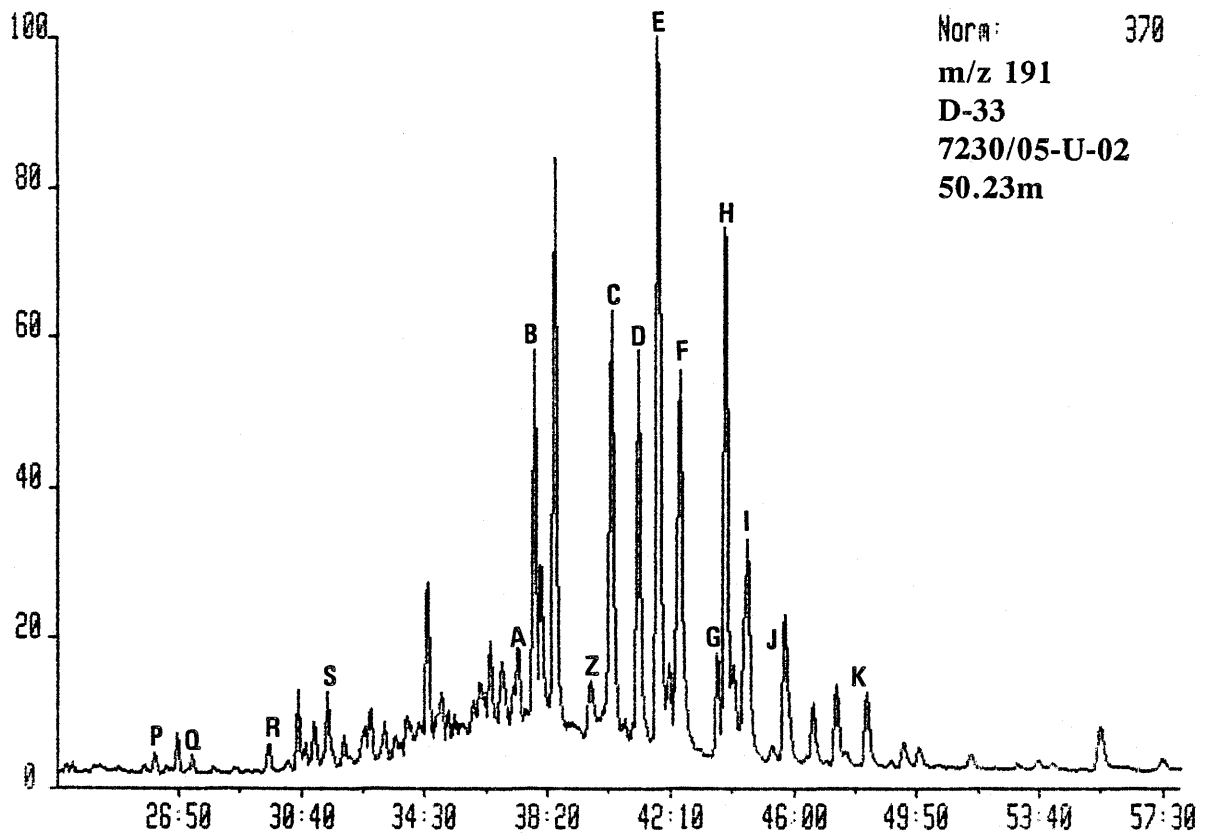
Sir:Voltage 7070H

Sys: TRISTER

Sample 1 Injection 1

Group 1 Mass 191.1000

Text:21.3427.23



D33SAT 17-FEB-88

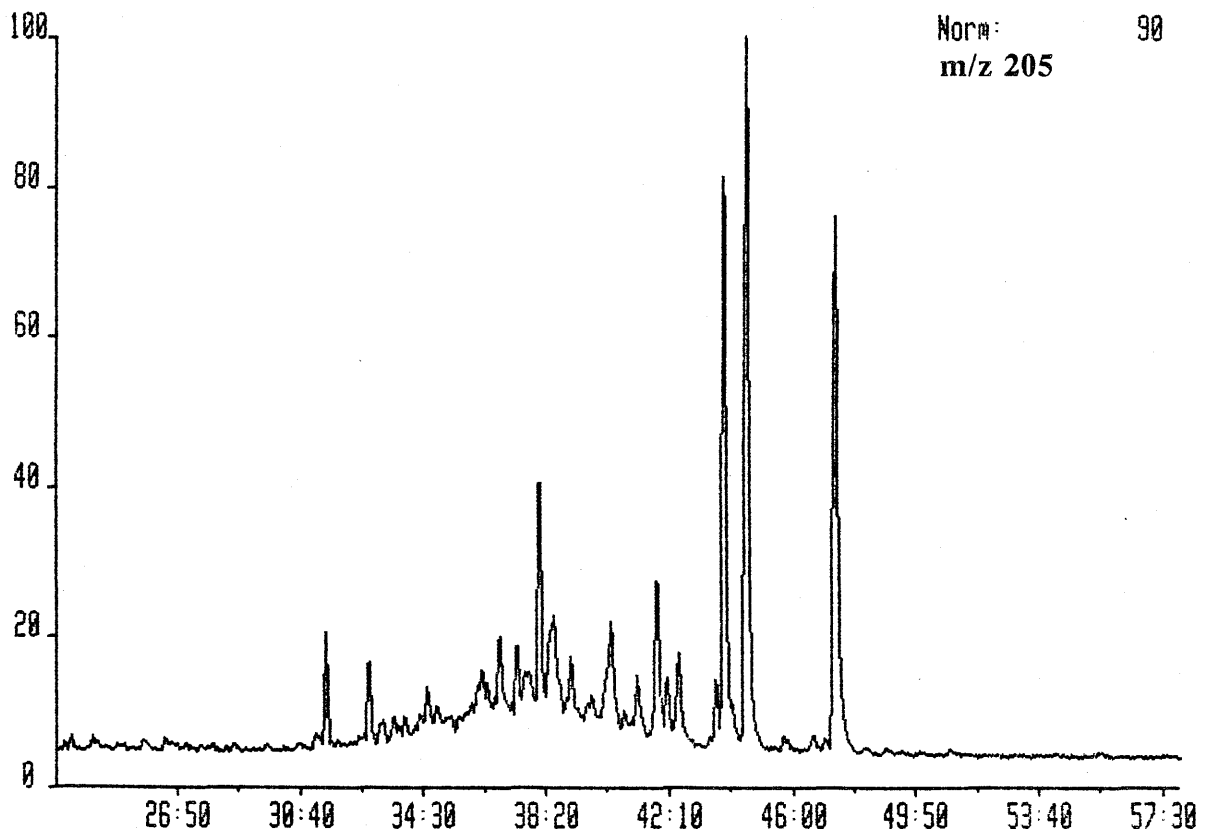
Sir:Voltage 7070H

Sys: TRISTER

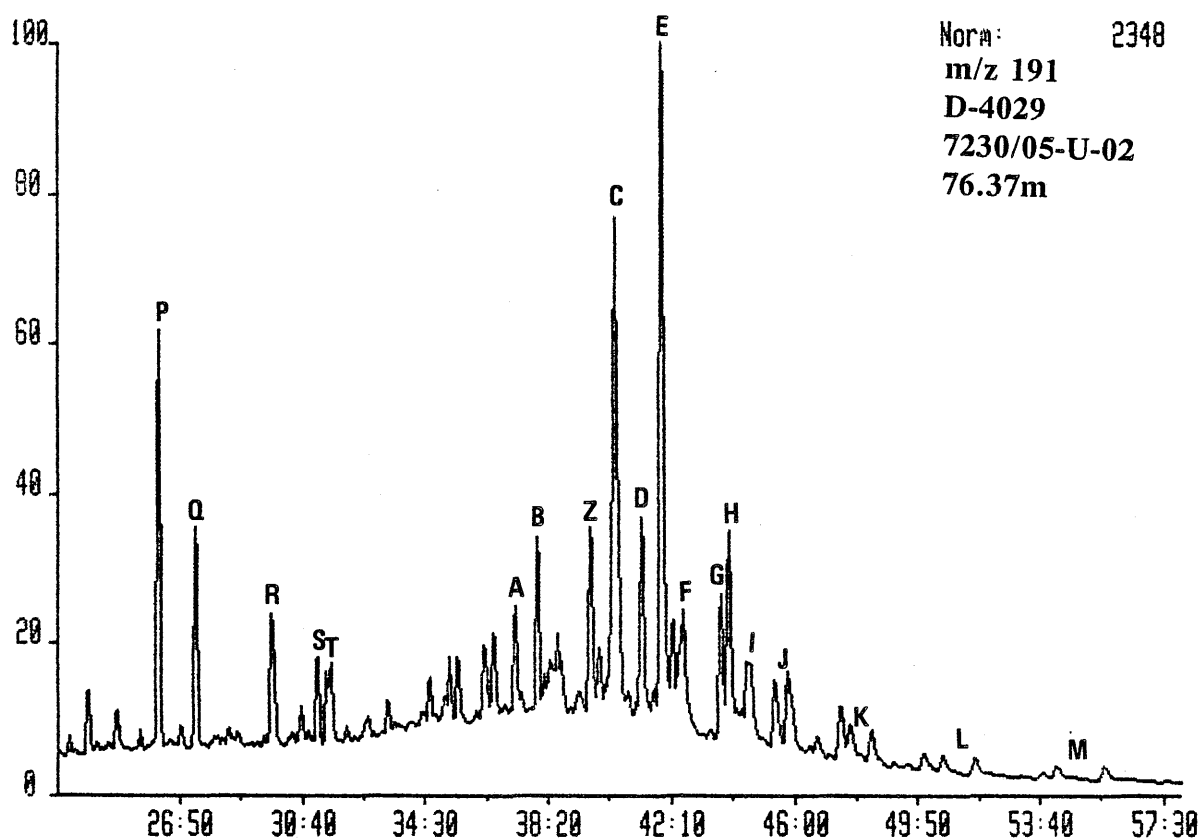
Sample 1 Injection 1

Group 1 Mass 205.1000

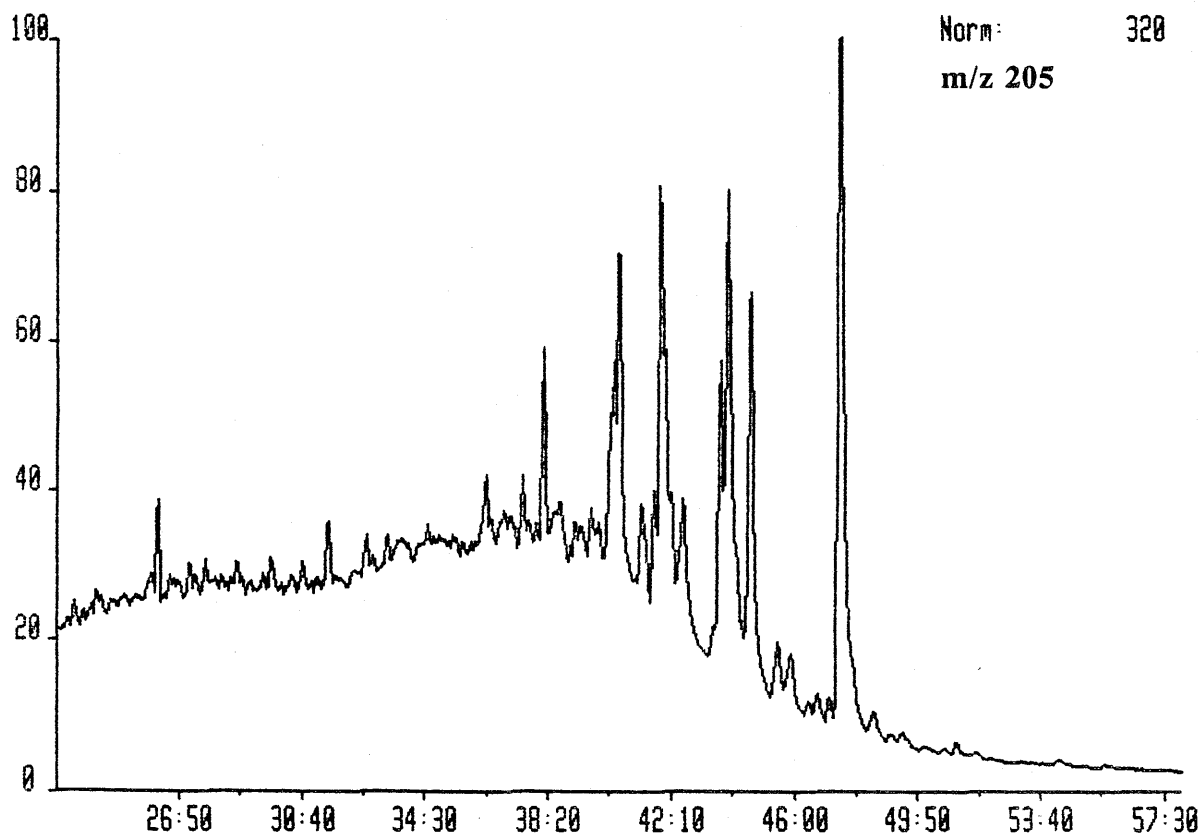
Text:21.3427.23



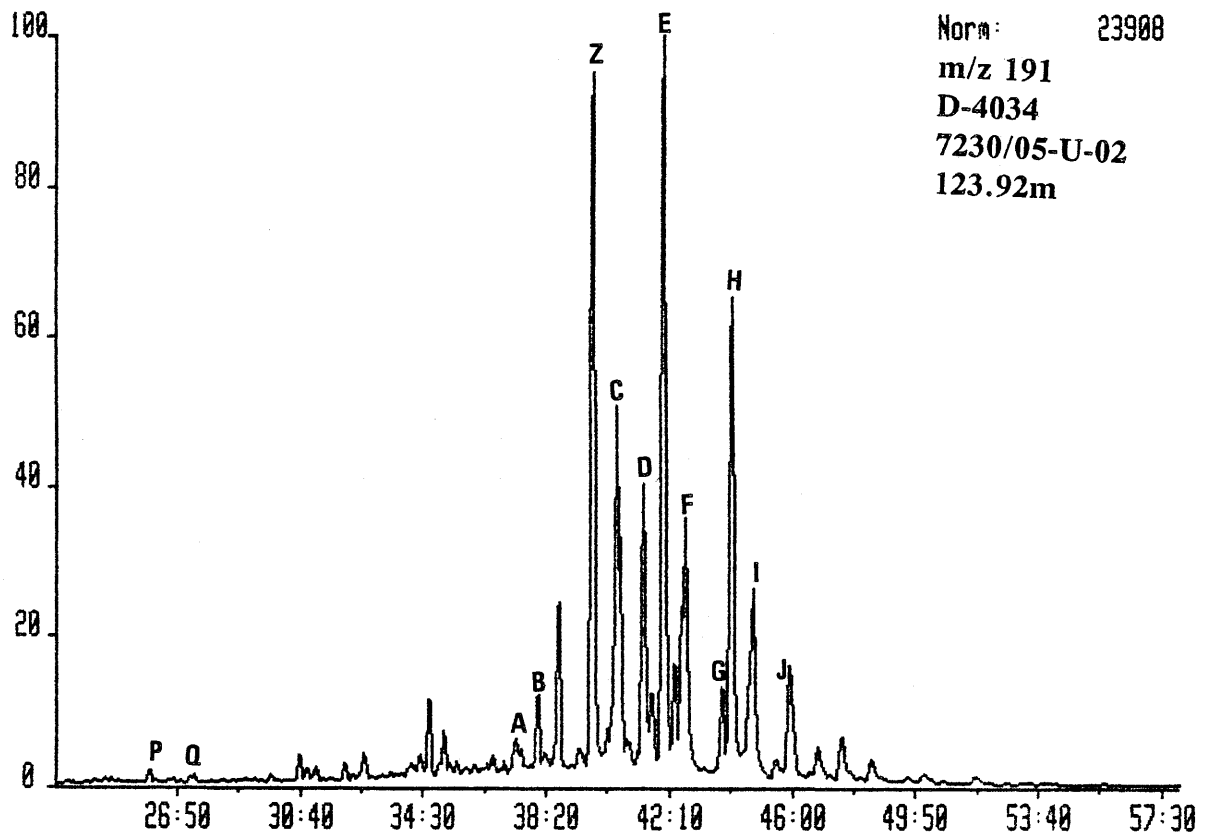
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Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



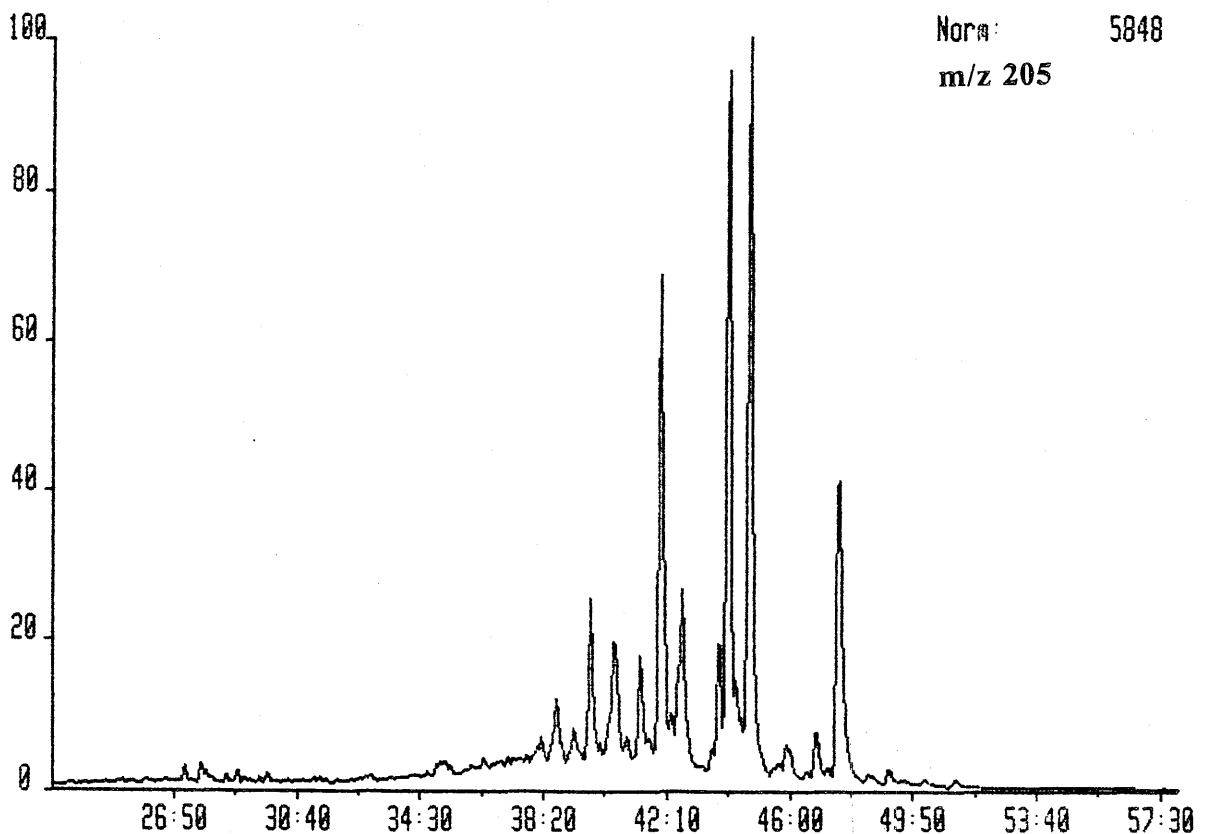
D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



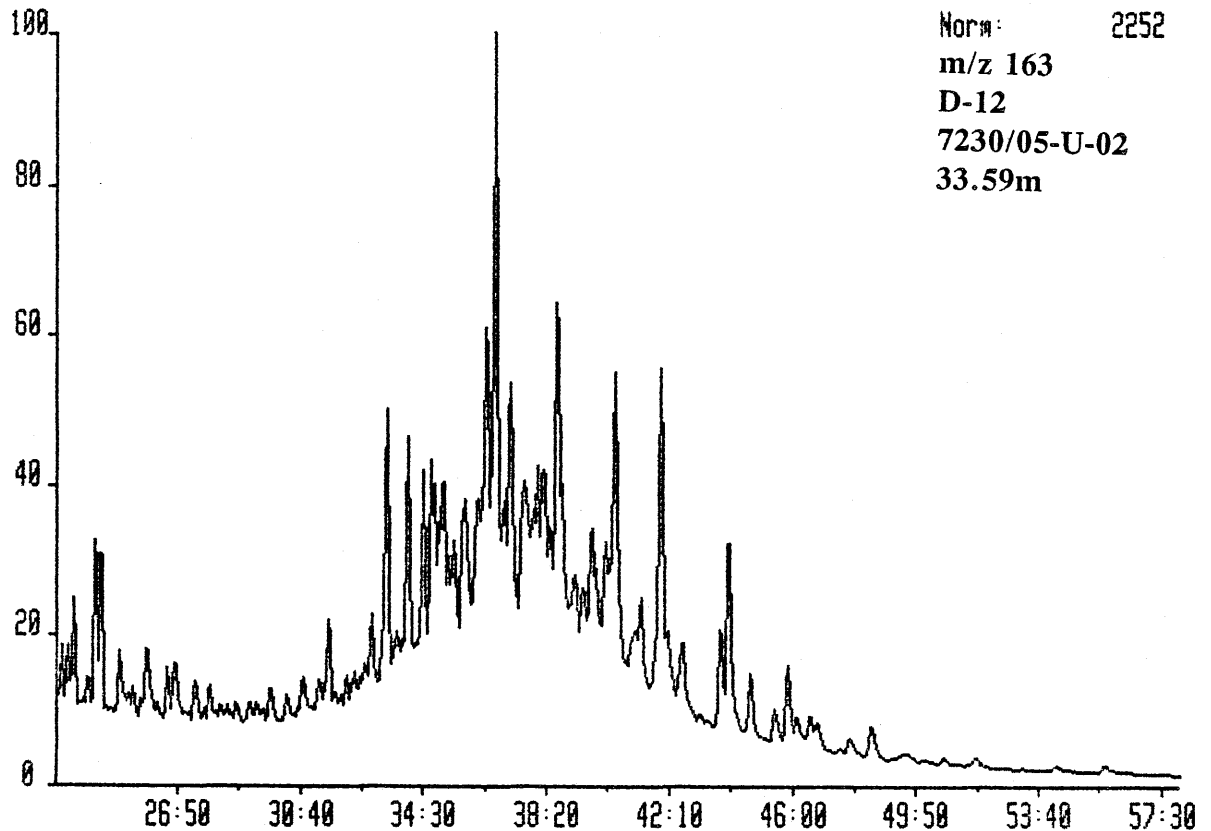
D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 191.1000
Text:21.3427.23



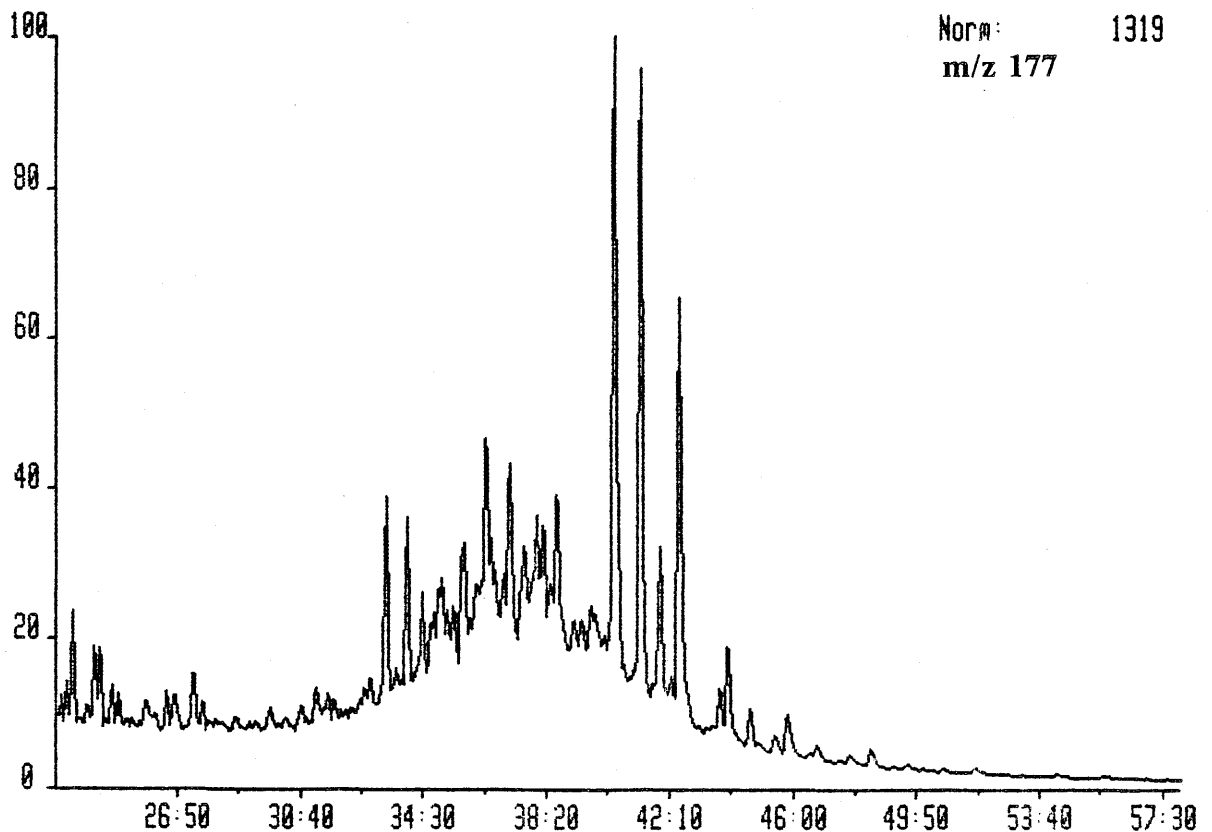
D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 205.1000
Text:21.3427.23



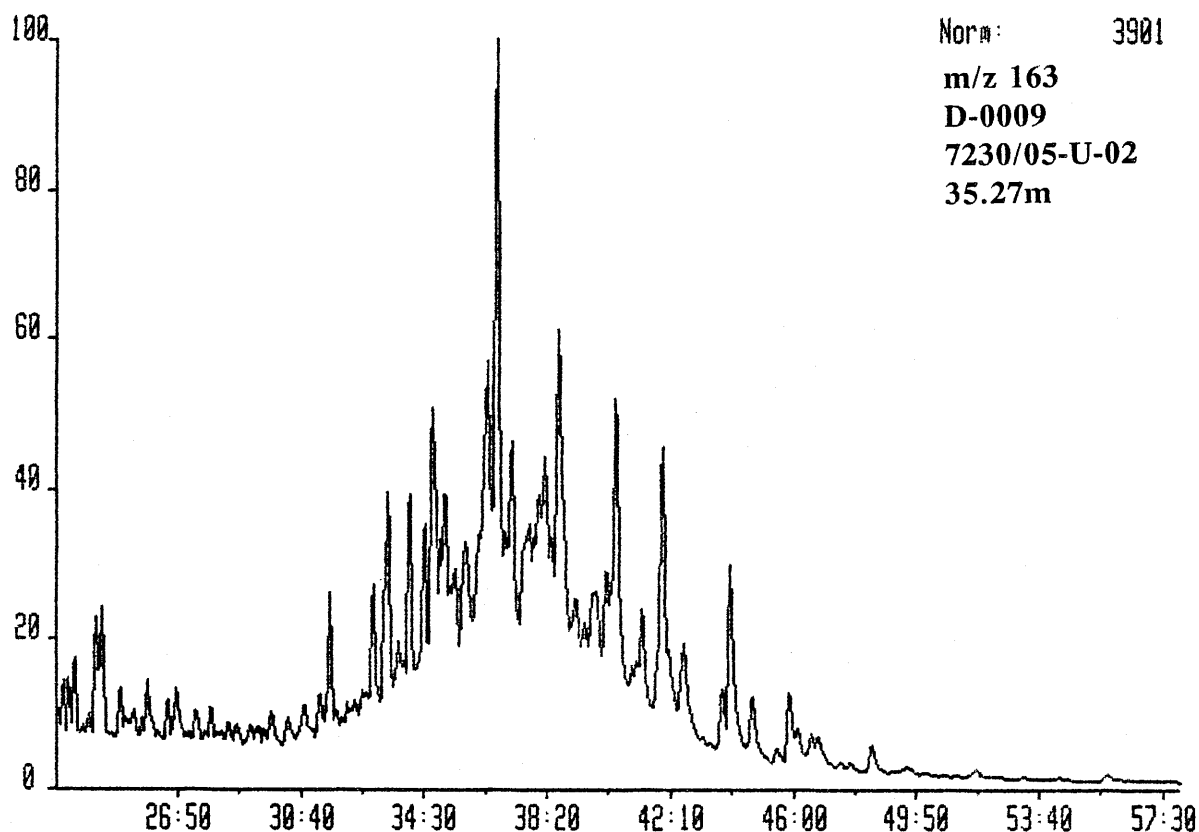
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



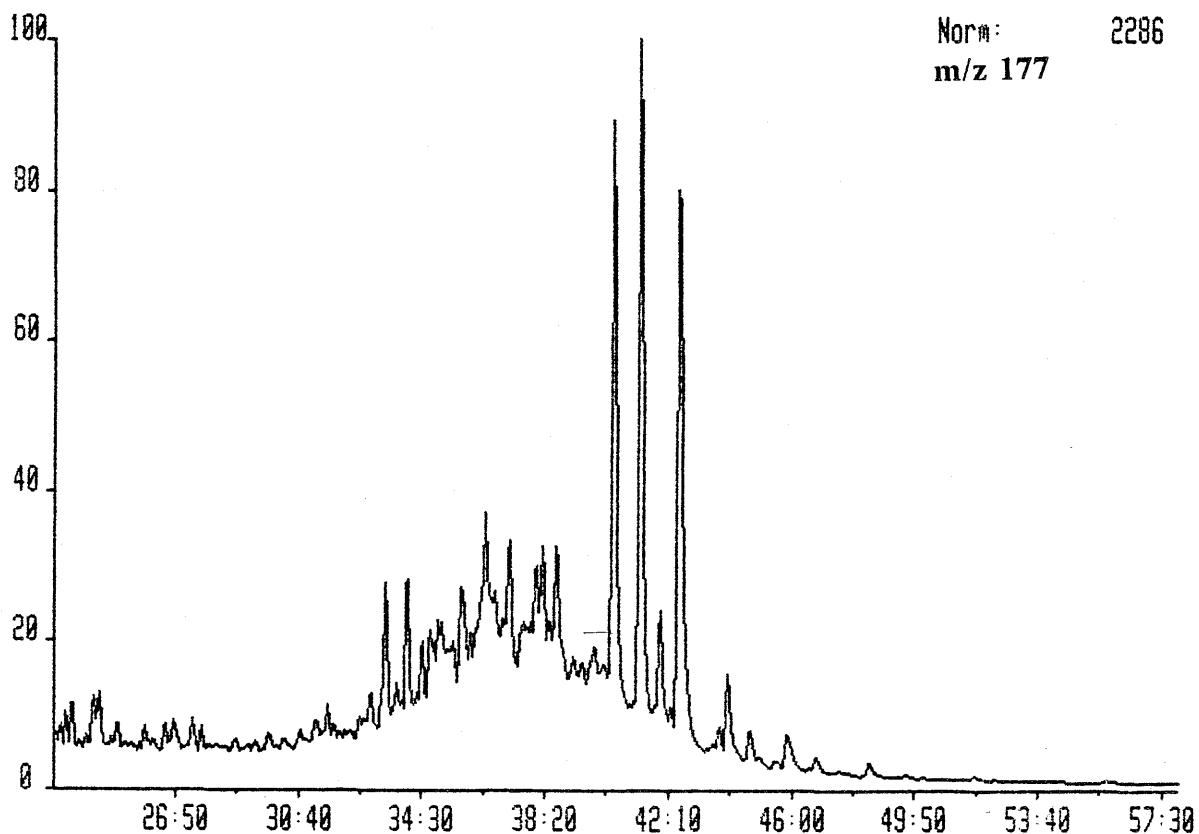
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



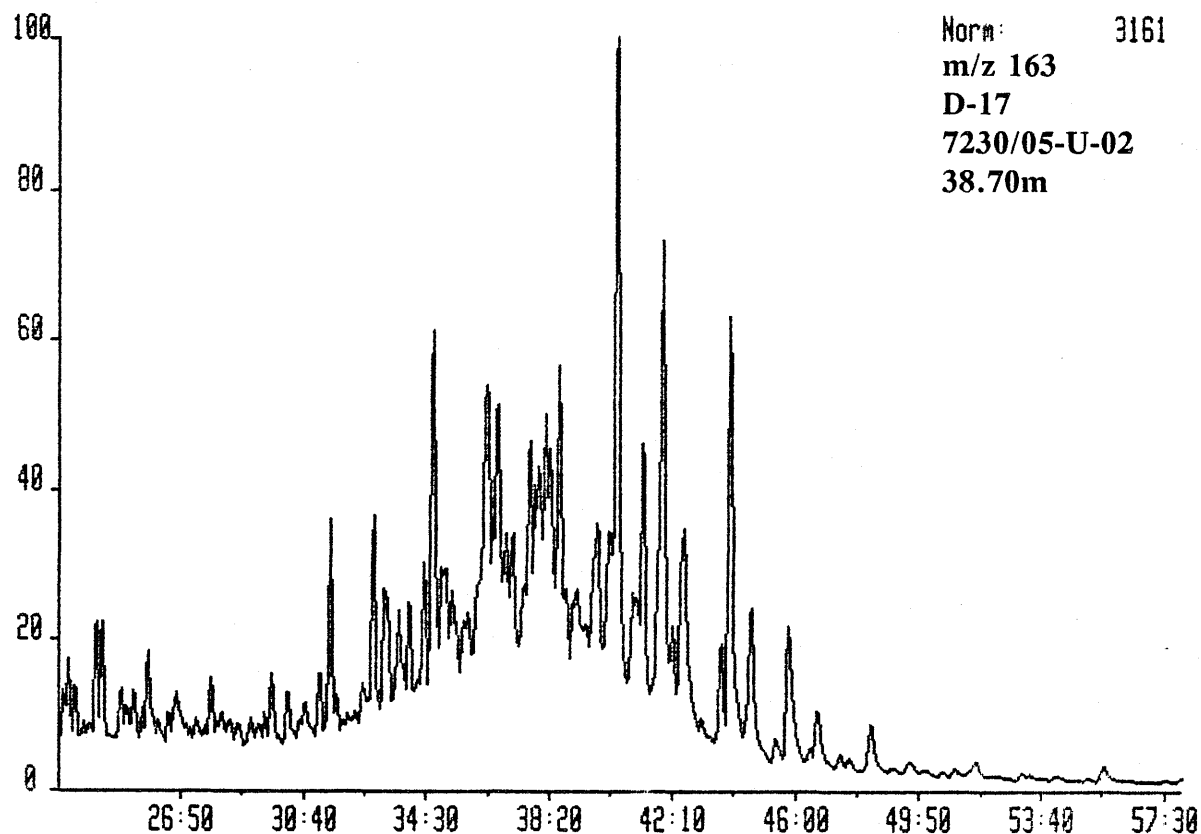
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



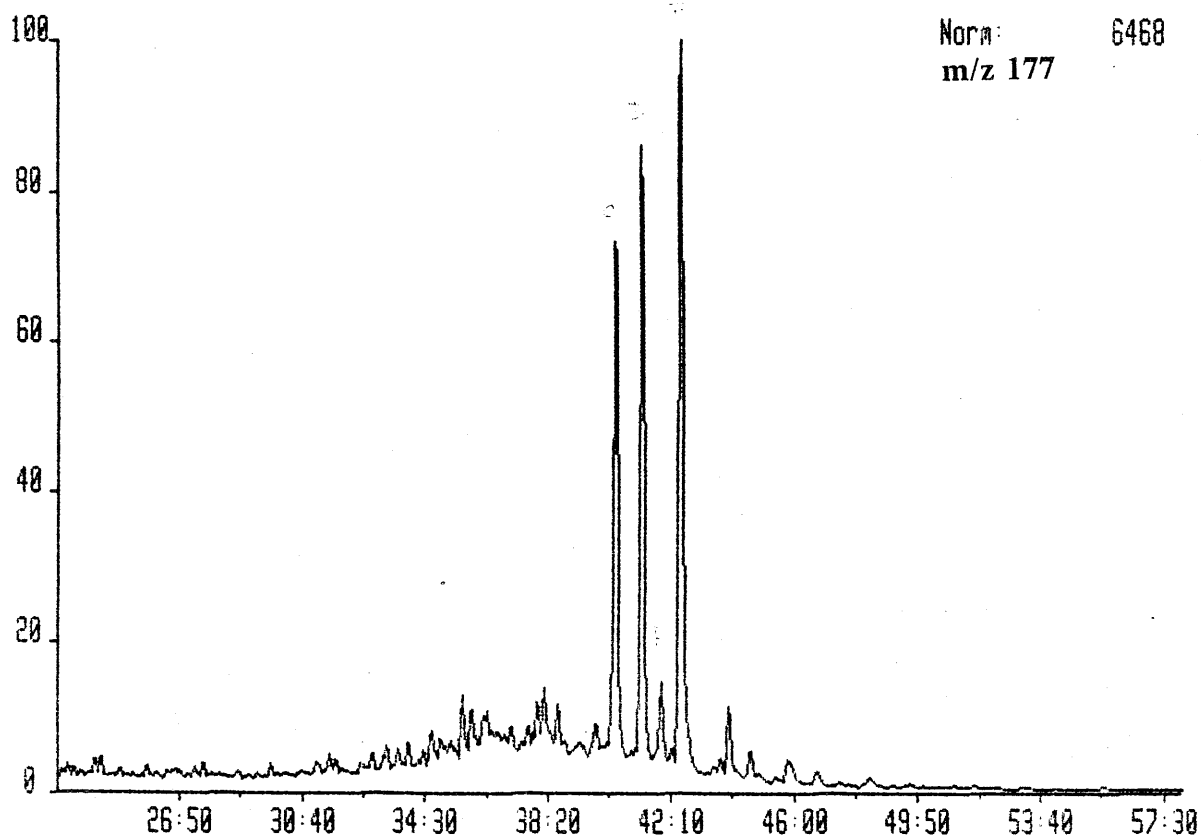
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

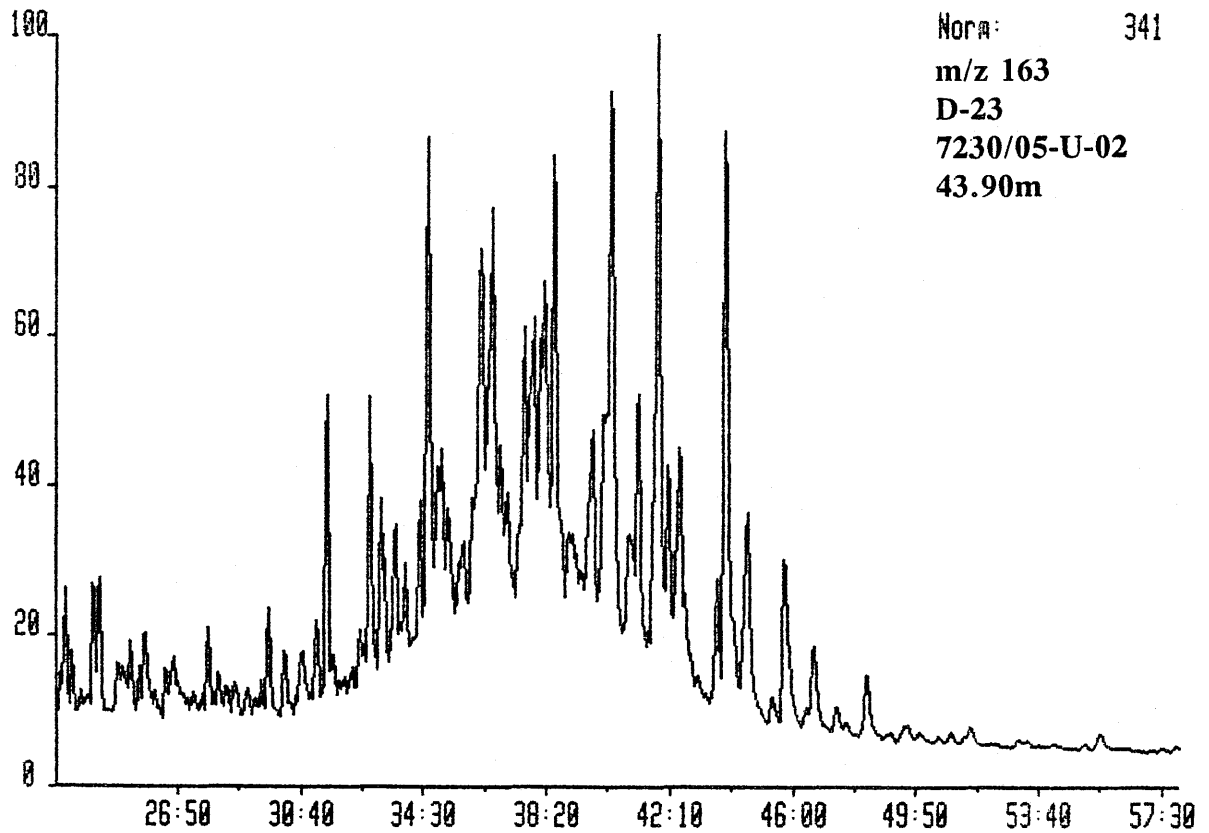




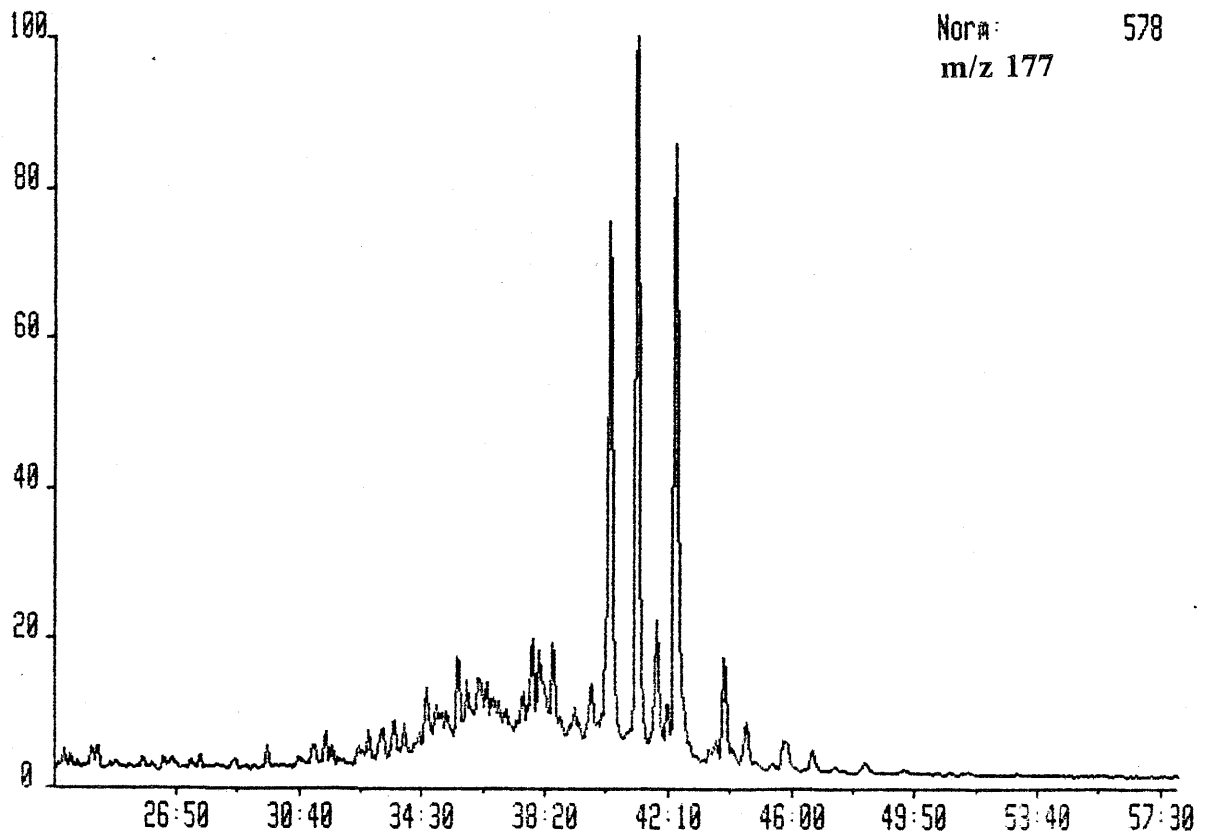
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D23SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D23SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23





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D33SAT 17-FEB-88

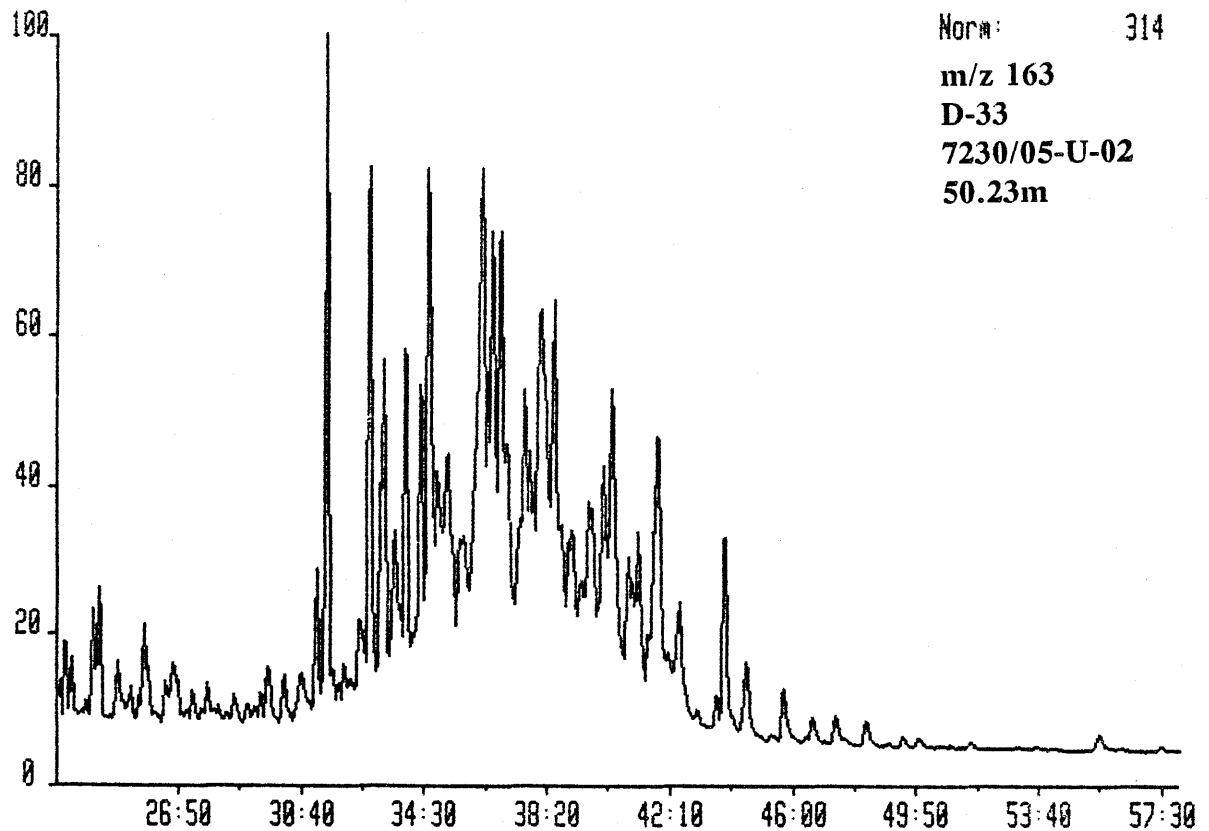
Sir: Voltage 7070H

Sys: TRISTER

Sample 1 Injection 1

Group 1 Mass 163.1000

Text: 21.3427.23



D33SAT 17-FEB-88

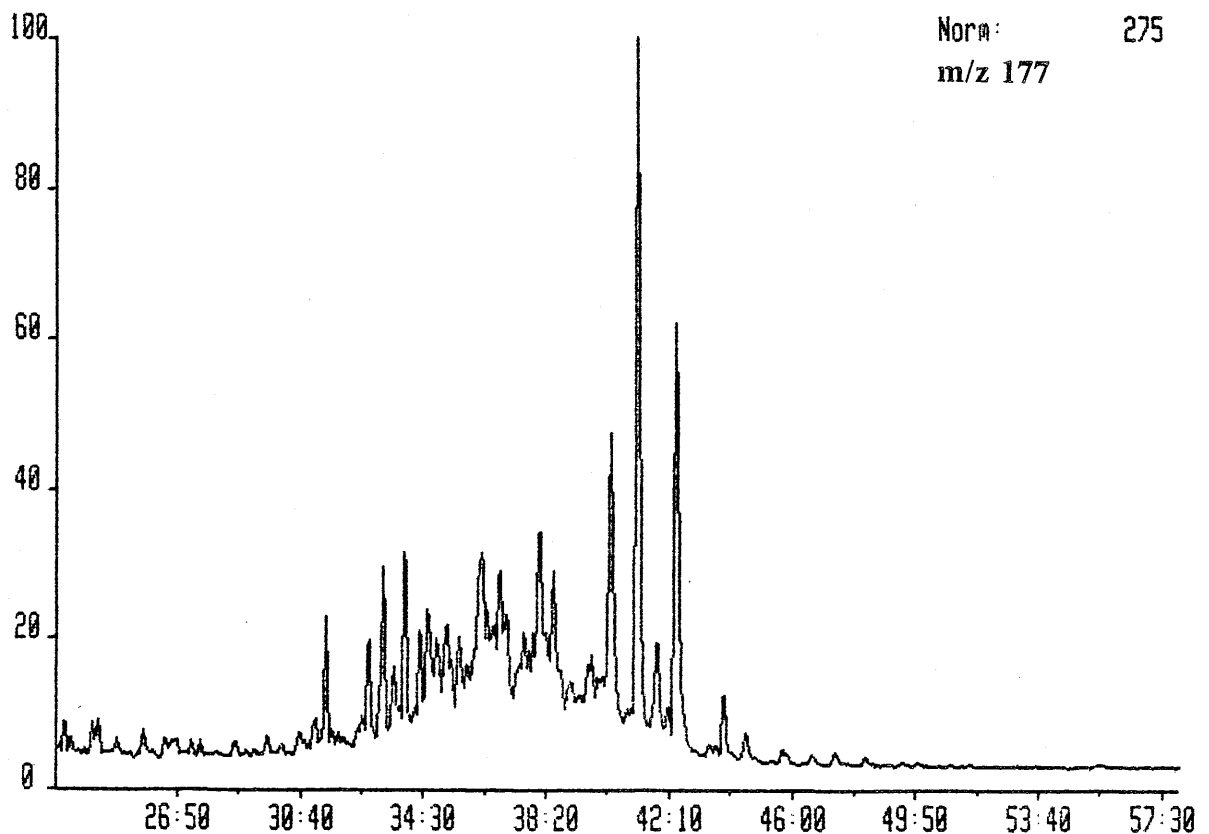
Sir: Voltage 7070H

Sys: TRISTER

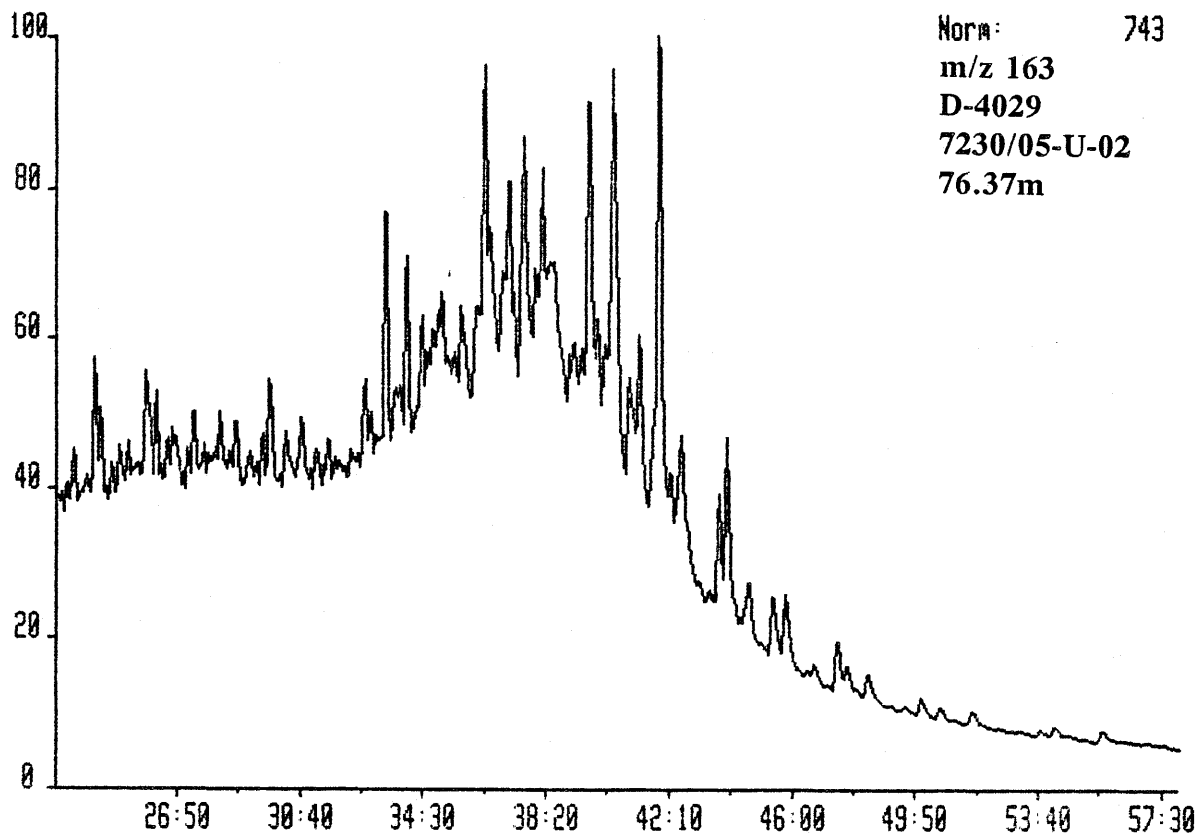
Sample 1 Injection 1

Group 1 Mass 177.1000

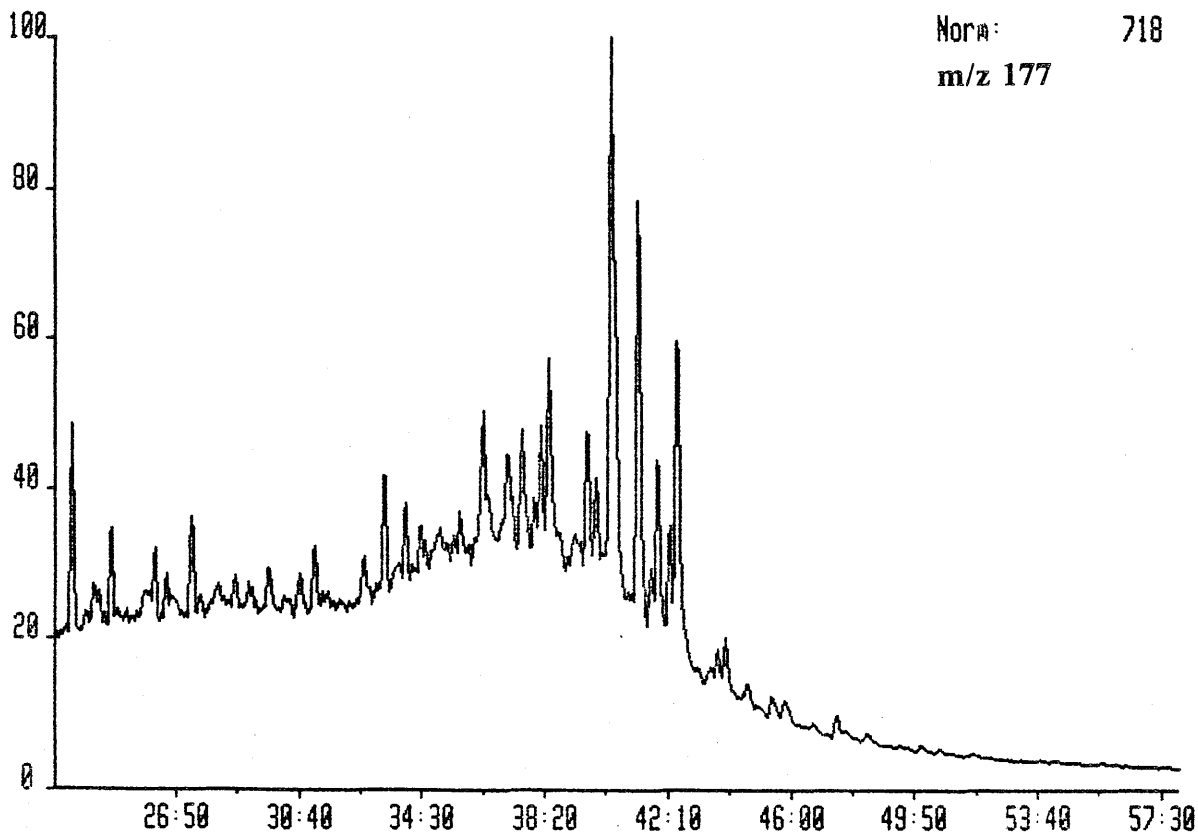
Text: 21.3427.23



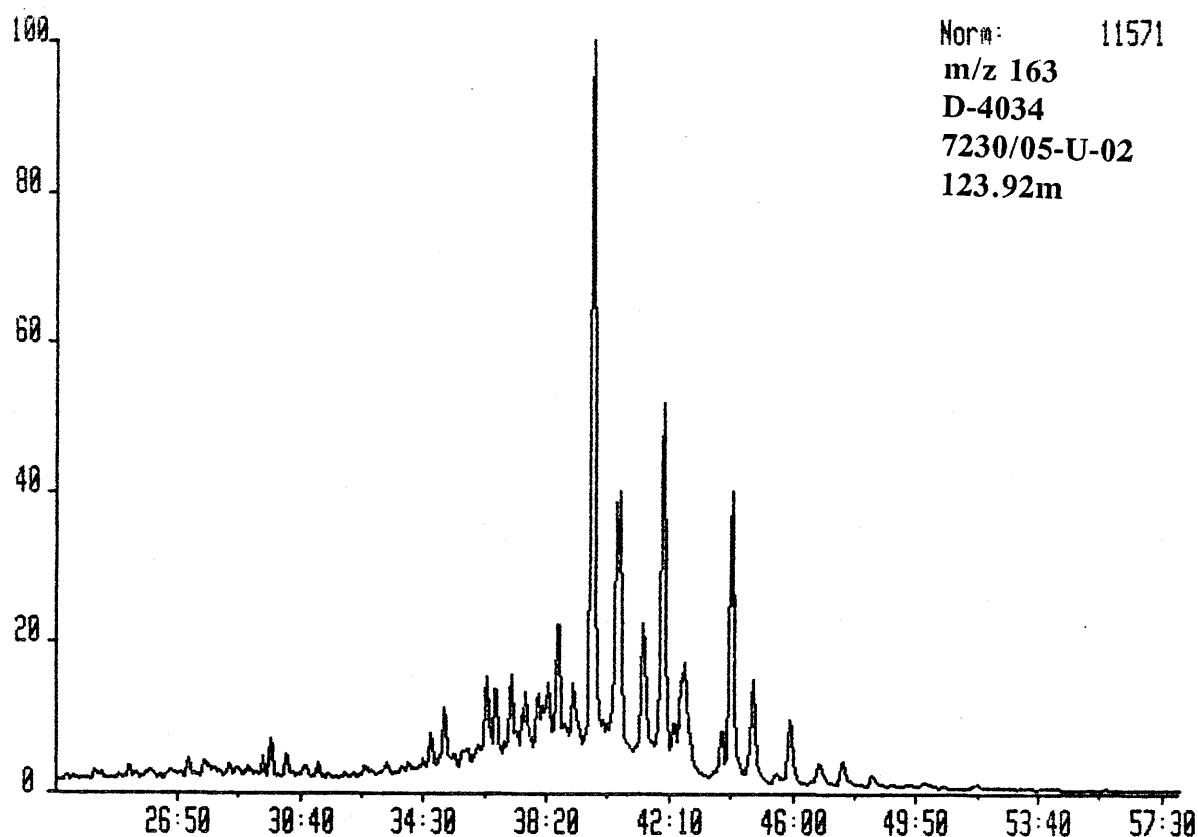
D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23



D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 163.1000
Text:21.3427.23



D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 177.1000
Text:21.3427.23

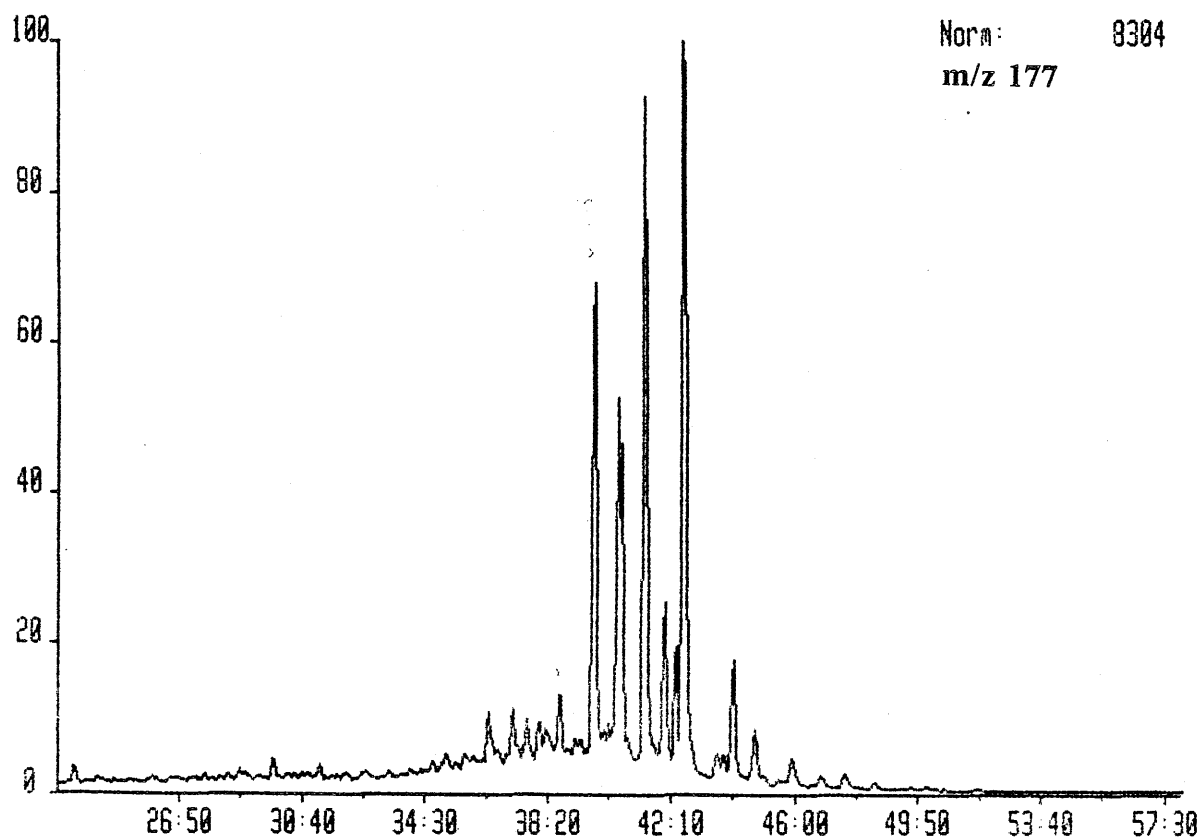
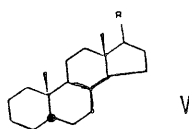
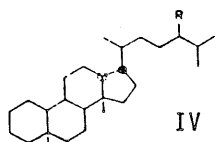
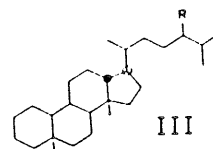
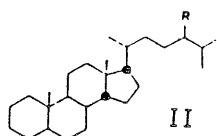
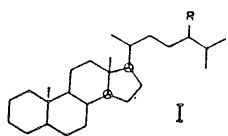


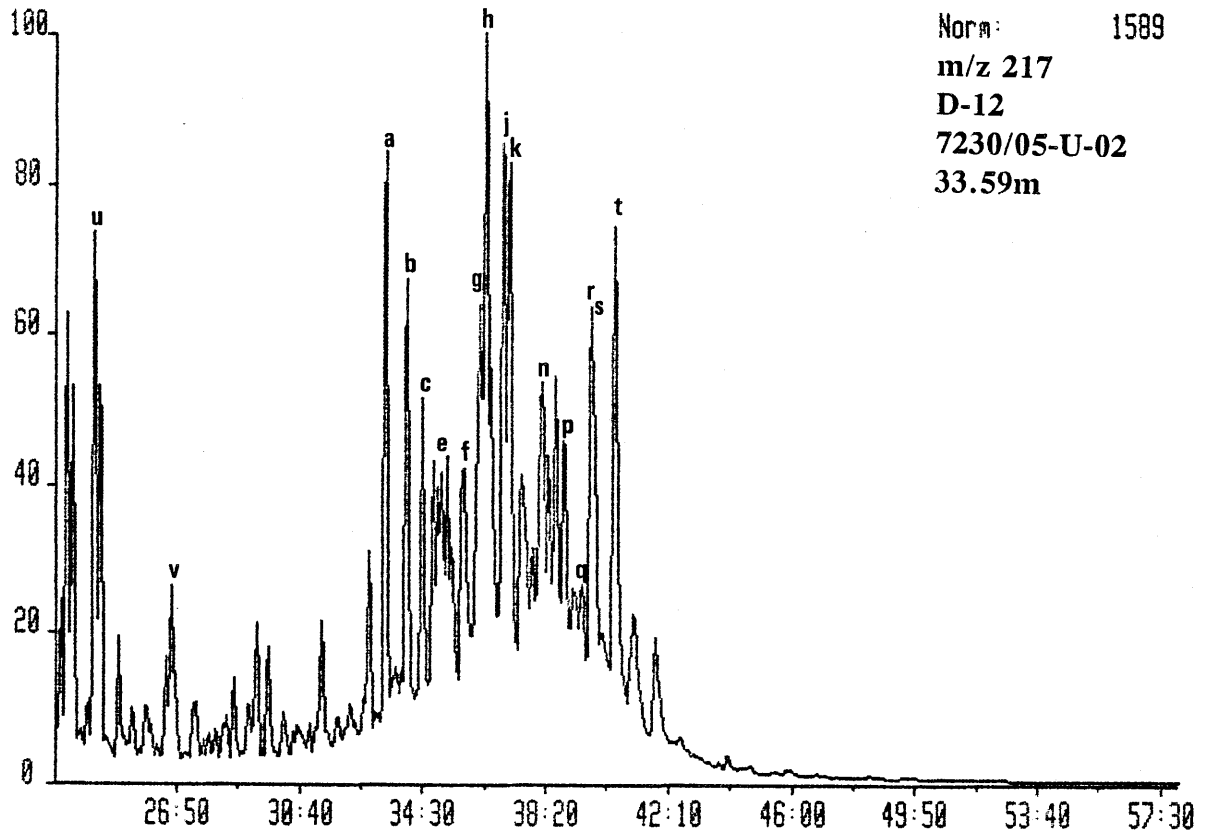
Figure A.II.8.5:

Mass fragmentograms of m/z 217, 218, 231, 259 (steranes)

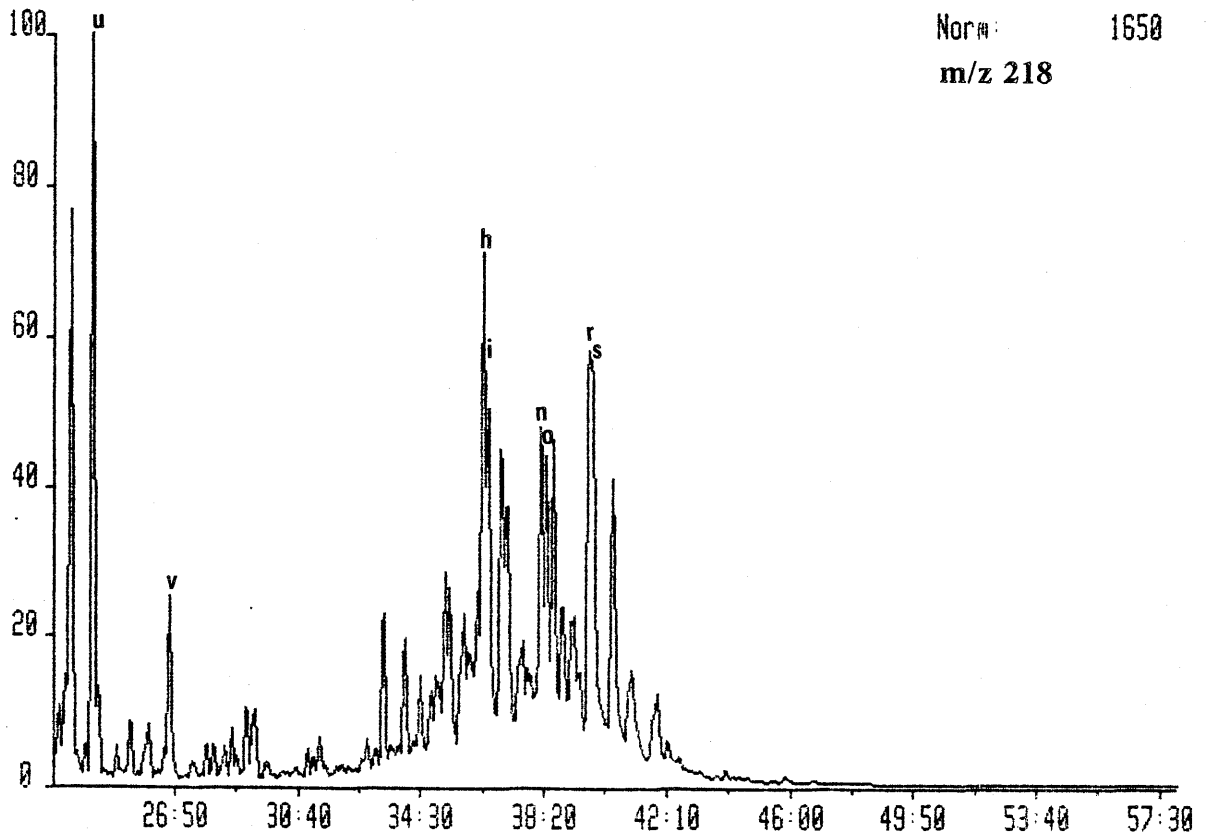
u	5 α (H)-sterane	C ₂₁ H ₃₆	(V, R=C ₂ H ₅)
v	5 α (H)-sterane	C ₂₂ H ₃₈	(V, R=C ₃ H ₇)
a	13 β (H), 17 α (H)-diasterane (20S)	C ₂₇ H ₄₈	(III, R=H)
b	13 β (H), 17 α (H)-diasterane (20R)	C ₂₇ H ₄₈	(III, R=H)
c	13 α (H), 17 β (H)-diasterane (20S)	C ₂₇ H ₄₈	(IV, R=H)
d	13 α (H), 17 β (H)-diasterane (20R)	C ₂₇ H ₄₈	(IV, R=H)
e	13 β (H), 17 α (H)-diasterane (20S)	C ₂₈ H ₅₀	(III, R=CH ₃)
f	13 β (H), 17 α (H)-diasterane (20R)	C ₂₈ H ₅₀	(III, R=CH ₃)
g	13 α (H), 17 β (H)-diasterane (20S)	C ₂₈ H ₅₀	(IV, R=CH ₃)
	+ 14 α (H), 17 α (H)-sterane (20S)	C ₂₇ H ₄₈	(I, R=H)
h	13 β (H), 17 α (H)-diasterane (20S)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₇ H ₄₈	(II, R=H)
i	14 β (H), 17 β (H)-sterane (20S)	C ₂₇ H ₄₈	(II, R=H)
	+ 13 α (H), 17 β (H)-diasterane (20R)	C ₂₈ H ₅₀	(IV, R=CH ₃)
j	14 α (H), 17 α (H)-sterane (20R)	C ₂₇ H ₄₈	(I, R=H)
k	13 β (H), 17 α (H)-diasterane (20R)	C ₂₉ H ₅₂	(III, R=C ₂ H ₅)
l	13 α (H), 17 β (H)-diasterane (20S)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
m	14 α (H), 17 α (H)-sterane (20S)	C ₂₈ H ₅₀	(I, R=CH ₃)
n	13 α (H), 17 β (H)-diasterane (20R)	C ₂₉ H ₅₂	(IV, R=C ₂ H ₅)
	+ 14 β (H), 17 β (H)-sterane (20R)	C ₂₈ H ₅₀	(II, R=CH ₃)
o	14 β (H), 17 β (H)-sterane (20S)	C ₂₈ H ₅₀	(II, R=CH ₃)
p	14 α (H), 17 α (H)-sterane (20R)	C ₂₈ H ₅₀	(I, R=CH ₃)
q	14 α (H), 17 α (H)-sterane (20S)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)
r	14 β (H), 17 β (H)-sterane (20R)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
	+ unknown sterane		
s	14 β (H), 17 β (H)-sterane (20S)	C ₂₉ H ₅₂	(II, R=C ₂ H ₅)
t	14 α (H), 17 α (H)-sterane (20R)	C ₂₉ H ₅₂	(I, R=C ₂ H ₅)



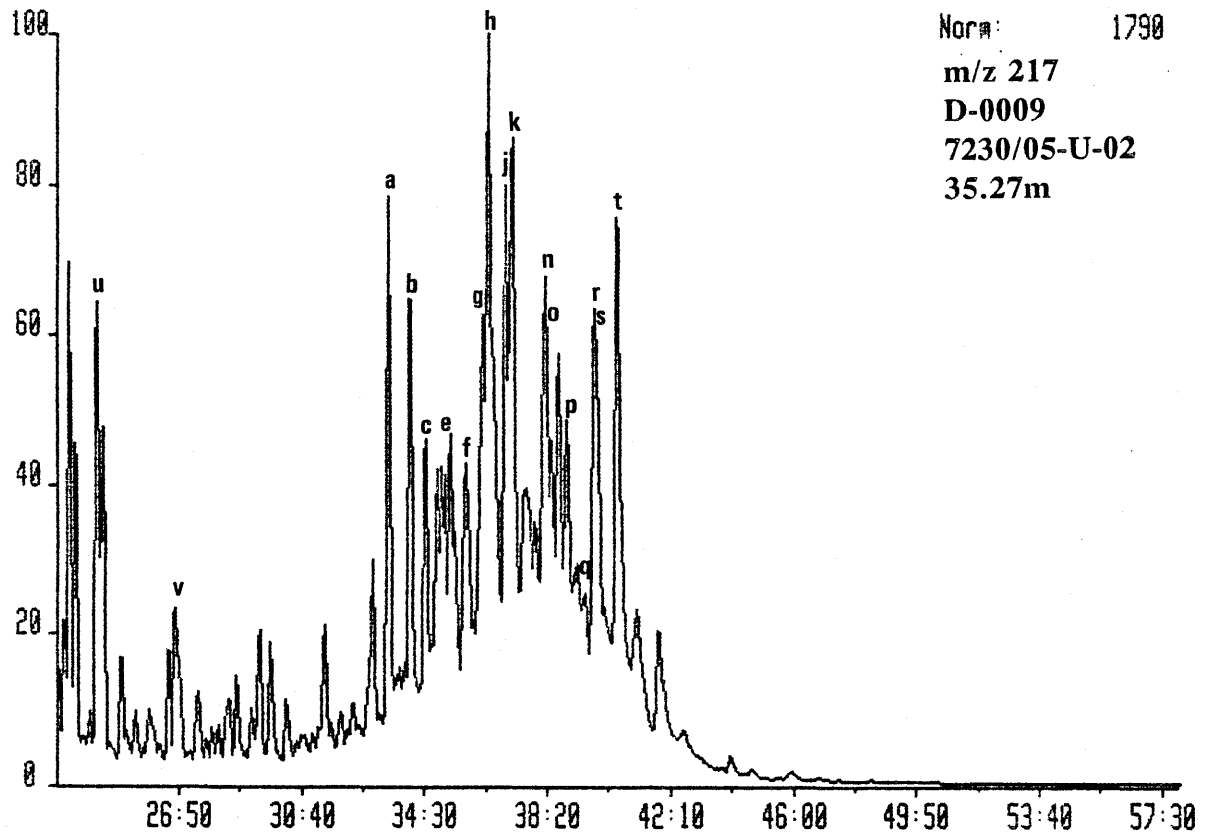
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



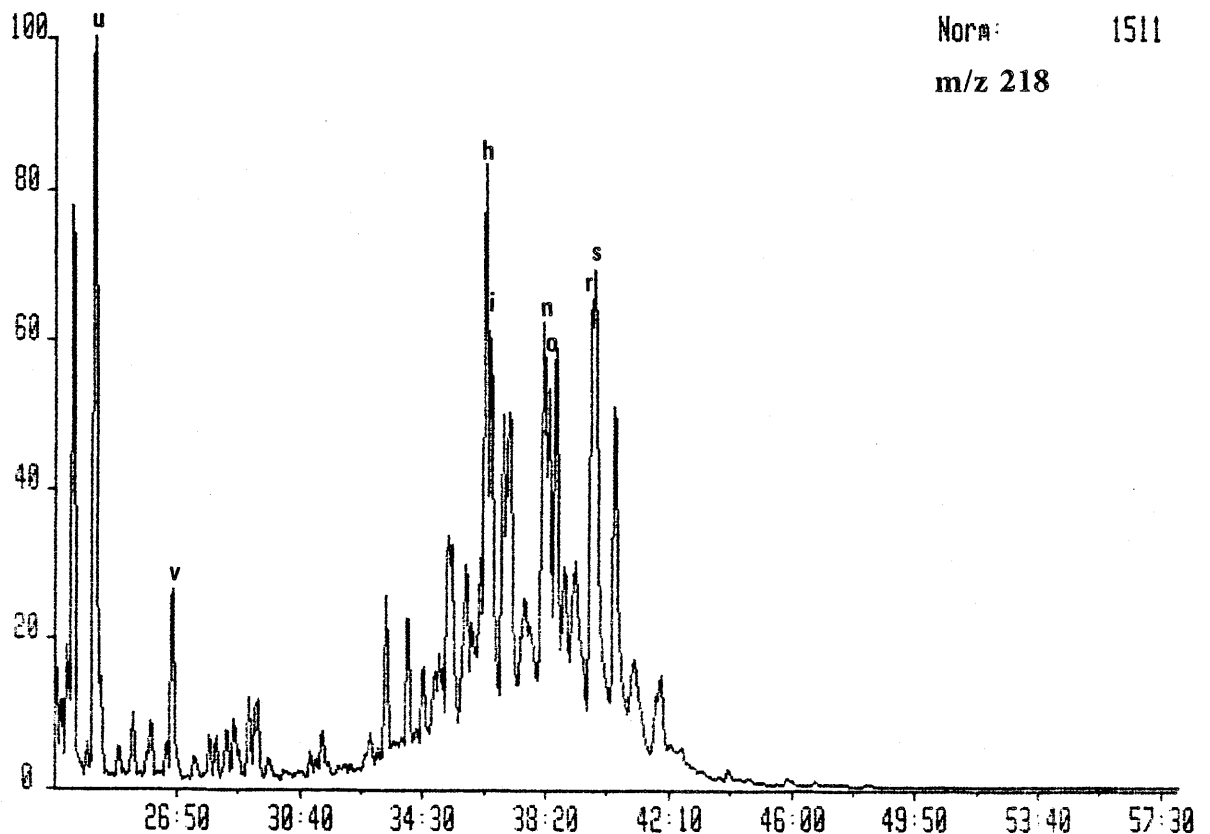
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



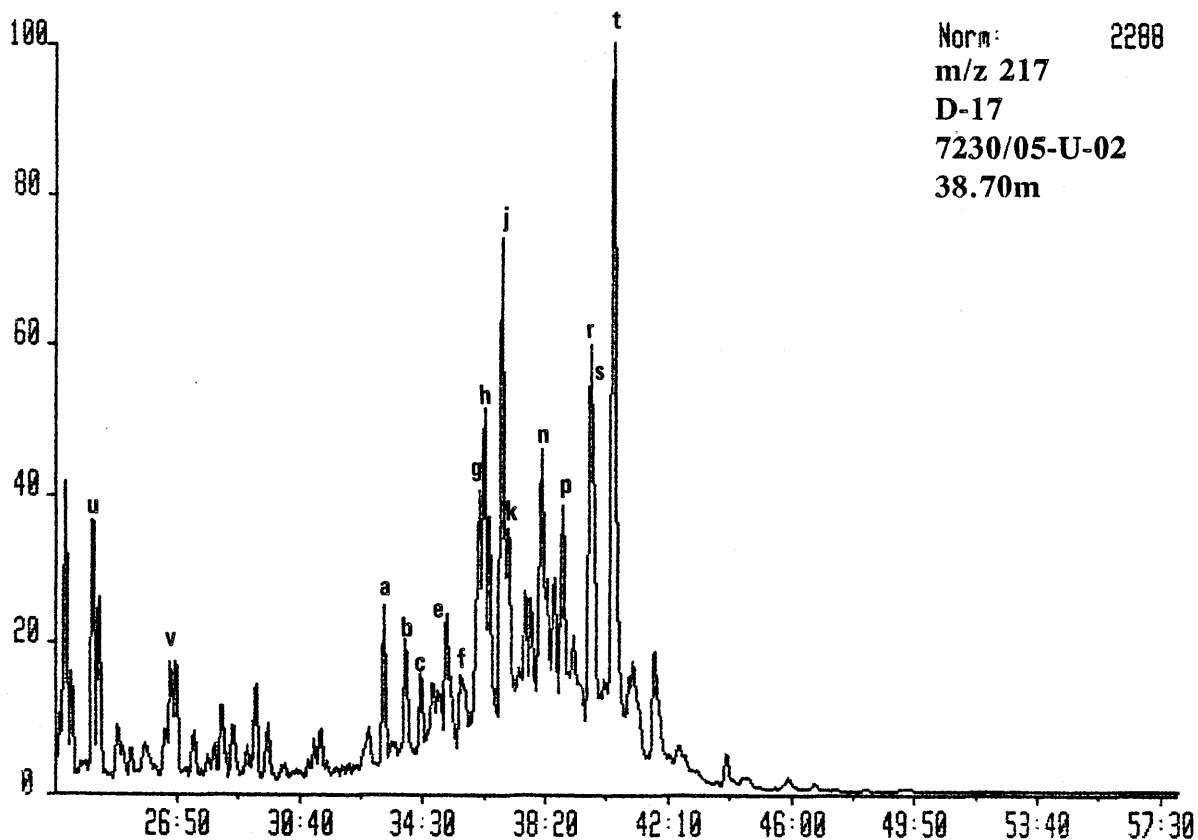
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



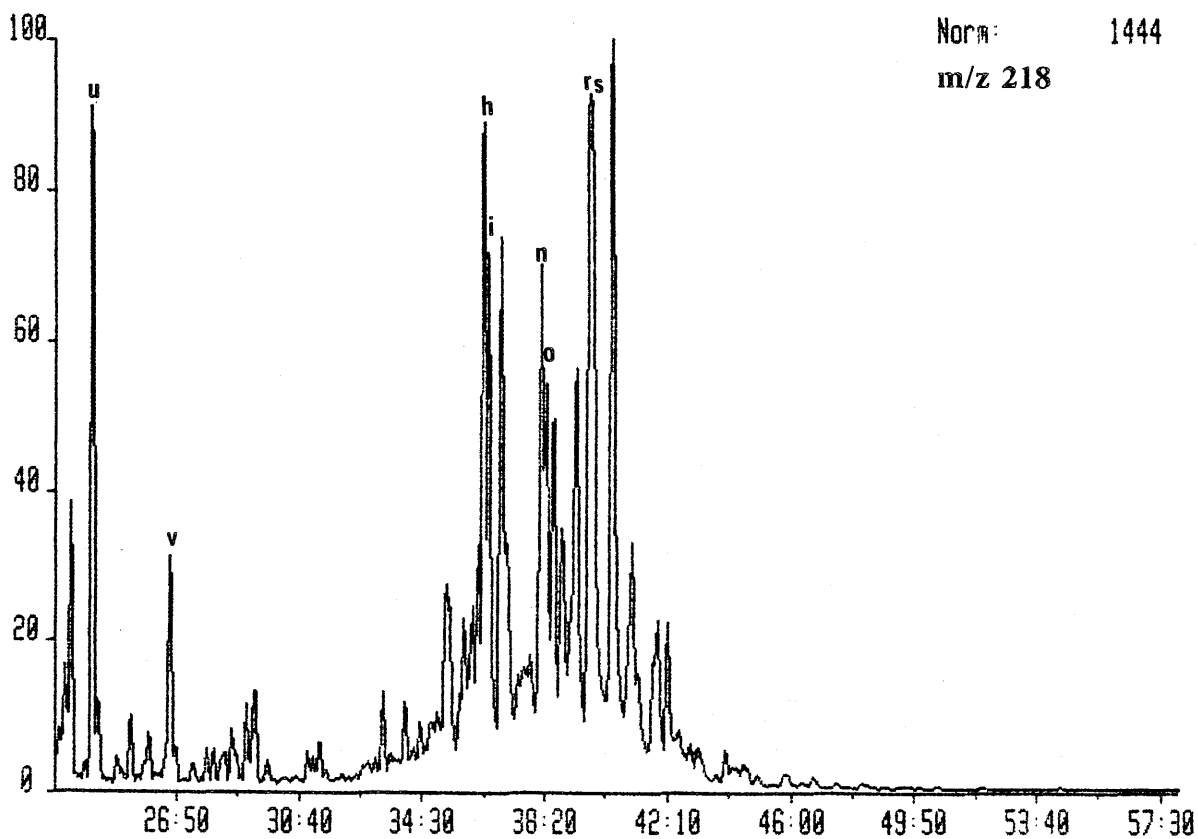
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23

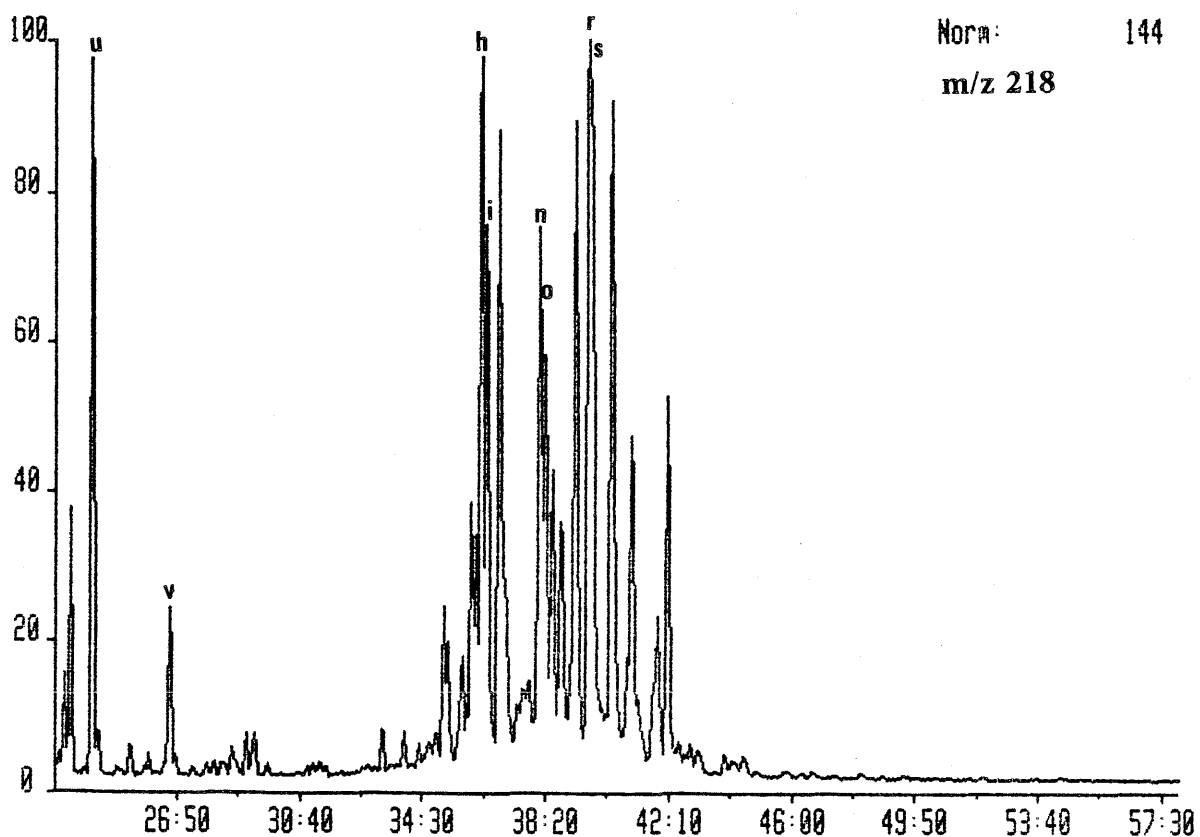
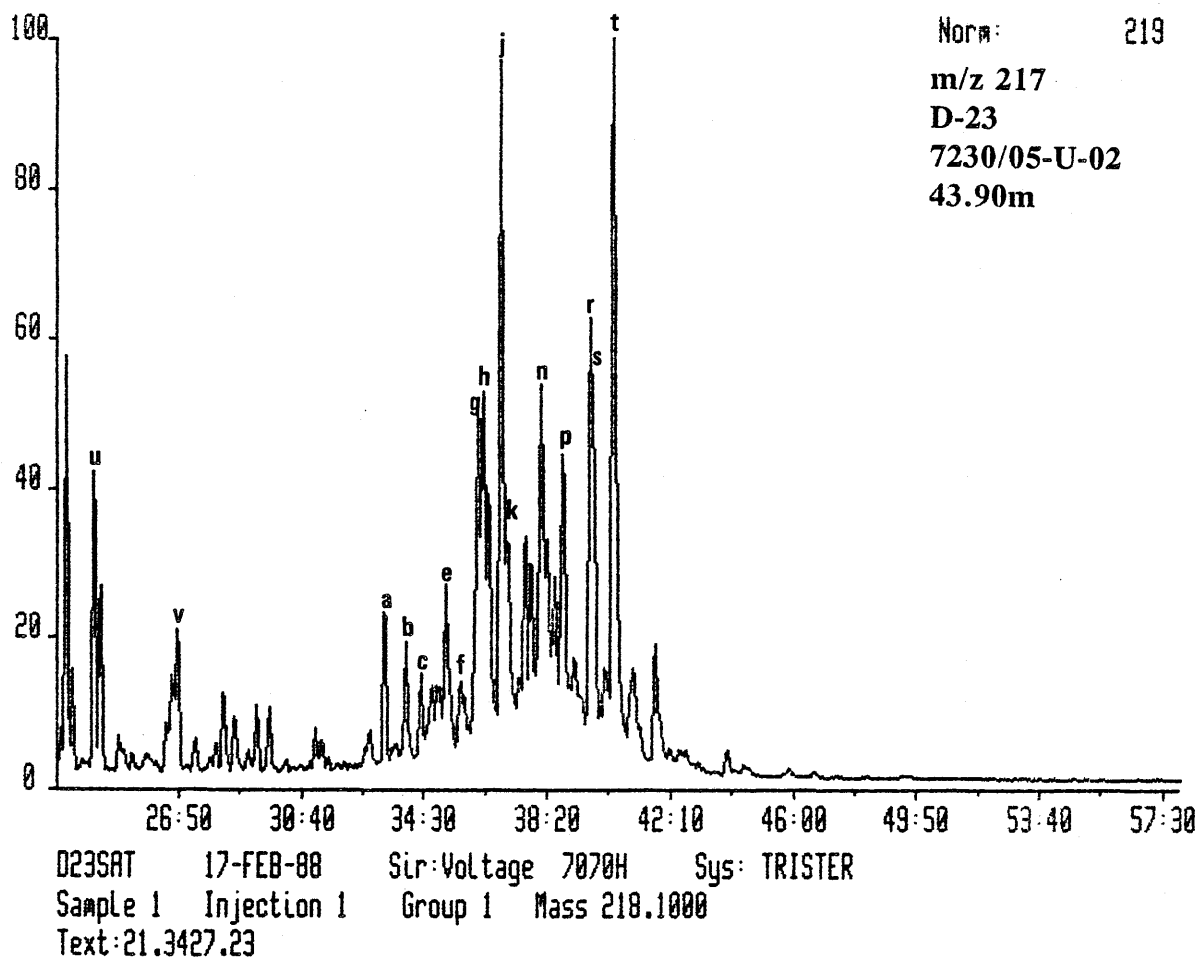




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D23SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23

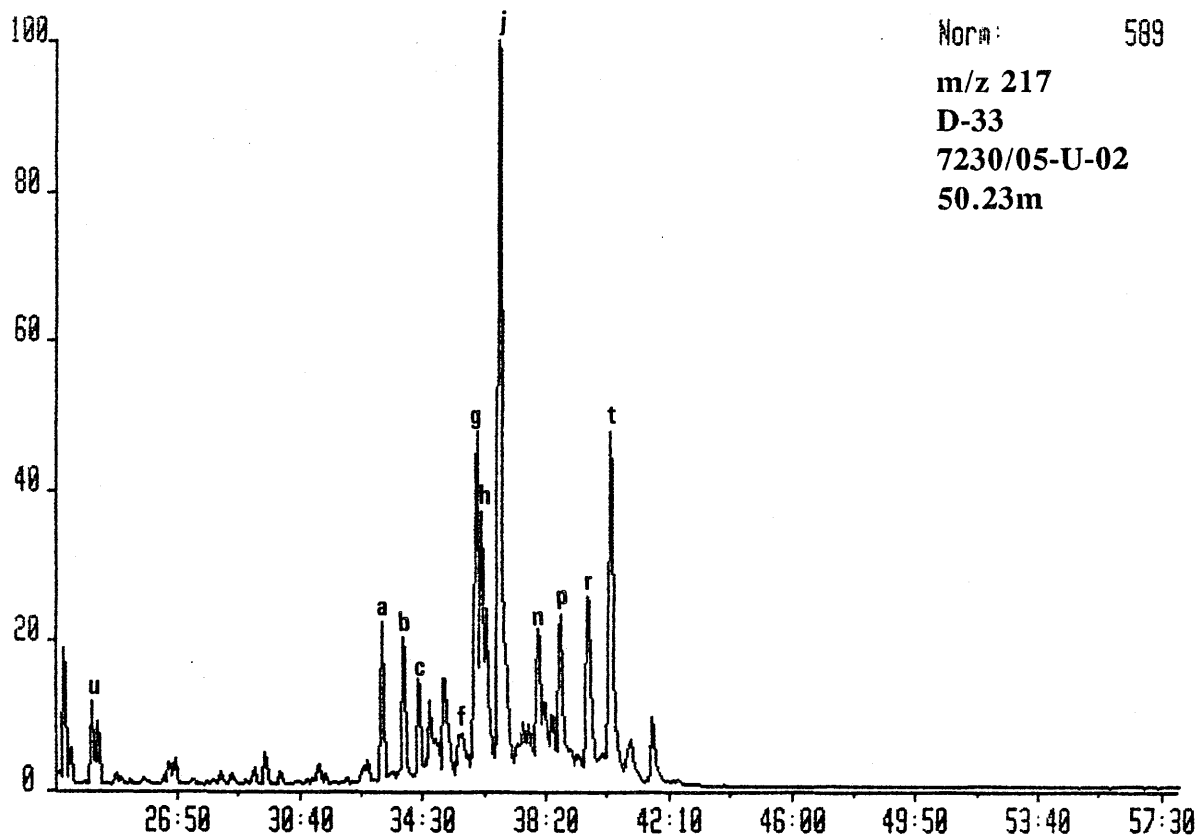




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033SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



Norm: 589

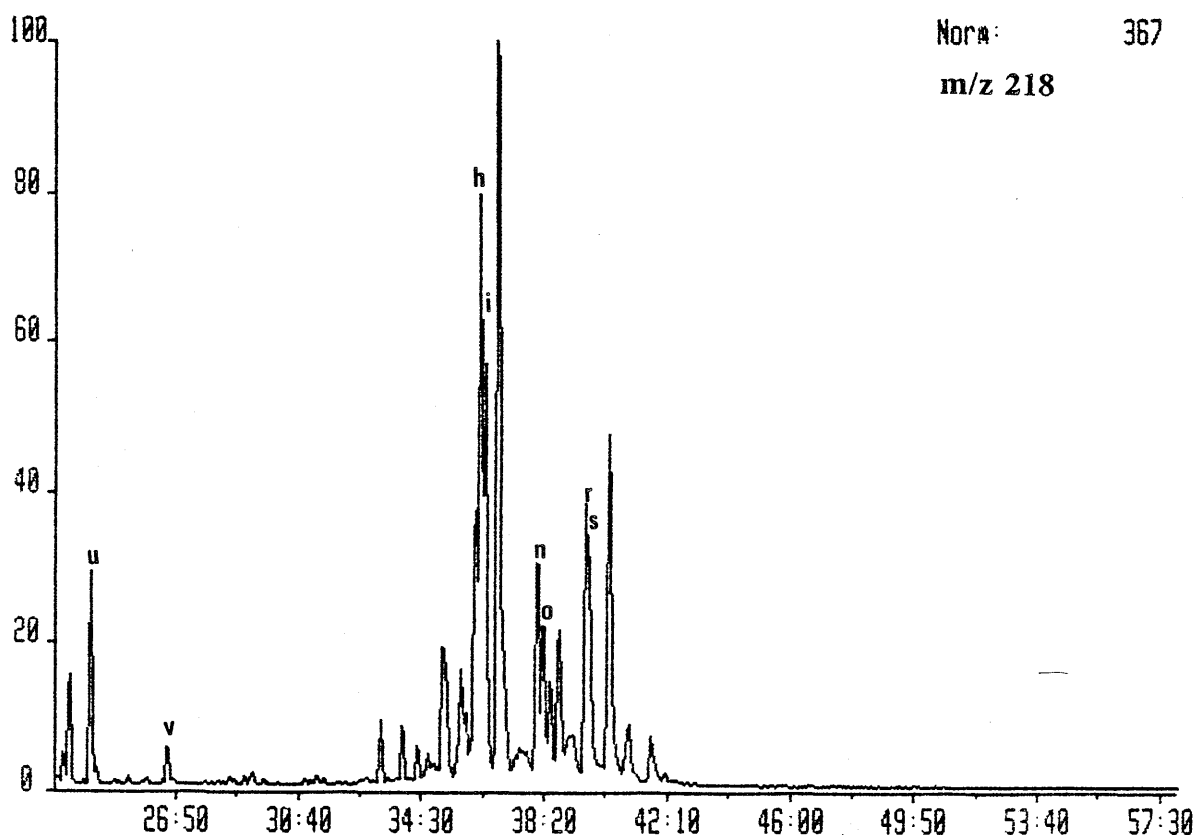
m/z 217

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50.23m

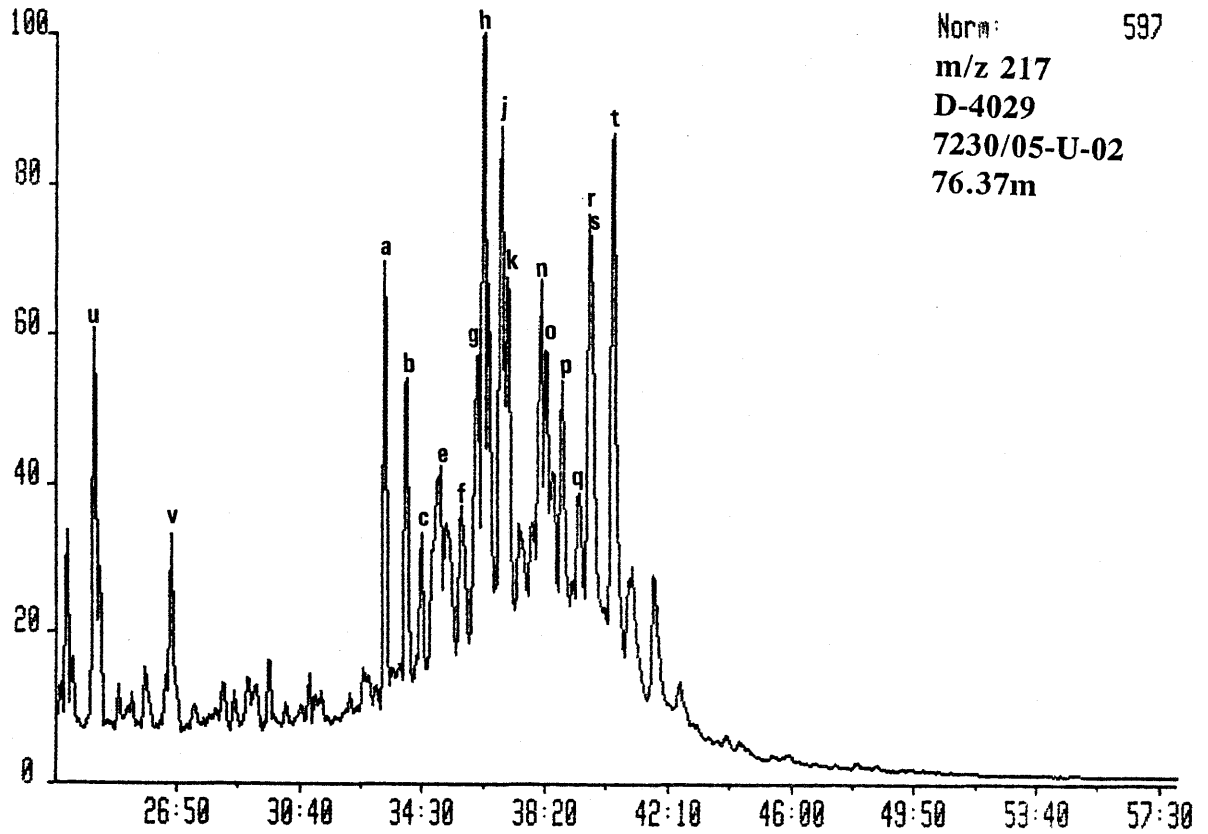
033SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



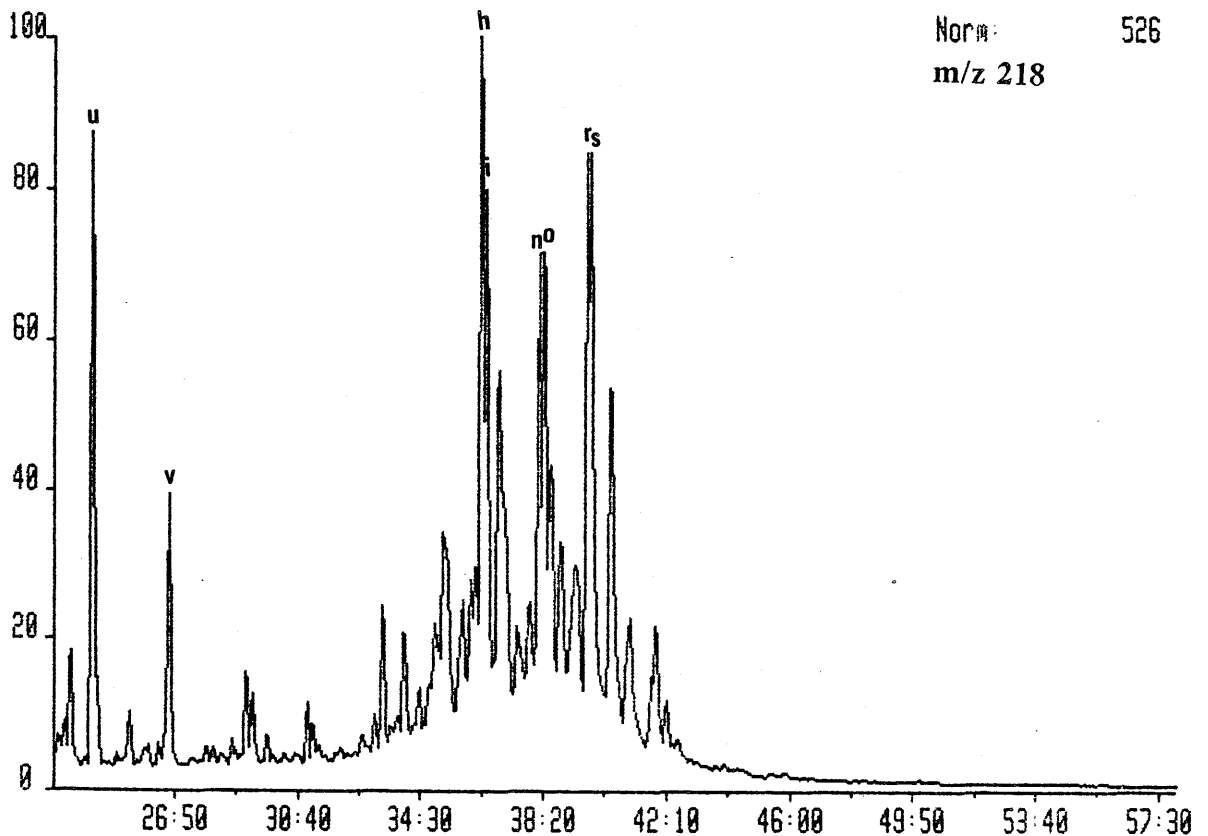
Norm: 367

m/z 218

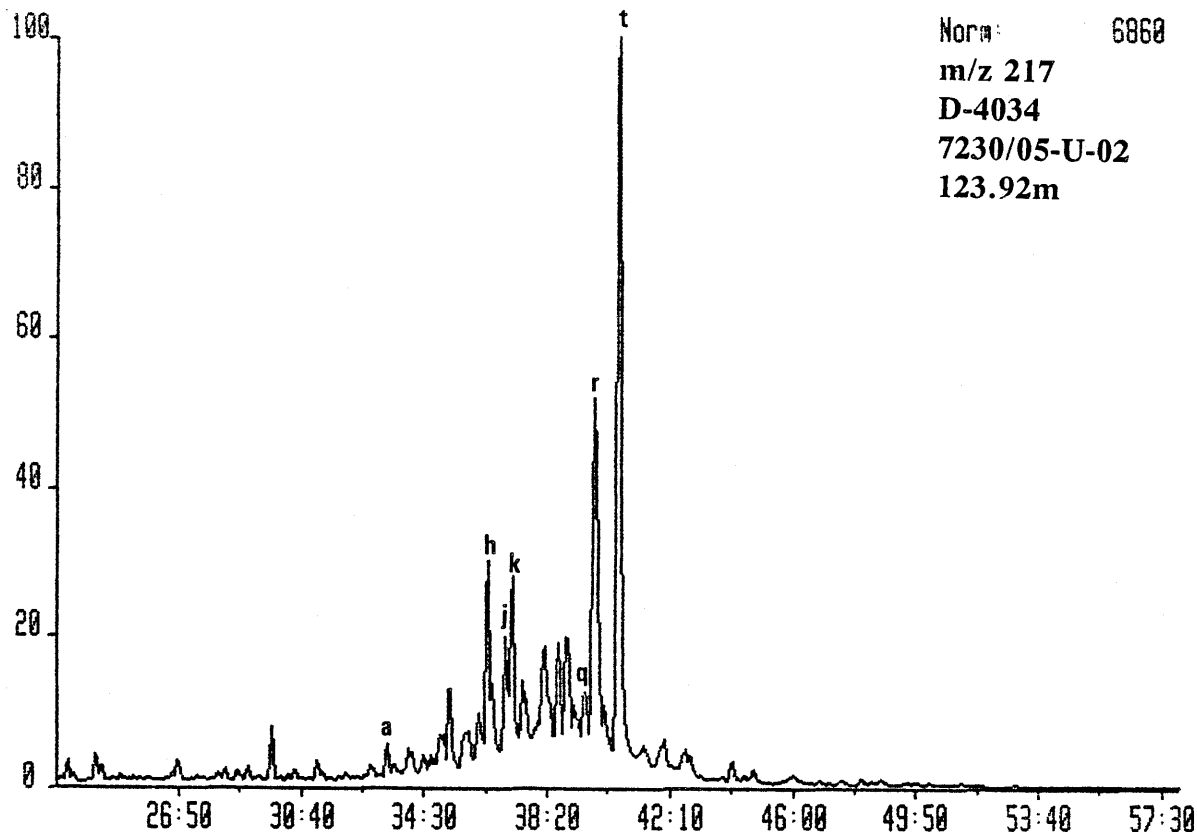
D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



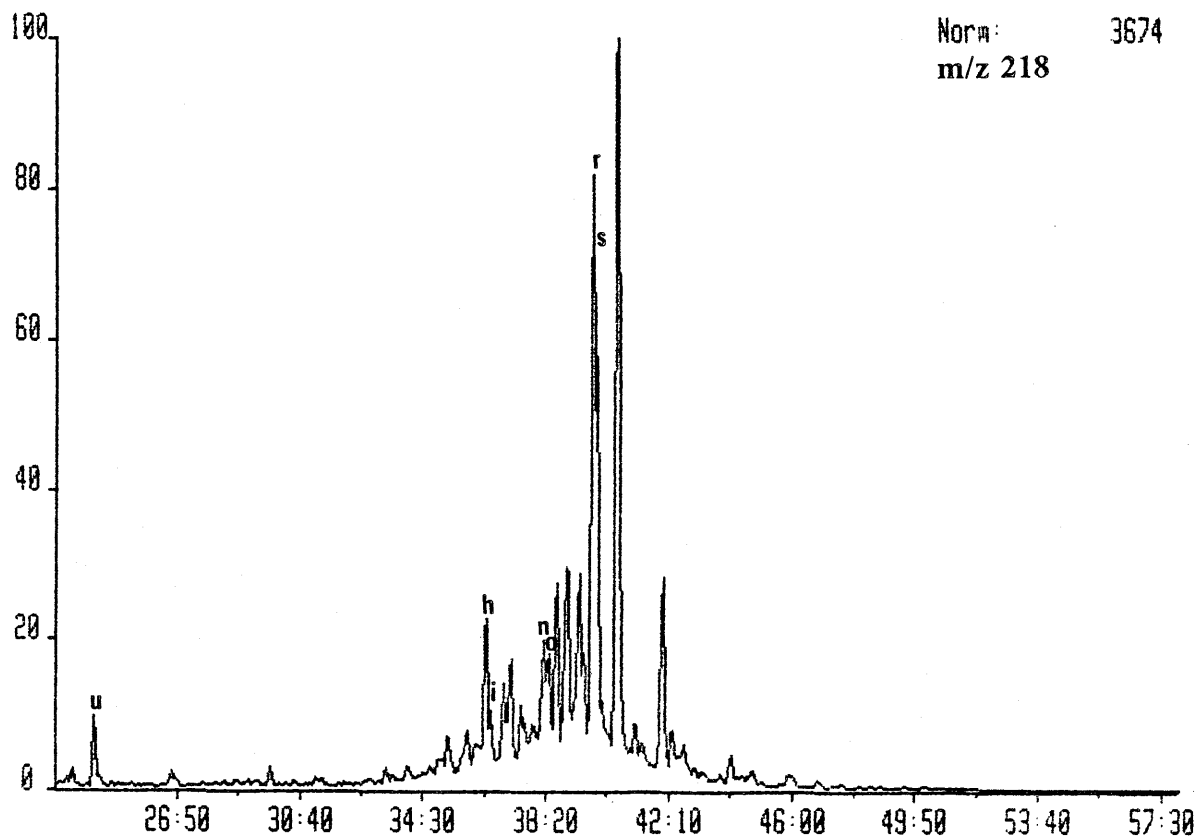
D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



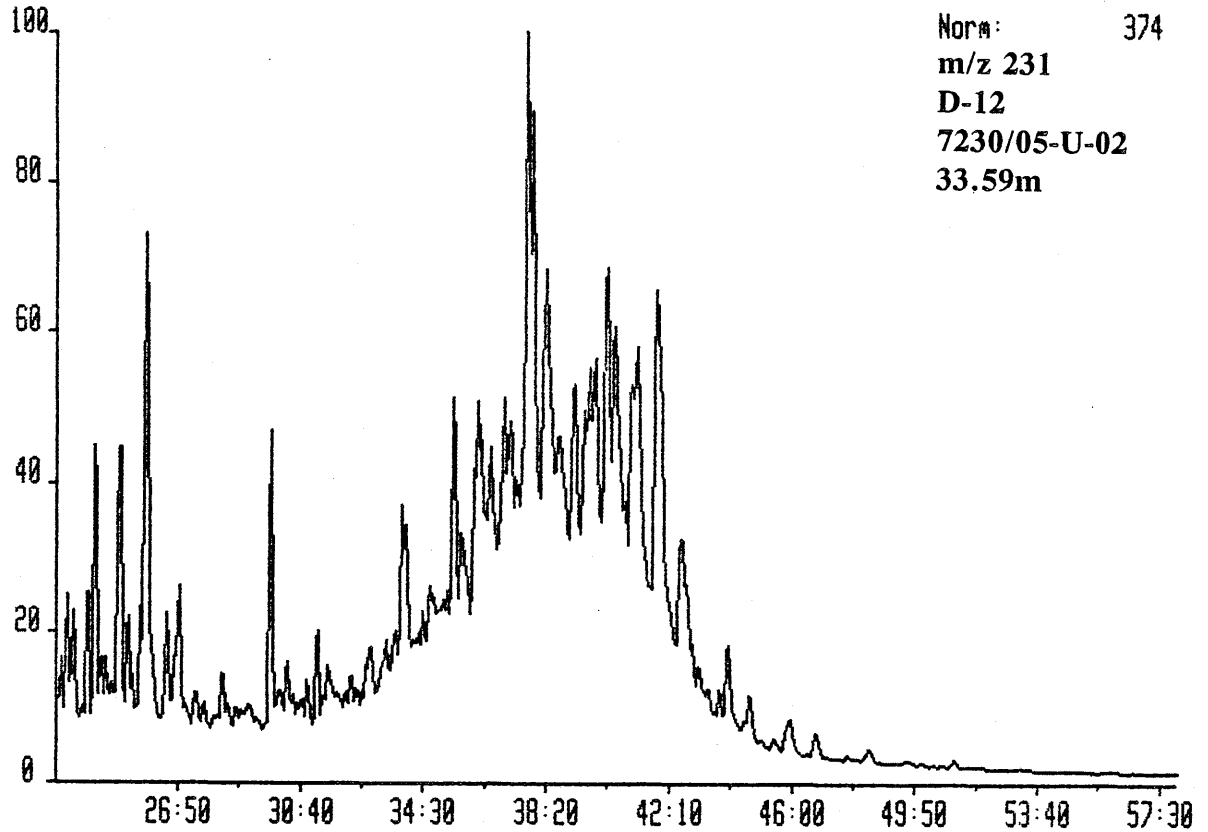
D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 217.1000
Text:21.3427.23



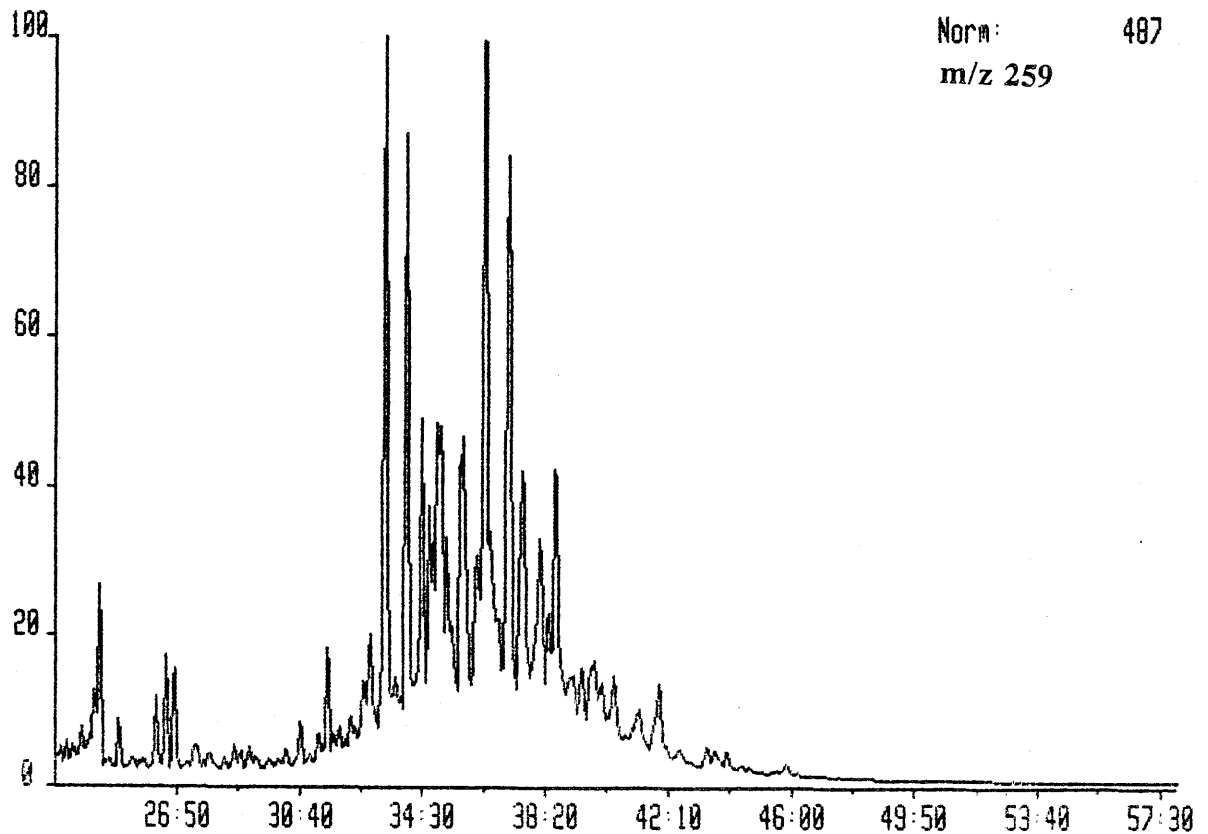
D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 218.1000
Text:21.3427.23



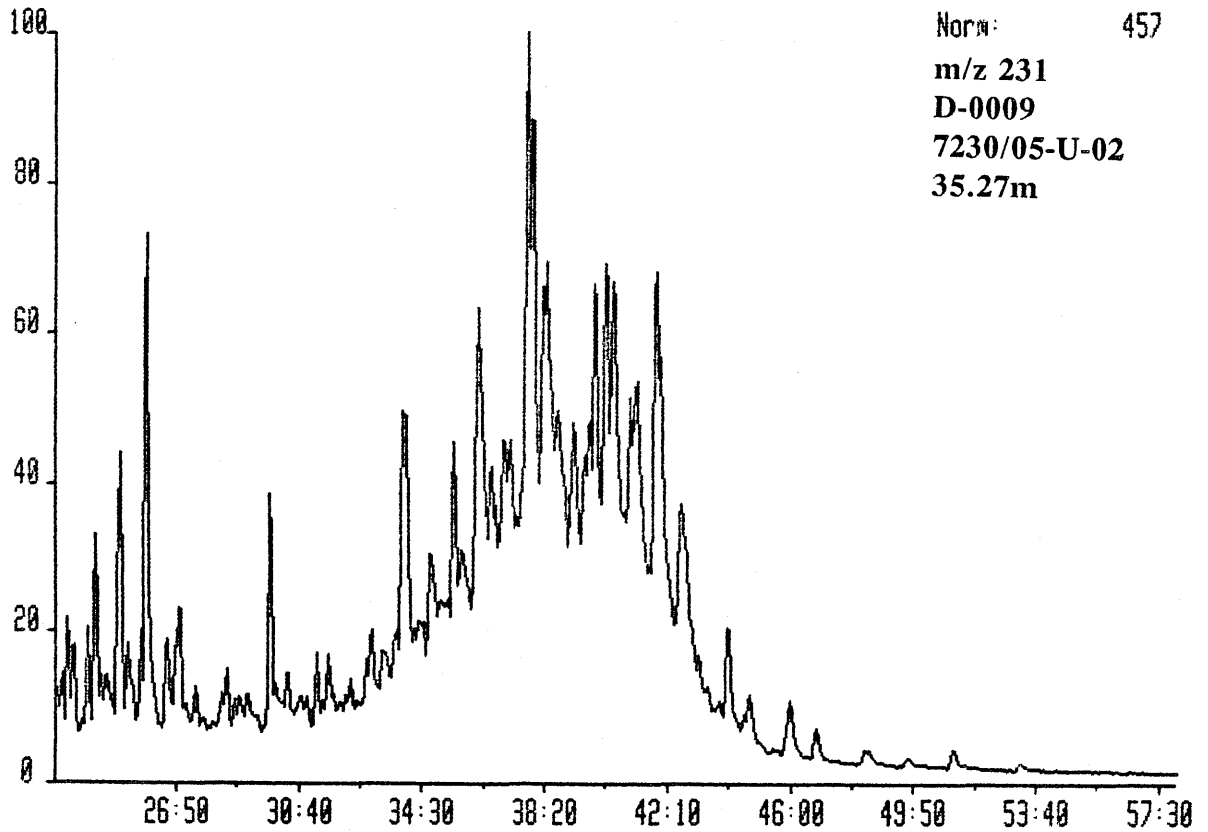
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



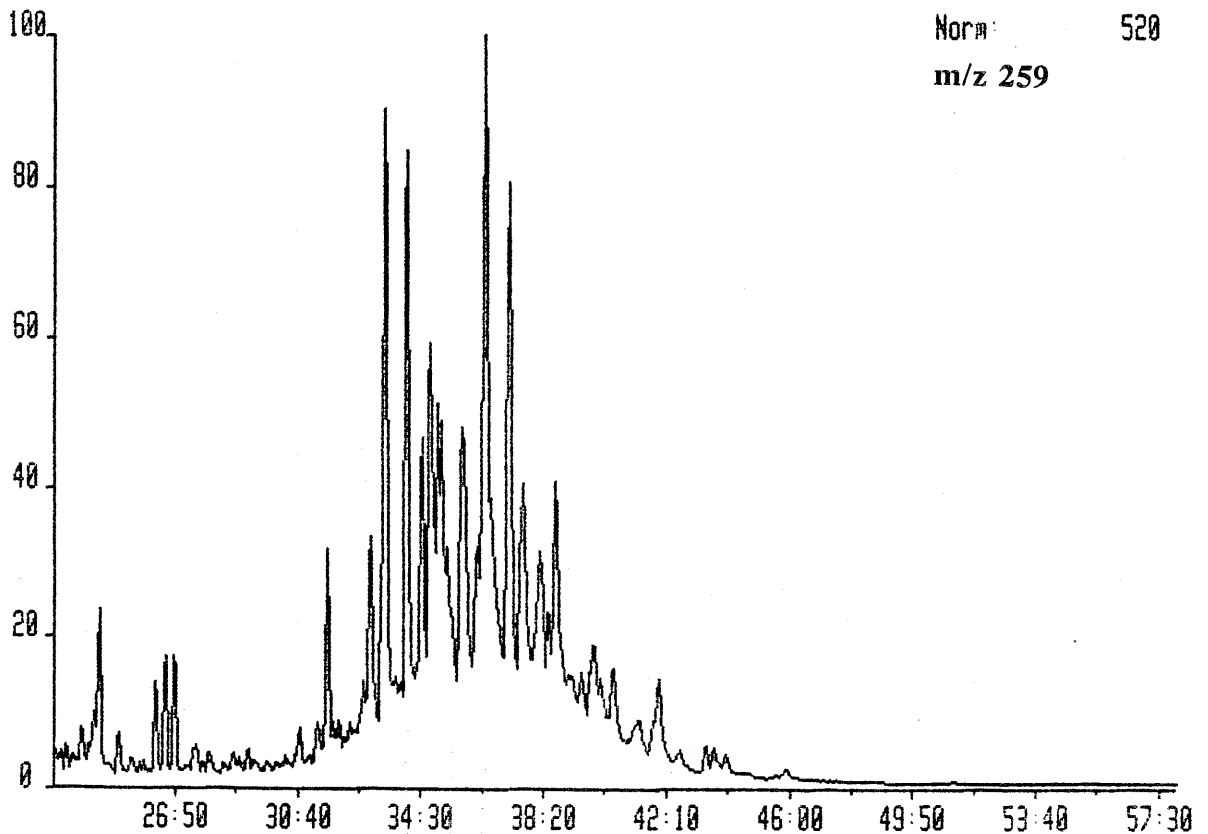
D12SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



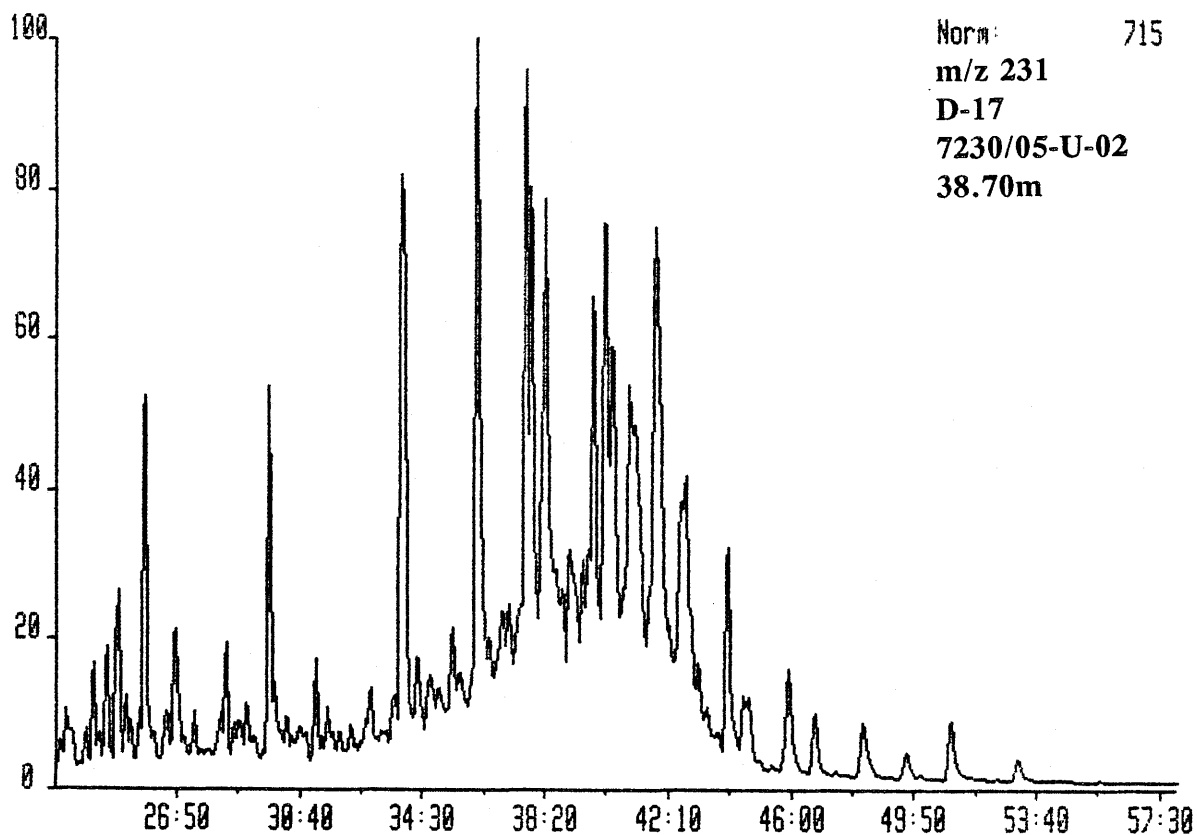
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



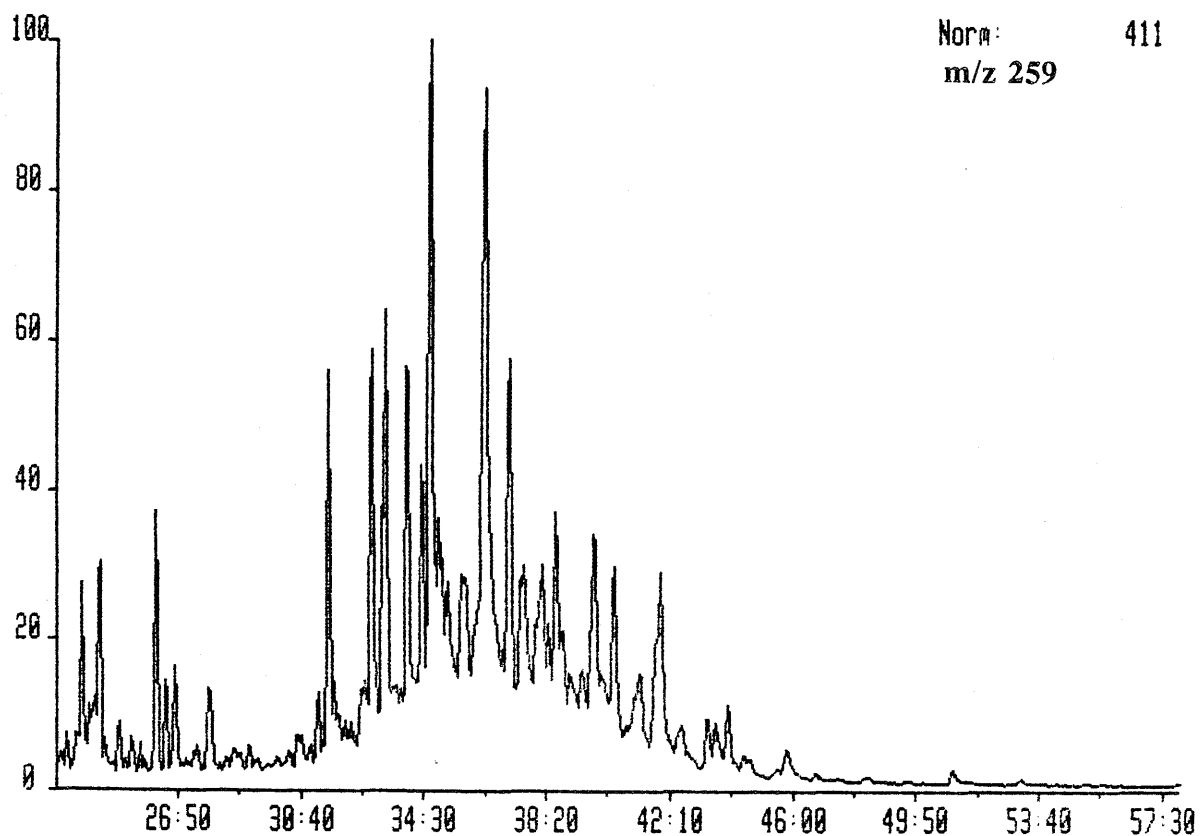
D9SAT 1-MAR-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



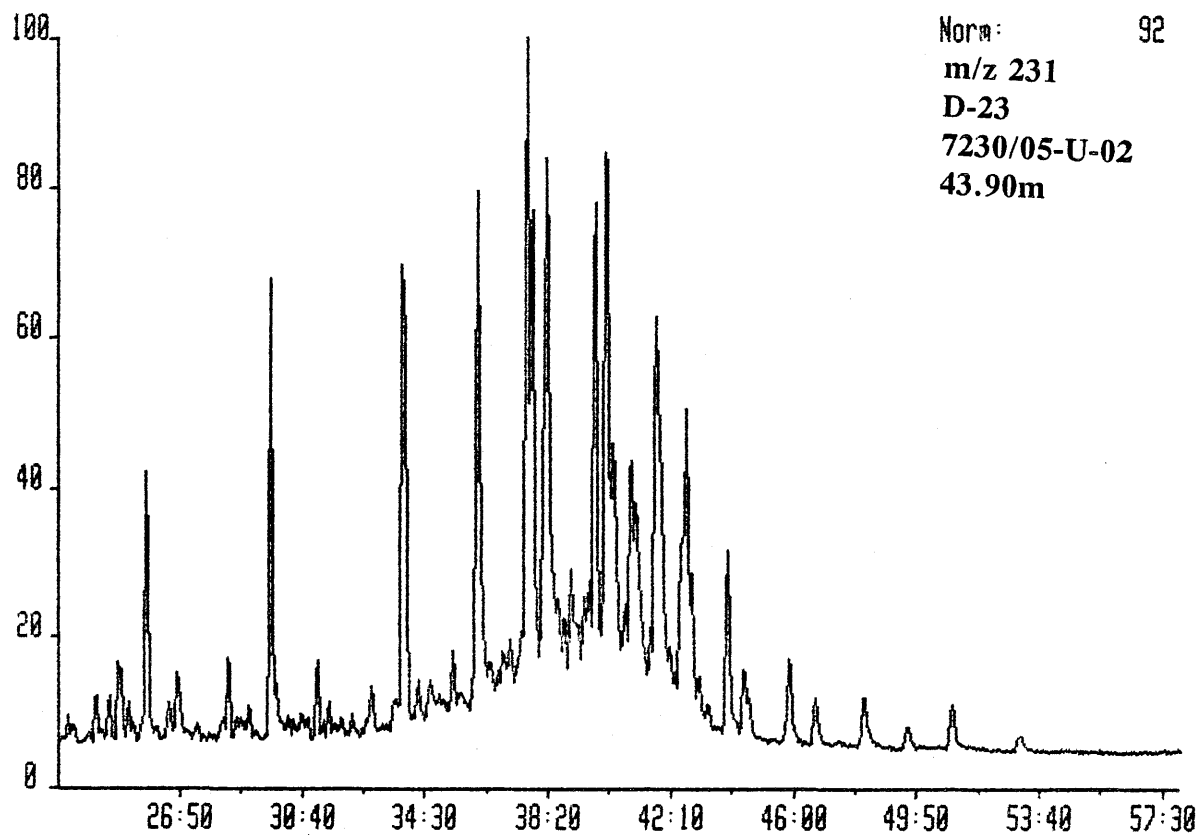
D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



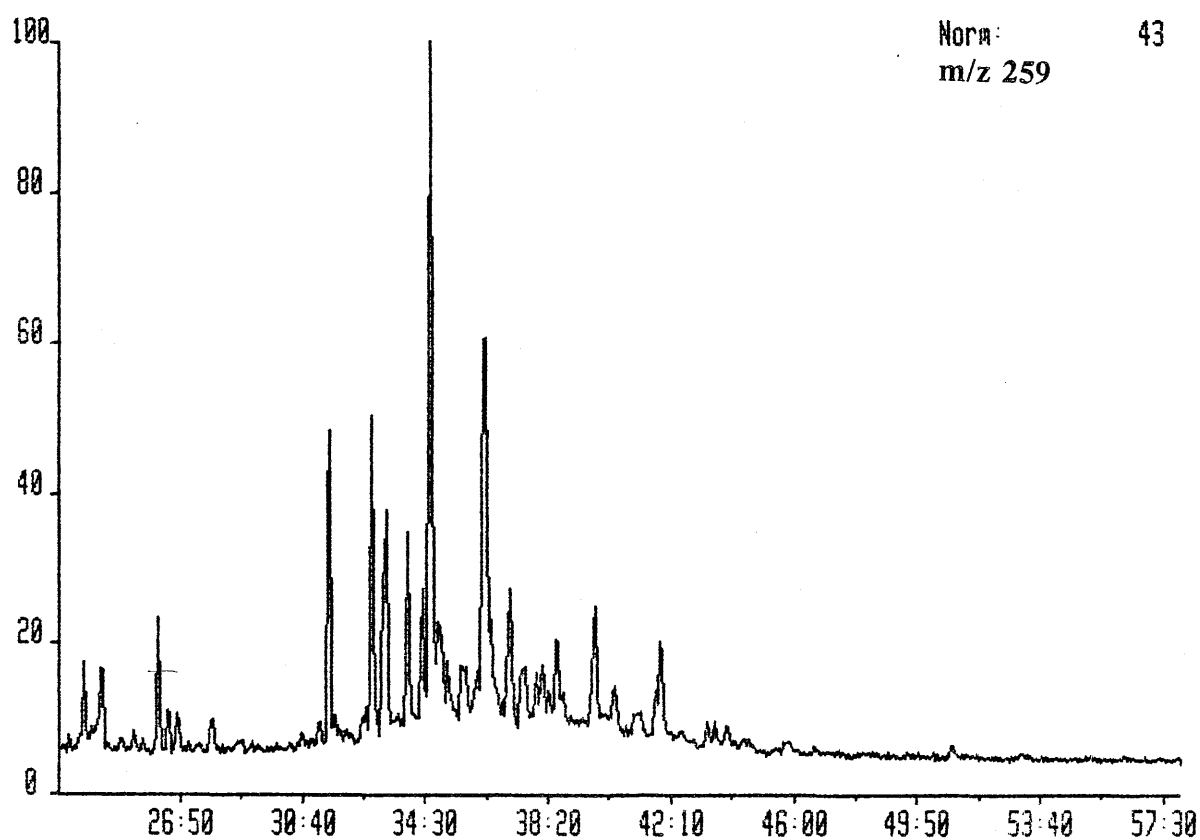
D17SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D23SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D23SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

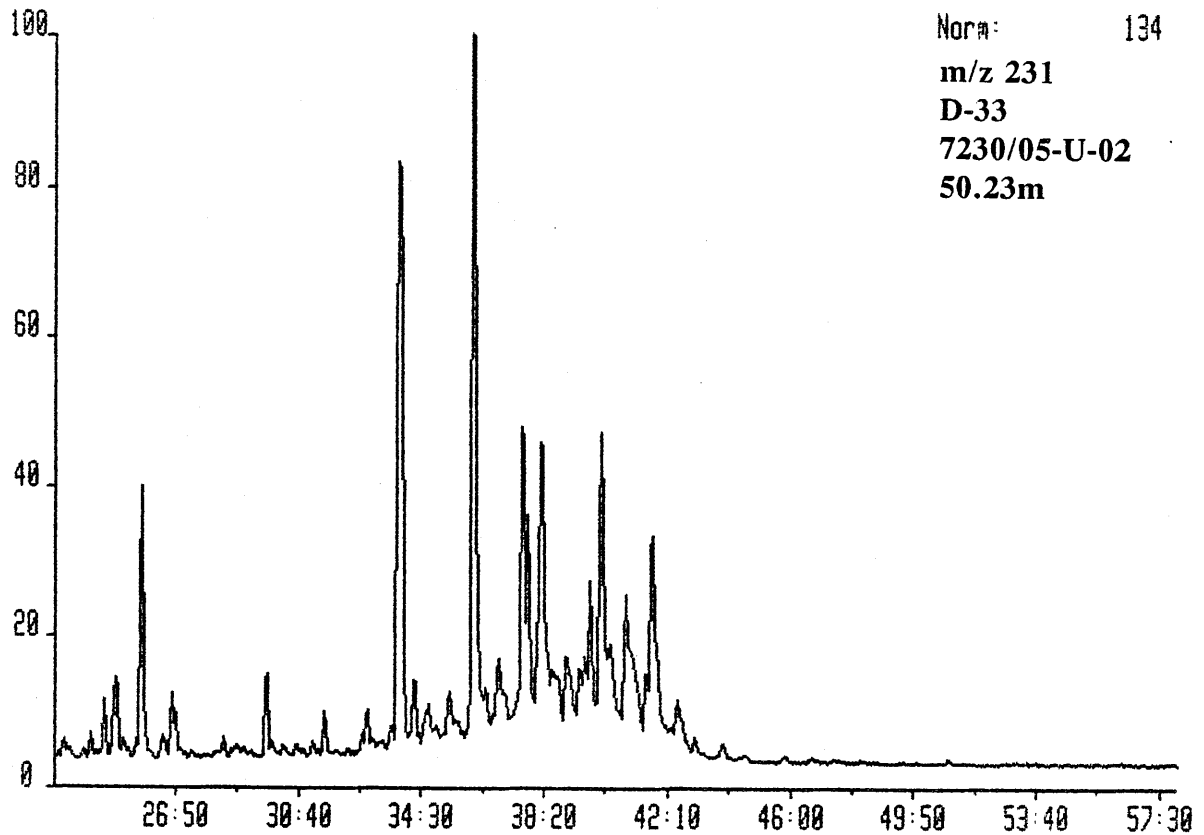




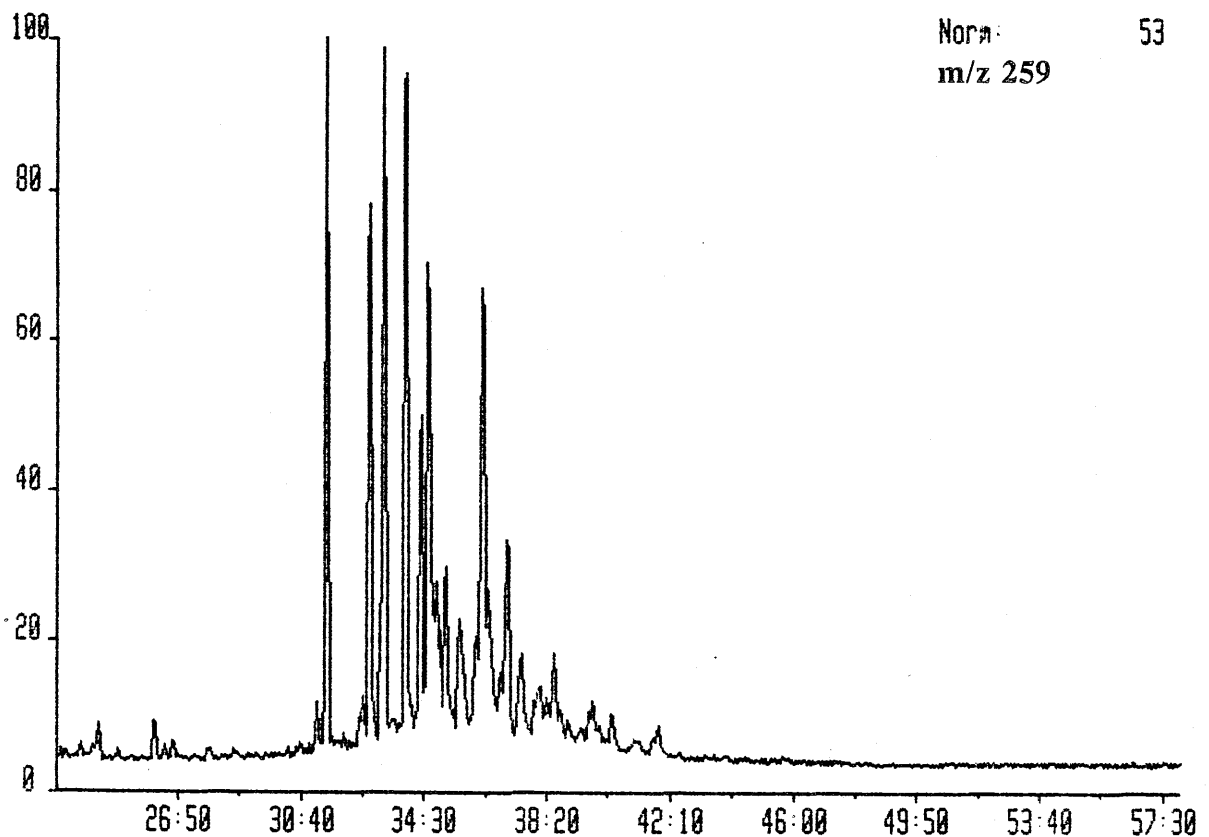
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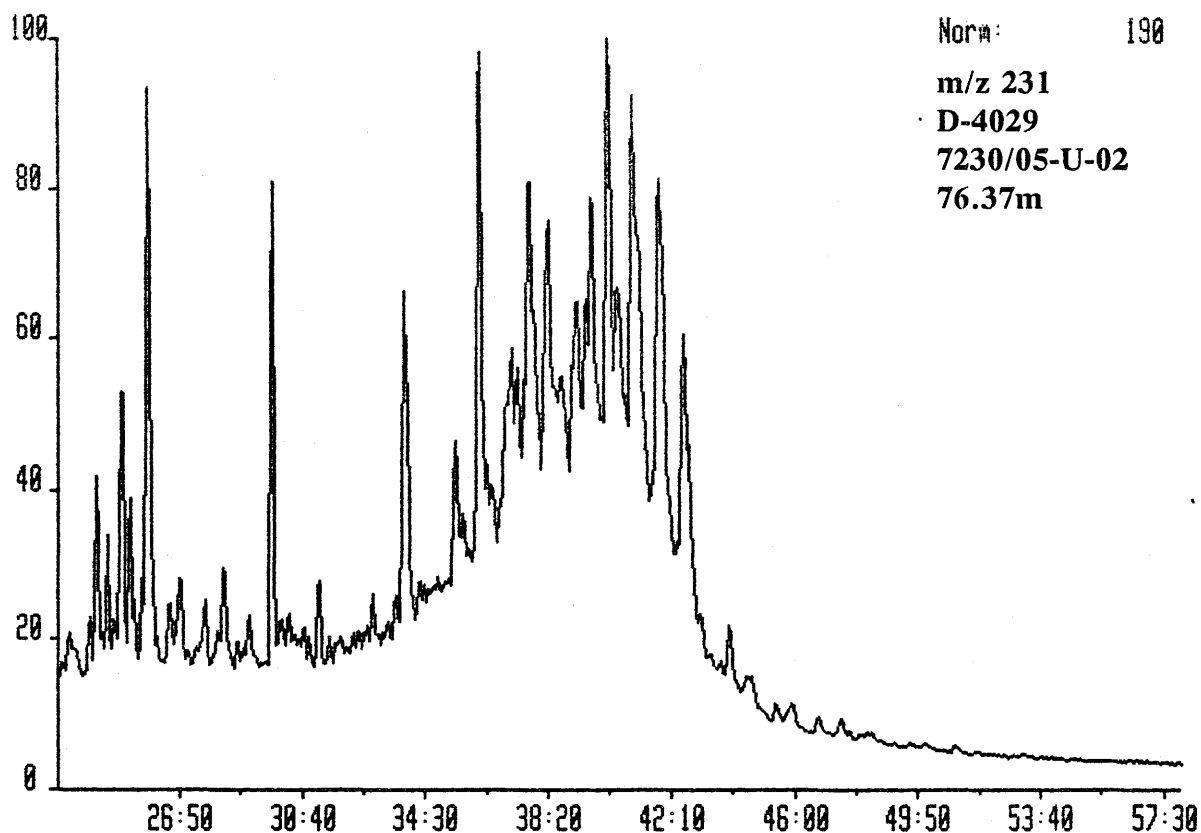
D33SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



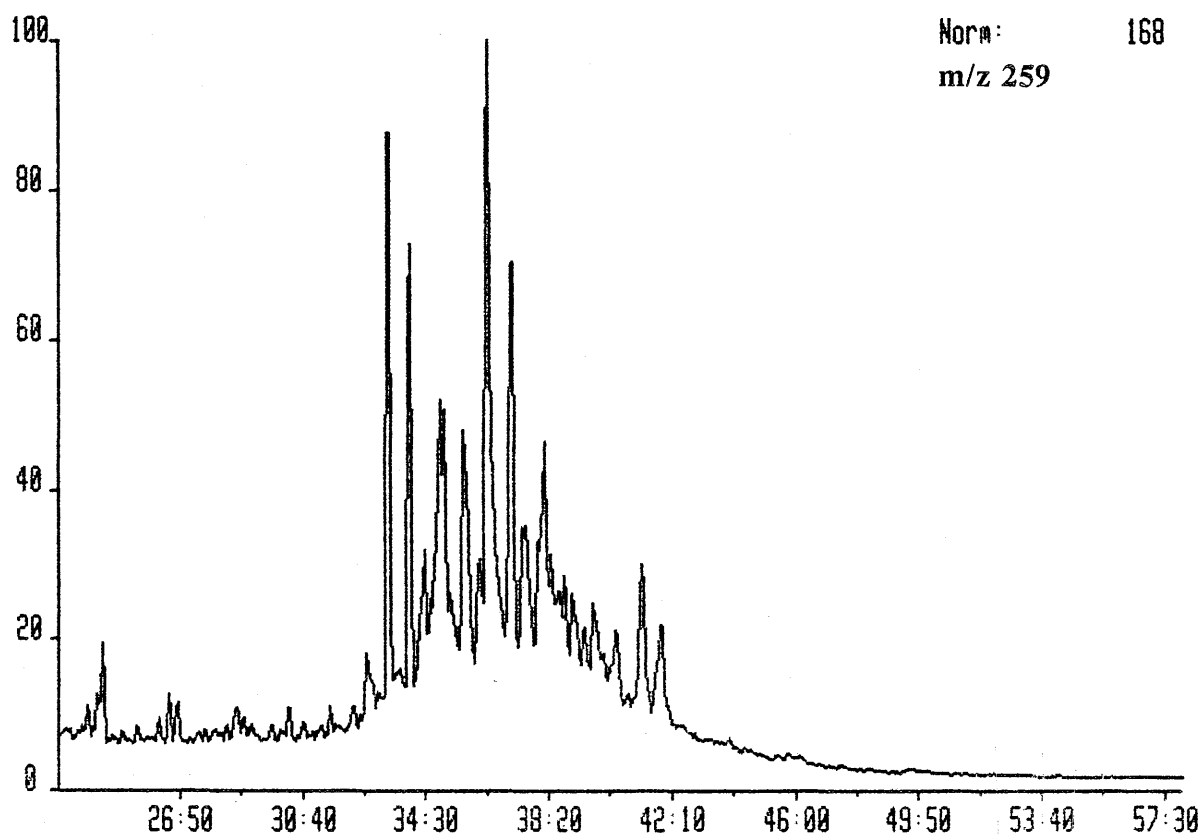
D33SAT 17-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



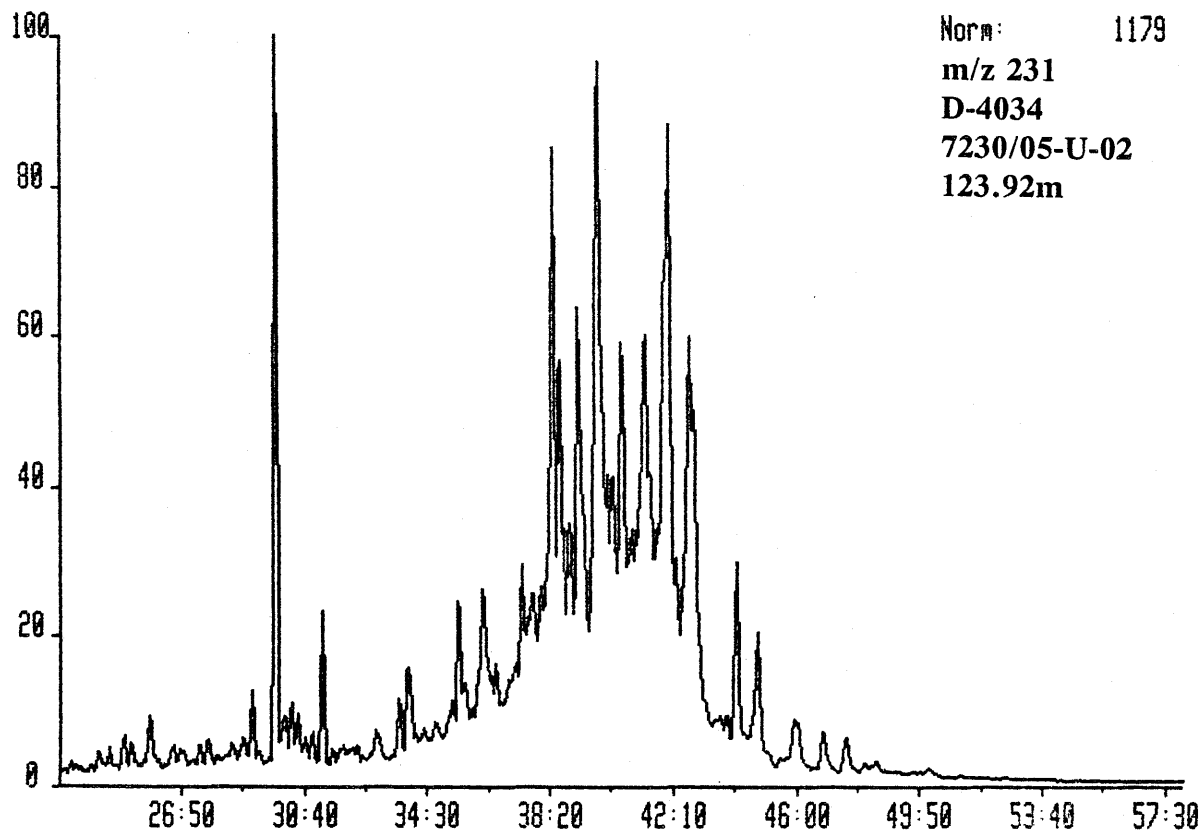
D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D4029SAT 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23



D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 231.1000
Text:21.3427.23



D4034SAT1 16-FEB-88 Sir:Voltage 7070H Sys: TRISTER
Sample 1 Injection 1 Group 1 Mass 259.1000
Text:21.3427.23

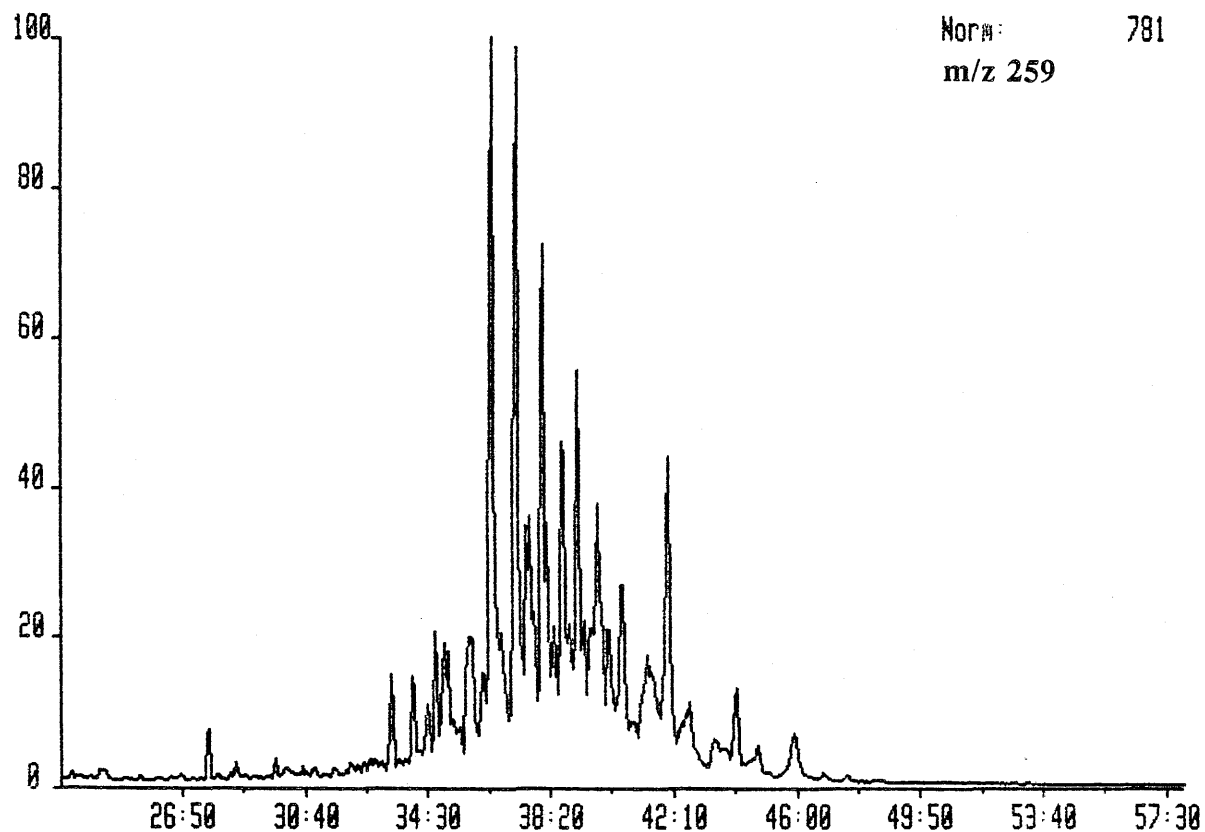


Figure A.II.8.6: Vitrinite reflectance histograms.

Key:

A	= Grey-black-brown claystone.
	Upper case letters indicate values included in the main population. Lower case letters represent values in other population.
pp	= Statistical data population
	Y = Main population, not necessarily representative of sample maturity.
	N = Other populations.
LOW+HIGH	= Population limits.
VAL.	= Number of measurements in that population.

Lithology cross-reference table

A = Clst. gy
 B = Clst. dk gy
 C = Clst. dk gy
 D = Clst. gn
 E = Clst. bn
 F = Clst. rd
 G = Clst. carb.
 H = Shale
 I = Sandstone
 J = Limestone
 K = Coal
 L = Lignite
 M = Carbargillite
 N = Siltstone
 O = Bit
 P = X

14-	
12-	
10-	N
	N
8-	K
	KN
6-	KI
	KK
4-	KKN
	KKN
2-	KKI
	KKI

PP	LOW	HIGH	LIT	#VAL	MEAN	STDV
Y	0.21	0.34	ALL	21	0.26	0.04
			OVERALL	21	0.26	0.04

0.21K	0.22K	0.22K	0.22N	0.23K	0.23K	0.23K	0.24N	0.24K	0.24K	0.25N
0.26K	0.26K	0.27I	0.27K	0.29K	0.29K	0.30N	0.31I	0.31I	0.33N	

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```

  |
14-|
  |
12-|
  |
10-|
  | KK
 8-| KK
  | KK
 6-| KK
  | KK
 4-| KK
  | KK
 2-| KKK
  | KKK

```

```

0-+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
  0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

```

```

PP LOW HIGH LIT #VAL MEAN STDV
Y 0.23 0.34 ALL 20 0.26 0.03
  OVERALL 20 0.26 0.03

```

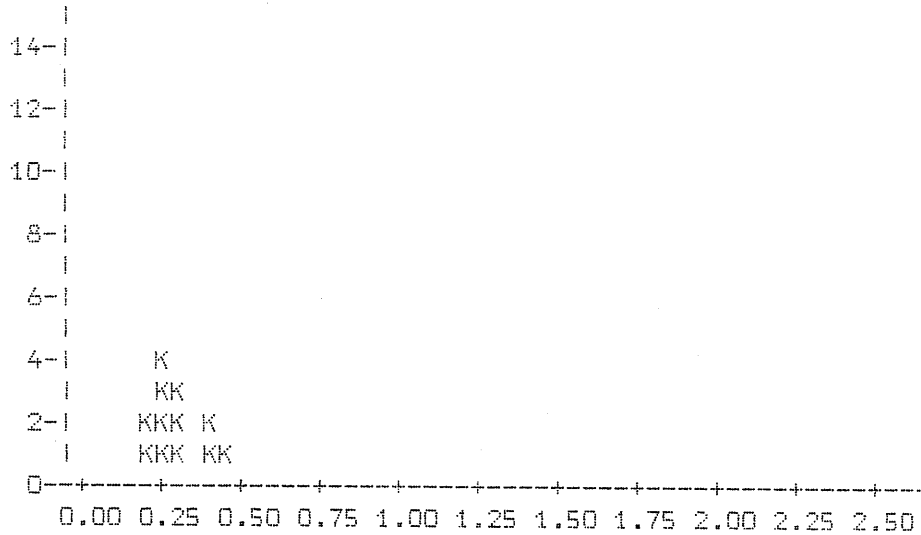
ORDERED VALUES FOLLOW:

```

0.23K 0.23K 0.23K 0.24K 0.24K 0.24K 0.24K 0.24K 0.24K 0.25K 0.26K
0.26K 0.26K 0.27K 0.27K 0.28K 0.28K 0.29K 0.30K 0.33K

```

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PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.23 0.48 ALL 12 0.32 0.08
 OVERALL 12 0.32 0.08

ORDERED VALUES FOLLOW:

0.23K 0.24K 0.25K 0.25K 0.27K 0.28K 0.31K 0.32K 0.34K 0.42K 0.43K
 0.47K

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14-|

12-|

10-|

K

K

8-|

K

KK

6-|

KK

KK

4-|

KK

KK

2-|

KKK

KKK

0-|

0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 2.25 2.50

PP LOW HIGH LIT #VAL MEAN STDV

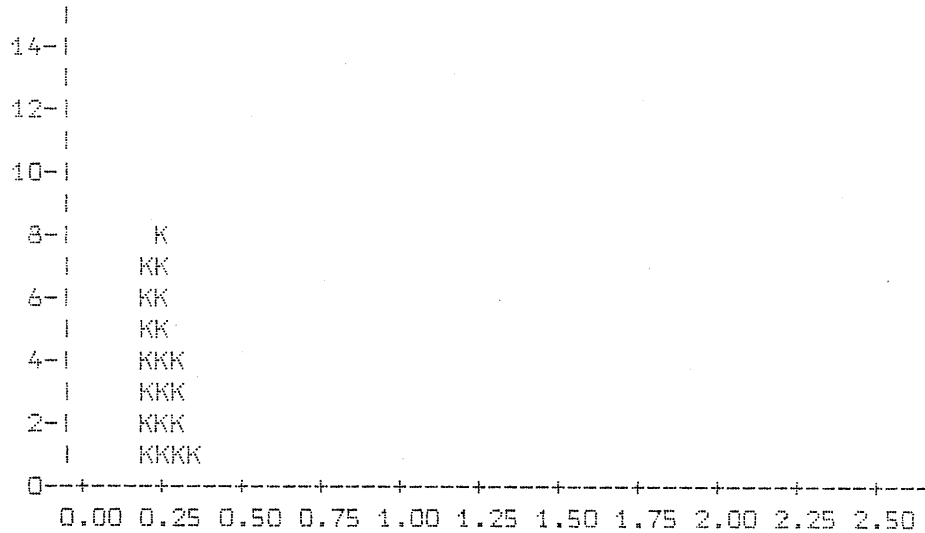
Y 0.22 0.32 ALL 19 0.25 0.03

OVERALL 19 0.25 0.03

ORDERED VALUES FOLLOW:

0.22K 0.22K 0.23K 0.23K 0.23K 0.23K 0.23K 0.23K 0.24K 0.24K 0.25K
 0.25K 0.25K 0.25K 0.26K 0.27K 0.27K 0.30K 0.31K

IKU# D-2000 118.3M 7230/5-U-2



PP LOW HIGH LIT #VAL MEAN STDV
 Y 0.20 0.37 ALL 20 0.26 0.04
 OVERALL 20 0.26 0.04

ORDERED VALUES FOLLOW:

0.20K 0.20K 0.21K 0.21K 0.22K 0.23K 0.24K 0.25K 0.25K 0.25K 0.26K
 0.27K 0.27K 0.27K 0.28K 0.30K 0.30K 0.31K 0.33K 0.36K

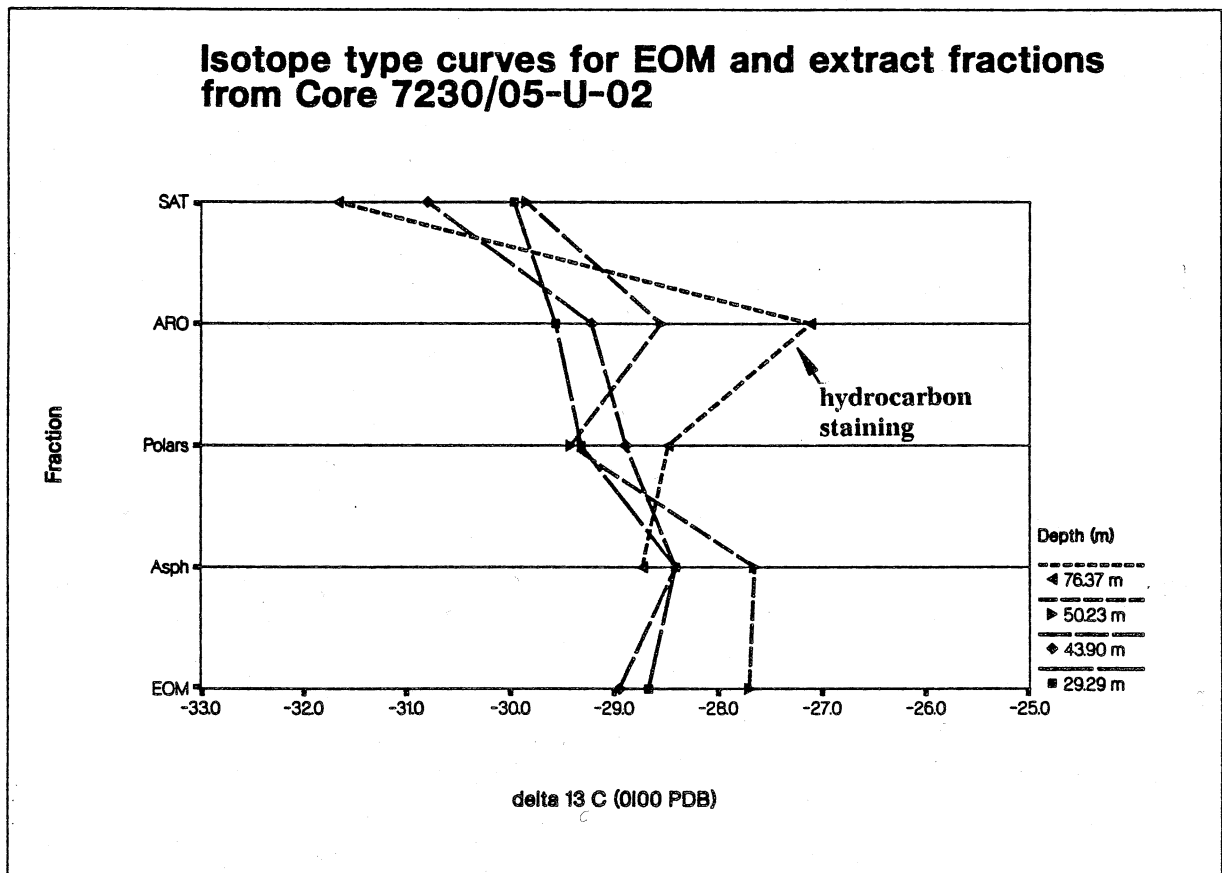


Figure A.II.8.7: Carbon isotope type curves of sediment extracts.

A.III EXPERIMENTAL METHODS AND INTERPRETATION LEVELS

Gas analyses

Hydrous pyrolysis gas (full analysis of hydrocarbons and inert gases):

The gas from hydrous pyrolysis was analysed on an HP 5880 gas chromatograph equipped with a capillary column and an FID for hydrocarbon analysis and two packed columns and a TCD for analysis of the inert gases (N_2 , O_2 , CO_2):

- 50 m x 0.2 mm i.d. fused silica column, coated with 0.5 μ m OV-101.
- 3 ft steel column packed with molecular sieve 13x, 80/100 mesh.
- 6 ft steel column packed with Porapak T x 4 ft steel column packed with Porapak Q, 80/100 mesh.

Temperature program: 30°C (12 min.) - 8°C/min. - 150°C (5 min.).

Standard gas samples containing methane, ethane, propane, n-butane, n-pentane, n-hexane and hydrogen, oxygen, nitrogen, carbon monoxide, carbon dioxide and methane, respectively, were used for quantification.

Headspace gas:

The canned and frozen (-80°C) sample was allowed to thaw. Then a septum was attached to the can and a sample of the headspace gas was taken for analysis of C_1 , C_2 , C_3 , i- C_4 , n- C_4 and C_{5+} hydrocarbons.

This analysis was performed on Carlo Erba Fractovap 2150 and 2350 gas chromatographs equipped with 2 m x 1/8" stainless steel columns filled with Porapak Q on Chromosorb using nitrogen as carrier gas. An oven temperature of 150°C was used. After elution of n-butane, the column was back-flushed and C_{5+} compounds were recorded as one peak. A standard gas sample containing methane, ethane, propane, n-butane, n-pentane and n-hexane (100 ppm each) was used for quantification.

The can was then opened and headspace volume, water volume, and sample weight were measured. The canned samples were washed with warm water (30-40°C) on 4.0, 2.0 and 0.125 mm sieves to remove drilling mud and were then dried at 35°C.

Occluded gas:

Prior to drying, an aliquot of the 1-4 mm fraction of each sample was crushed in water for 10 minutes using a gas-tight ball mill. The evolved gas was analysed as described for headspace gas.

Total Organic Carbon

Bulk samples were crushed in a disk mill or mortar. Aliquots of the samples were then weighed into Leco crucibles, then treated three times with hot 10% HCl in order to remove carbonate, and finally washed four times with distilled water in order to remove any traces of HCl. The crucibles were then placed on a hot plate (60°C) and dried for 24 hours. The total organic carbon (TOC) content of the dried samples was determined using a Leco CS 244 carbon/sulphur analyser.

The instrument was calibrated using a sediment standard with 2.72 % carbon. Calibration and blank runs were carried out every 15th measurement.

Rock-Eval pyrolysis

Powdered sample (100 mg shale, 5-10 mg coal) was weighed into a platinum crucible (the base and cover of which are made of sintered steel), and analysed on a Rock-Eval II pyrolyser (Girdel/IFP) under standard conditions (Carrier gas: helium; flow rate: 100 ml/min.; temperature programme: 300°C (3 min.) - 25°C/min. - 550°C).

Pyrolysis Gas Chromatography (Py-GC Programmed)**Thermal extraction (S1)**

The whole rock sample (20-30 mg) was placed in a boat-shaped sample probe and thermo-extracted in a stream of helium at 340°C for 4 minutes.

Pyrolysis-Gas Chromatography (S2)

The thermo-extracted sample was pyrolysed in a helium atmosphere using a furnace type pyrolyzer as described by Solli et al. (1984). The pyrolysis temperature program was 340°C - 50°C/min. - 550°C. The outlet of the furnace was directly connected to a splitter (30:1) which enabled the pyrolysis products to be simultaneously recorded as a bulk "S2" peak by an FID and passed into a gas chromatograph. The pyrolysis products were trapped on the chromatographic column by cooling the front part of the column with liquid nitrogen. On completion of the pyrolysis programme, the collected pyrolysis products were injected on to the column by removing the nitrogen bath. The GC conditions are outlined below.

GC conditions

Column: 30 m DB-1, i.d. 0.32 mm, fused silica capillary column.

Carrier gas: Helium, inlet pressure 7.5. psi; flow rate 1.5 ml/min.

Temp. programme: -10°C (1 min.) - 5°C/min. - 310°C (10 min.)

Extractable Organic Matter

Powdered rock was extracted by Soxhlet technique with boiling dichloromethane (DCM) containing 7%(v/v) methanol as solvent in a Soxtec apparatus for 3 hours (1 h boiling, 2 h rinsing).

DCM of organic geochemical grade was used and blank analyses indicated that the occurrence of contaminating hydrocarbons was negligible. Activated copper fillings were used in order to remove any free sulfur from the samples.

After extraction, the solvent was evaporated off using a Büchi Rotavapor and the amount of extracted organic matter (EOM) was determined.

Medium-pressure liquid chromatography (MPLC)

The EOM or oil (>210°C) sample was diluted in DCM (1:3 mg/μl) and the asphaltenes were precipitated using excess n-pentane (40:1 pentane:(DCM+EOM)). The asphaltene fraction was weighed after drying at 50°C for 12 hours.

The remaining maltenes were separated into saturated, aromatic and non-hydrocarbon fractions using an MPLC system with n-hexane as eluant (Radke et al. 1980). The various fractions were concentrated using a Büchi Rotavapor, then transferred to glass vials and the remaining solvent removed.

Gas chromatographic analysis

The whole oil sample from hydrous pyrolysis was analysed using an HP 5730A gas chromatograph fitted with a 15 m DB-5 fused silica column. 0.02 μl of sample solution were injected in split mode (split ratio 1:10). Hydrogen with a flow rate of 2.5 ml/min. was used as a carrier gas, and the temperature programme used was -50°C (2 min.) - 4°C/min. - 280°C.

The saturated and total aromatic hydrocarbon fractions were diluted with n-hexane and analysed on HP 5730A and HP 5710A gas chromatographs, fitted with DB-1 and DB-5 fused silica columns (15 m x 0.25 mm i.d.), respectively. Hydrogen with a flow rate of 2.5 ml/min was used as carrier gas. The injection split ratio was 1:10. The temperature programme used was 80°C (2 min.) - 4°C/min. - 280°C.

All the data from the GC analyses were processed on a VG Multichrom lab data system.

Gas chromatography - mass spectrometry (GC-MS)

GC-MS analyses of the saturated fractions of the samples D-1980 through D-1984 were performed on a VG Quadrupole 12-250 GC-MS system. The HP 5790A Series GC was fitted with a fused silica DB-5 capillary column (30 m x 0.32 mm i.d.). Helium (1.5 ml/min.) was used as carrier gas and the

injections were performed in splitless mode.

GC-program: 60°C (2 min.) - 8°C/min. - 120°C (0 min.) - 4°/min. - 280°C.

The remaining saturated fractions and the aromatic fractions were analysed on a VG Micromass 70-70H GC-MS-DS system. The Varian Series 3700 GC was fitted with a fused silica DB-5 capillary column (30 m x 0.32 mm i.d.). Helium (1.5 ml/min.) was used as carrier gas and the injections were performed in splitless mode.

GC-program: 120°C (2 min.) - 4°C/min. - 280°C.

The hydrocarbons were analysed in multiple ion mode (MID) at a scan cycle time of approximately 2 secs. The mass spectrometers operated at 70eV electron energy with an ion source temperature of 200°C. Data acquisition was performed using VG data systems.

Peaks were identified by comparison with elution patterns in certain mass chromatograms. Peak ratios were calculated from peak heights in the appropriate mass chromatograms.

Vitrinite Reflectance

Vitrinite reflectance measurements were carried out on whole-rock samples as follows: the rock samples were broken up if necessary, and mounted in a fast-setting synthetic resin. Temperatures in excess of 50°C were avoided as these can result in alteration of the organic material. Once the resin was set, the sample plugs were ground on coarse silicon carbide paper in order to expose an area of sample for polishing. The samples were then ground on 600 and 280 grade silicon carbide paper to remove any coarse scratches.

Where clastic sediments were involved, grinding and polishing was carried out using propan-2-ol to avoid swelling of any clay minerals in the sample. If coals were to be measured, then water was used.

After coarse grinding, the samples are polished on Selvyt-covered laps

using 5/20 and gamma grade alumina powder. Following polishing, the surface of the sample plugs was carefully cleaned to remove any traces of the polishing powders.

Reflectance measurements were carried out using a Leitz MPV-Compact microscope and photo-multiplier combination. The measurements were made under oil immersion, using an oil with a refractive index of 1.518 at a wavelength of 546 nm. The surface of the sample was examined for suitable vitrinite particles, and measurements were taken on these. The reflectance of a vitrinite particle was determined relative to an optical glass standard with a known reflectance of a similar order to that of the sample.

If possible, a minimum of twenty reflectance measurements was taken on each sample. Coals and carbonaceous claystone samples provide the most reliable data, while sandstones and carbonates provide the least reliable data.

The samples were also examined in ultra-violet light in order to better determine the composition and colour of the fluorescent material present in the sample. The colour of certain liptinite macerals in ultra-violet light can be related to the thermal maturity of the sample kerogen. A scale comparing vitrinite reflectance measurements and sporinite fluorescence to thermal maturity is shown in Table 3 of the interpretation levels.

Evaluation of kerogen type and thermal maturity in transmitted light

The rock samples were crushed and treated with hydrochloric acid and hydrofluoric acid in order to remove the mineral matter and isolate the kerogen. The isolated kerogen was mounted in glycerine jelly on microscope slides as a strew-mount.

The treatment of the isolated kerogen varied according to the requirements and preservation of the samples. This included:

- T-slide: total acid residue.
- O-slide: kerogen debris remaining after flotation in ZnBr_2 to remove heavy minerals.
- Si-slide: sieved residue.
- X-slide: oxidised residue.

T- and/or O-slides were necessary in order to evaluate the kerogen composition/palynofacies of the samples.

Si- and/or X-slides were required if it was necessary to concentrate larger kerogen fragments or spores/pollen for spore colouration and/or age determination, respectively, (N.B.: oxidised residue is not used for spore colour determination as oxidation will alter the colour).

The samples were examined using a Leitz Dialux microscope with a white halogen light source. Objective lenses of 10x and 63x magnification were used. The higher magnification allowed a more detailed description of the kerogen, with resolution down to 2µm diameter.

Thermal alteration indices (TAI) were measured from the colour of spores and pollen. The techniques used for this are adapted from Staplin (1969) and Burgess (1974). IKU has used a 1-10 scale for thermal alteration index (TAI)/Spore colouration index (SCI) since December, 1986.

Kerogen terminology

The following kerogen terminology is used:

1. Amorphous material - degraded, unstructured material of unidentified origin.
2. Algal material - particles of recognisably algal origin.
3. Liptinitic material - recognisable spores, pollen, cuticle and cysts.
4. Woody material - structured and unstructured woody tissue.
5. Coaly material - black, reworked or oxidised material.

Hydrous pyrolysis

The samples were pyrolysed at 340°C for 72 h covered by water. The pyrolysis was performed in stainless steel (SS-316) containers which were equipped with a valve. The sample was covered with water of a volume not less (in ml) than the sample weight (in g) and between 22 and 40% of the container volume in order to guarantee that the sediment samples remained covered with liquid water also at the pyrolysis temperature. The void volume was repeatedly (4x) evacuated and filled with helium. When heating was discontinued, the container was aircooled to room temperature and the

gas produced was quantitatively collected and analysed. The container was then opened, and a sample of hydrous pyrolysis oil floating on the water surface was collected and analysed. Remaining expelled hydrous pyrolysate fluid which adhered on the surfaces of water, container walls, and sediment, was washed out with hexane/pentane/dichloromethane (1:1:1).

Carbon isotope analysis

The $^{13}\text{C}/^{12}\text{C}$ isotope analyses were carried out by GCA Geochemische Analysen, Manfred Schmitt, in Lehrte, F.R.G.

The samples were filled in a glass capillary and transferred into a combustion system filled with copper dioxide, heated to 900°C . The reaction products were flushed with a stream of ultrapure helium and oxygen through silver wool (450°C) in order to remove traces of halogens and sulphur.

H_2O and CO_2 were trapped in separate cool traps. After removal of the carrier gas by high vacuum, CO_2 and H_2O were sealed off separately in 6 mm glass tubes. H_2O was reduced to H_2 by zinc at 460°C .

The $^{13}\text{C}/^{12}\text{C}$ isotope ratio was measured with a high precision mass spectrometer Finnigan MAT 251.

Precision of preparation lines and mass spectrometer was controlled daily by measurements of standard substances and by double analyses.

The isotope ratios are given as delta-values:

$$\delta^{13}\text{C} = ((^{13}\text{C}/^{12}\text{C}_{\text{sample}} - ^{13}\text{C}/^{12}\text{C}_{\text{standard}}) / ^{13}\text{C}/^{12}\text{C}_{\text{standard}}) * 1000$$

$^{13}\text{C}/^{12}\text{C}$ ratios are calculated versus PDB.

INTERPRETATION LEVELS

1. TOTAL ORGANIC CARBON (TOC)

TOC (wt%)	Richness of source rock
<0.5	Poor Source Rock
0.5-1	Fair Source Rock
1-2	Good Source Rock
>2	Rich Source Rock

2. ROCK-EVAL PYROLYSIS

a) Data Supplied

S1	Free hydrocarbons (mg/g rock).
S2	Potential or pyrolysable hydrocarbons of kerogen (mg/g rock).
S3	Oxygen content of kerogen (mg CO ₂ /g rock).
Hydrogen Index	S2/TOC x 100 (mg hydrocarbons/g TOC).
Oxygen Index	S3/TOC x 100 (mg CO ₂ /g TOC).
Petroleum Potential	S1+S2 (mg HC/g rock).
Production Index	S1/(S1+S2).
Tmax	Temperature at which the S2 peak is at maximum (°C).

b) Interpretation

Kerogen type	Hydrogen Index (mg HC/g TOC)
Type I	>650
Type II	400-650
Type II/III	200-400
Type III	50-200
Type IV	<50 and up to 100 where oxygen index is very high.

N.B. Hydrogen and particularly oxygen indices are affected by organic carbon and carbonate mineral contents. Thus decreasing TOC contents, where the same organic matter type is present, can result in reduced hydrogen and increased oxygen indices (Katz 1983 and Espitalié et al. 1984). Hence oxygen indices are not used.

Petroleum Potential	S1+S2 (mg HC/g rock) *)
Poor	<1
Fair	1-5
Good	5-10
Rich	>10

S1 and S2 values can be raised by the presence of migrated bitumens.

Production Index	S1/(S1+S2) *)
Primary bitumen	<0.1
Generated or migrated hydrocarbons	0.1-0.5
Predominantly migrated Hydrocarbons or stain	>0.5

Tmax

Variations in values can occur due to maturity, kerogen type, migrated bitumens or low S2 peaks. The following maturity boundaries are therefore only approximate.

Tmax (°C)	Maturity stages of type II kerogens	Equivalent vitrinite reflectance in coals (% Ro)
425	Immature	0.5
435		0.7
450	Oil generation zone	1.0
>450	Gas generation zone	

3. COMPARISON OF MICROSCOPIC THERMAL MATURATION SYSTEMS AT IKU

MATURATION LEVEL	SPORE COLOUR TAI	VITRINITE REFLECTANCE %Ro	SPORINITE FLUORESCENCE
IMMATURE	1.0 - 3.5	0.25 - 0.40	1 - 4
EARLY MATURITY	3.5 - 4.0	0.40 - 0.60	4 - 6
MODERATE MATURITY	4.0 - 4.5	0.60 - 0.80	6 - 7
MATURITY	4.5 - 5.5	0.80 - 1.00	7 - 8
LATE MATURITY	5.5 - 6.0	1.00 - 1.20	8 - 9
POST-MATURE	6.0 - 10.0	>1.20	Absent

*) Only approximate guide and not intended to indicate absolute limits.

4. EXTRACTABLE ORGANIC MATTER (OR SOLUBLE BITUMEN)

a) Data Supplied

Weight of extracted rock	(g)
EOM extractable organic matter	(mg, mg/g of rock, mg/g TOC)
Sat saturated hydrocarbons	(mg, mg/g of rock, mg/g TOC, wt% of EOM)
Aro aromatic hydrocarbons	(mg, mg/g of rock, mg/g TOC, wt% of EOM)
HC/EOM = (Sat+Aro)/EOM	(wt%)
Non-HC/EOM	(wt%)
HC/non-HC x 100	
Sat/Aro x 100	

b) Interpretation of source-rock richness based on hydrocarbon content.

Hydrocarbon content is dependent on maturity, total organic carbon content and kerogen type as well as being influenced by migrated hydrocarbons. The values should therefore be treated as a rough guide only.

Source rock richness	HC (ppm of rock)
Poor	<100
Fair	100-250
Good	250-500
Rich	>500

MOLECULAR RATIOS FROM TERPANE AND STERANE MASS CHROMATOGRAMS APPLIED AS MATURITY AND SOURCE CHARACTERISTIC PARAMETERS

Geochemical fossils or biological marker components are characteristic of the type of organic matter present at the time the sediments were deposited. The biological isomers of these components undergo changes due to increased maturity in particular, but also to a certain degree caused by migration and weathering processes.

Source characteristic parameters

In the m/z 191 mass chromatograms which represent the terpanes, the hopanes and moretanes are the major components in most extracts and oils. Of the hopanes the C_{27} and C_{29} - C_{35} homologs are ubiquitous, while the C_{28} bisnorhopane is believed to be typical of certain types of source rocks. This is also the case for the component, probably gammacerane, sometimes seen to coelute with the 22S isomer of the C_{31} $17\alpha(H)$ -hopanes (H). In the sterane mass chromatograms, m/z 217 and m/z 218, the molecular weight distribution of the C_{27} - C_{29} regular steranes is believed to be representative of the original input of organic matter. The highest molecular weight compounds, the C_{29} steranes, represent organic matter of terrestrial origin, while the lower molecular weight analogs originate from more marine type environments.

Maturity dependent parameters

The biological isomers of the hopanes, the $17\beta(H)$, $21\beta(H)$ -hopanes, undergo structural changes during the maturation process. The isomerisation reactions are thought to be produced via the $17\beta(H)$, $21\alpha(H)$ -hopanes (moretanes) to the most stable $17\alpha(H)$, $21\beta(H)$ -hopanes. At equilibrium 100% of the $17\alpha(H)$ -hopanes are seen. The ratio $\alpha\beta/\alpha\beta+\beta\alpha$ is used to describe this reaction. In the extended hopanes ($>C_{31}$), the thermally stable S configurations at C-22 become increasingly more abundant as compared to the biologically preferred R configurations at increased maturity level. The equilibrium ratio is approximately 60% of the 22S configuration. Another ratio that is known to change with maturity is the Tm/Ts (Seifert et al., 1978) of the C_{27} hopanes. The maturable $18\alpha(H)$ -trishnorhopane (Tm) is reduced in intensity relative to the more stable $17\alpha(H)$ -trishnorhopane (Ts), causing the Tm/Ts to decrease at increased maturity. This ratio is also believed to be source dependant, and this should be born in mind when

applying the ratio for maturity comparison. The amount of tricyclic terpanes is also to a certain extent seen to be maturity dependant.

Two isomerisation reactions taking place in the steranes are most commonly applied for maturity assignments from the m/z 217 mass chromatograms. The biologically preferred 14 α (H),17 α (H)-isomers of the regular steranes is transformed to the thermally stable 14 β (H),17 β (H)-steranes, the % $\beta\beta$ approaching 75% at equilibrium. An equilibrium concentration of 50% is seen of the stable S configuration at C-20 as opposed to the 100% of the biological 20R epimer (Mackenzie et al., 1980). The abundance of rearranged steranes increased with increasing maturity.

One of the reactions taking place at an early stage of diagenesis is the aromatisation of steranes, leading to the formation of mono- and triaromatic analogs. This process is measured as the abundance of triaromatic relative to mono-aromatic compounds (% tri/tri + mono) in the m/z 231 and 253 mass chromatograms, respectively. In addition the degree of side chain cracking, as %C₂₀/C_{26,27} and %C₂₁/C_{28,29} respectively, is applied. These cracking processes are also taking place during early diagenesis, and are used for maturity assignment together with the previously mentioned ratios.

Migration and weathering

The effect on the geochemical fossils of migration and weathering, is less apparent than the maturity induced changes. Migration is believed to cause an increase in the relative amounts of rearranged and 14 β (H),17 β (H) regular steranes (Seifert and Moldowan, 1978, 1981). Severe biological alteration leads to the formation of desmethyl-hopanes (Seifert and Moldowan, 1979).

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Shallow Drilling Barents Sea 1987

Appendix to

Main
report:

Organic
geochemical
data



IKU
SINTEF GROUP