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PETROLEUM GEOCHEMICAL STUDIES

PL 104, WELL 30/9-5

By

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Resyme Konklusjon Anbefaling
Summary Conclusion Recommendation

- Two gases analysed from Well 30/9-5 have likely been derived from a marine source at condensate window maturity.

- Vitrinite reflectance suggests a Ro = 0.5 % threshold at 2300 m depth.

- Small amounts of migrated HC of possible Viking Group origin have been encountered in Brent group sandstones. Small amounts of migrated HC of likely none-Viking Group origin have been found in Cook Formation sandstones.

Emneord Key words
Shows identifications, biomarkers maturity, Ro, gas isotop analysis

Emnekategori Subject category
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Geosection

Kvadrant Blokk - Brønn / Quadrant Block - Well
30/9-5

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LIST OF CONTENTS

1 INTRODUCTION

Three aspects have been covered in this study.

1. Molecular and isotopic composition of gases to determine maturity and likely origin of gases produced from formation waters.

2. Vitrinite reflectance from determination of a well maturity profile.

3. Extraction of hydrocarbons from sandstone intervals to identify the origin of possible migrated hydrocarbons.

I GAS ANALYSIS

The interpretation in this section is based upon the publication by M. Schoell (1983) and A.T. James (1983).

These publications suggest diagrams from which genetic relationship and gas maturity can be achieved.

Data from two gas samples, RFT 1217 and an other unlabelled RFT sample have been examined. The hydrocarbon compositions and stable isotope contents are listed in Table I.1. These data are plotted in figures I.1-I.4.

Fig. I.1 showing the combination of ^{13}C consentration in methane versus relative consentration of C_{2+} hydrocarbons. Both samples are offset the indicated fields due to high amounts of C_{2+} hydrocarbons, but the methane ^{13}C value lies in the Tc region suggesting gas asosciated with condensate generation. However, as migration can lead to strip off or complementary enchancement of C_{2+} hydrocarbons, a change of composition will occure parallell to the C_{2+} axis indicated by arrow Md in Fig. I.1 (Methane is more water soluble and diffuses more rapidly through cap rocks).

In Fig. I.2 the ^{13}C consentration of methane is related to the D consentration of methane for identification of gas origin. Only D value for the unlabelled RFT gas existed. This sample plots in the condensate associated field Tc like in Fig. I.2.

In Fig. I.3 plotting of ^{13}C consentration of methane and ethane are done to determine genetic origin of the associated gases.

Both samples plot close to each other in the TT (m) region suggesting samples to be non-associated gases from sapropelic liptinitic organic matter, which is in contract to conclusions in Figs. I.1 and 2. However, both samples plot in the transition zone between associated and non-acciated gases. Consequently, and with reference to the "Po-Basin" case study in Schoell (1983), both gases can be classified as condensate associated gases derived from a marine source rock.

Fig. I.4 is a plot based on A.T. James publication (1983) which enables identification of level of organic naturation (LOM) at which a gas likely non-mixed, is generated. (Mixed gases can usually not be plotted due to unsystematic variations in isotope content with respect to molecular size).

Sample RFT 1217 plots at end oil window - beginning condensate window in agreement with conclusions from the Schoell diagram plots.

The unlabelled sample suggests gas from early oil window and contradicts the conclusions drawn from Figs. I.1-I.3. A possible explanation for this discrepancy is that this unlabelled gas can be a blend derived from different sources.

General conclusions

The two gases analysed from Well 30/9-5 have likely been derived from a marine source in the condensate window. The unlabelled gas may be a mixture of gases from different sources. However, the methane signature suggests it to be associated with condensate formation whilst ethane and propane values contradict this and suggest low maturity gas. A mixture from different sources are therefore given as explanation for this discrepancy.

Sample RFT 1217 and may be the unlabelled RFT have been subjected to migrational effects. I.e. it has been a differential loss of methane from these gases due to either water washing and/or differential diffusion through non-porous medias.

II VITRINITE REFLECTANCE MATURITY

A suite of cutting samples (16) from 1220 m to 2853 m have been analysed for vitrinite reflectance. The mean values of the vitrinite populations are given in Table II.1 and histograms are shown in Appendix I.

An edited maturity profile based on data from Table II.1 is shown in Fig. II.1.

This profile suggests Ro=0.5 % at approximately 2300 m.

III CHARACTERISATION OF SHOWS

A suite of 9 sandstone samples covering 3 different reservoir intervals have been extracted. The extracts have been group-type-separated and the saturated fractions are characterised by GC and GC-MS.

Extraction yields and results of group type separations are listed in Table III.1.

All samples gave low yields of extracts. These extracts contain in general high abundance of non-hydrocarbons (NSO and asphaltenes).

The chromatograms of saturated fractions from Brent sandstones show an oil like distribution, rich in normal paraffins. Apart from sample 2242 m which has a slight odd-over-even dominance, all samples have CPI > 1.0.

Pr/Ph are in the range 1.15-1.61 (Table III.2). From these characterisation it can be concluded that these samples contain small amounts of mature migrated hydrocarbons.

One of the Cook samples, 2452 m, has been analyzed by GC as whole extract making the n-paraffin distribution less pronounced. However, parameters in Table III.2 suggest a fairly mature sample (CPI = 1.0) with characteristics different from the Brent samples.

The other Cool sample, 2455 m, combines an oil-like alkane distribution, slightly richer in heavy n-paraffins than the Brent samples.

Both Cook samples, conclusively, contain small amounts of migrated hydrocarbons.

These extracts have also been analysed with respect to their biological marker content. Fragmentograms of triterpanes (m/z 177 and m/z 191) and steranes (m/z 217) are compiled in Appendix II. Certain molecular parameters significant for thermal maturity and genetic origin have been calculated and are listed in Table III.3.

The maturity of the Brent samples (20S, Table III.3) are higher than expected for that particular depth. On the other hand, it is less mature than expected from a mature oil. Consequently, these extracts may contain hydrocarbons of mixed origin: indigenous, blended with migrated hydrocarbons.

The source parameter ($C_{28}/C_{29} + C_{28}$) suggests the migrated hydrocarbons to be of Viking-Group origin (significant content of the C_{28} bisnorhopane is a feature of Viking-Group derived oils from this region).

The Cook samples have also a low thermal maturity (20S) which suggest a mixture like in the Brent Group.

Bisnorhopane ($C_{28}/C_{29} + C_{28}$) is either missing or is present in low quantities (2452 m) suggesting the migrated hydrocarbons in this horizon to be of a possible non-viking group origin. (The Viking Group sediments contain sections without bisnorhopane content. They should therefore not be excluded totally as possible source for these migrated hydrocarbons).

The Statfjord samples (apart from 2615 m) have maturities more like oils. Although not seen in the n-alkane distributions, again, these samples are likely a combination of indigenous and migrated hydrocarbons.

General conclusions

Brent Group sandstones contain migrated hydrocarbon of likely Viking-Group origin superimposed on indigenous hydrocarbons.

Cook Fm sandstones contain migrated plus indigenous HC. The migrated HC (particular 2455 m) may contain migrated HC of non-Viking-Group origin.

Statfjord Fm contains very small, nearly neglible, amount of migrated HC superimposed on indigenous HC.

REFERENCES

James, A.T. (1983), AAPG Bulletin, V.67, No.7, pp.1176-1191.

Schoell, M. (1983), AAPG Bulletin, V.67, No.12, pp.2225-2238.

FIGURES

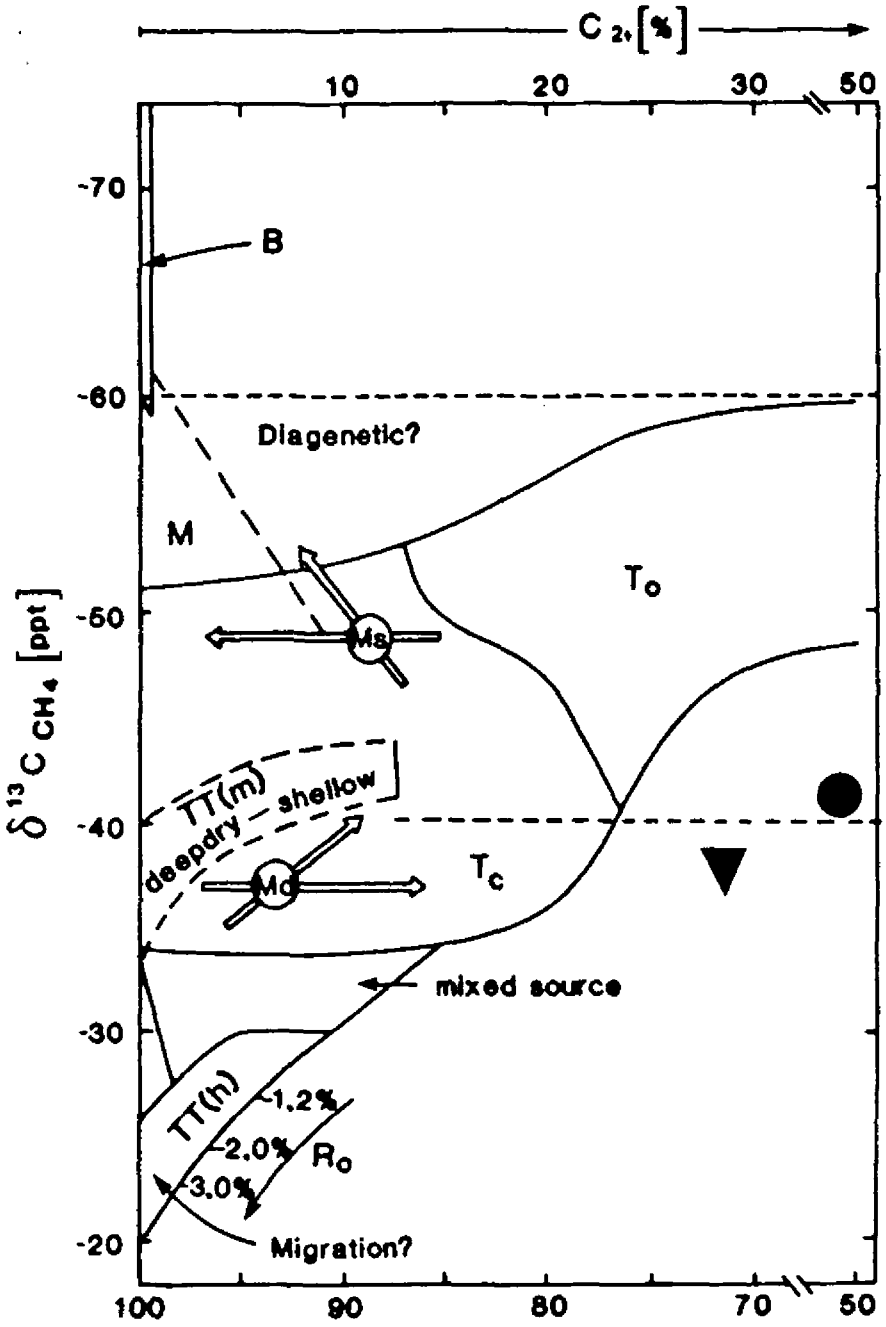
TABLES

Well 30/9-5

RFT?

RFT1217

FIGS. I.1 - I.4



▼ RFT?

● RFT 1217

FIG.I.1

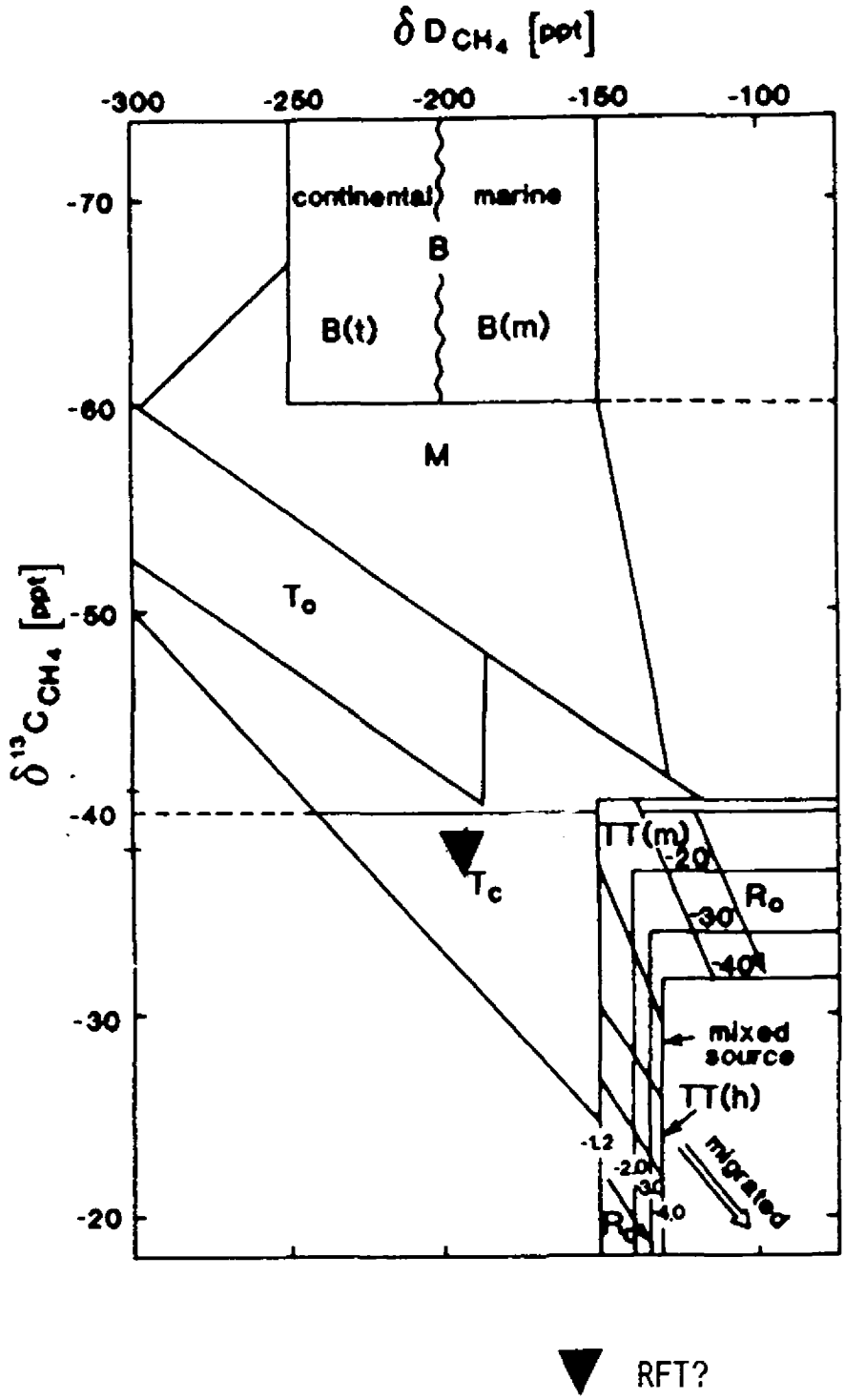

δ D CH4 [ppt]
-300
-250
-200
-150
-100
-70
-60
-50
-40
-30
-20
δ 13C CH4 [ppt]
continental
marine
B
B(t)
B(m)
M
To
Tc
TT(m)
-20
-30
-40
Ro
mixed source
TT(h)
migrated
-1.2
-2.0
-3.0
-4.0
RFT?

FIG. I.2

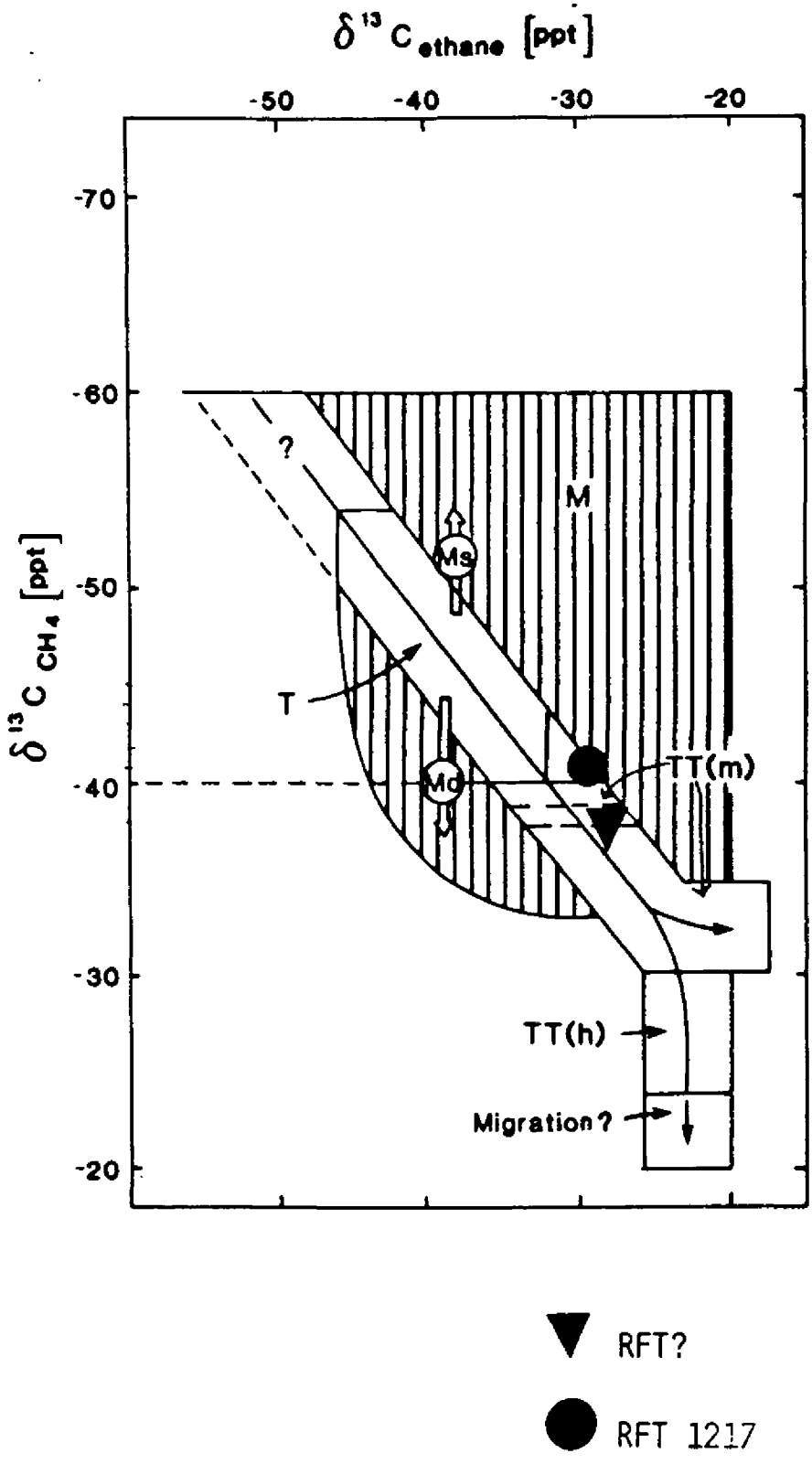

δ 13 C ethane [ppt]
-50
-40
-30
-20
-70
-60
-50
-40
-30
-20
δ 13 C CH4 [ppt]
?
M
Ms
T
Md
TT(m)
TT(h)
Migration?
RFT?
RFT 1217

FIG. I.3

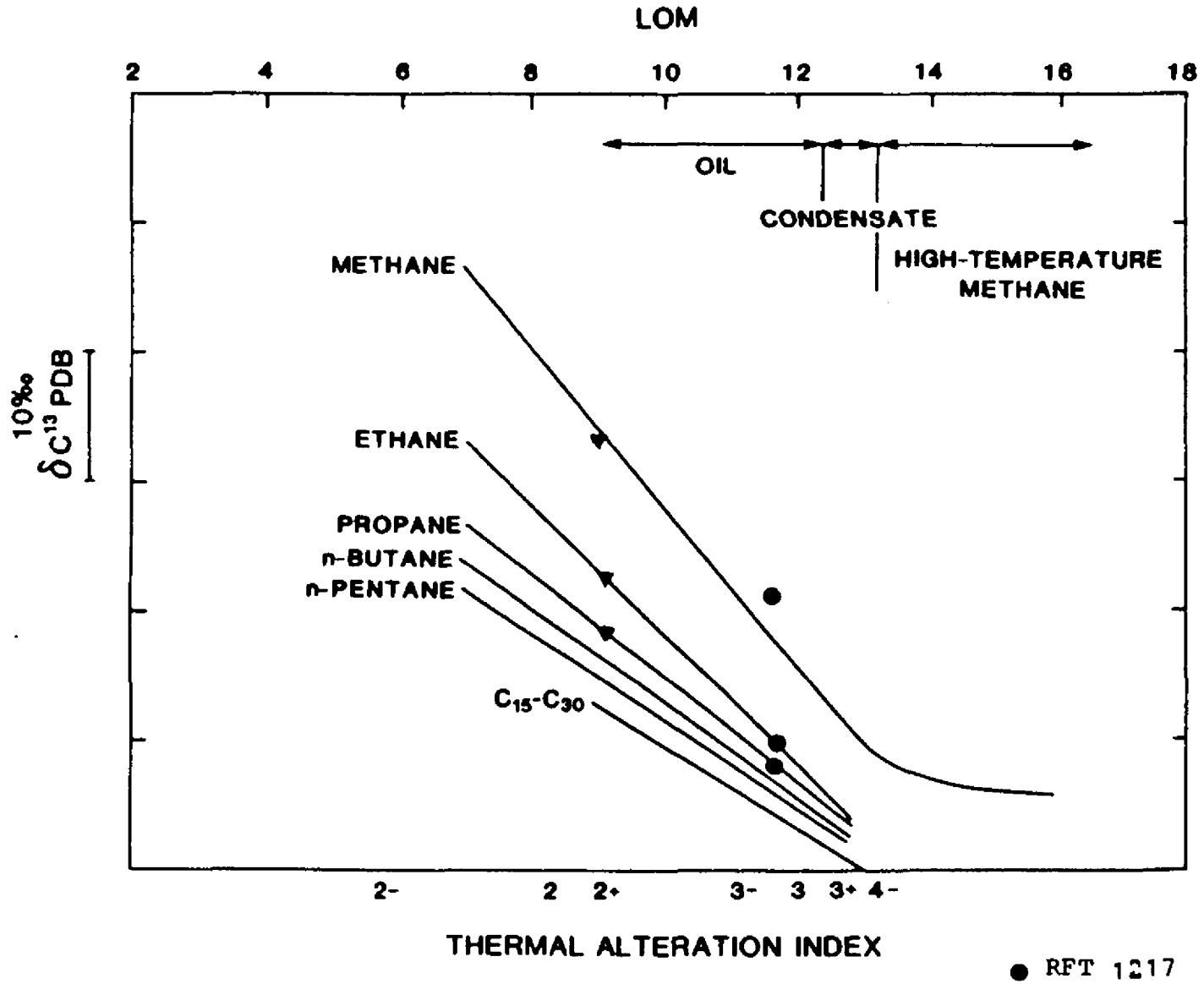

LOM
2
4
6
8
10
12
14
16
18
OIL
CONDENSATE
HIGH-TEMPERATURE METHANE
METHANE
ETHANE
PROPANE
n-BUTANE
n-PENTANE
C15-C30
10‰ δC13 PDB
2-
2
2+
3-
3
3+
4-
THERMAL ALTERATION INDEX
RFT 1217
RFT?

FIG. I.4

Vitrinite Reflectance, Well 30/9-5

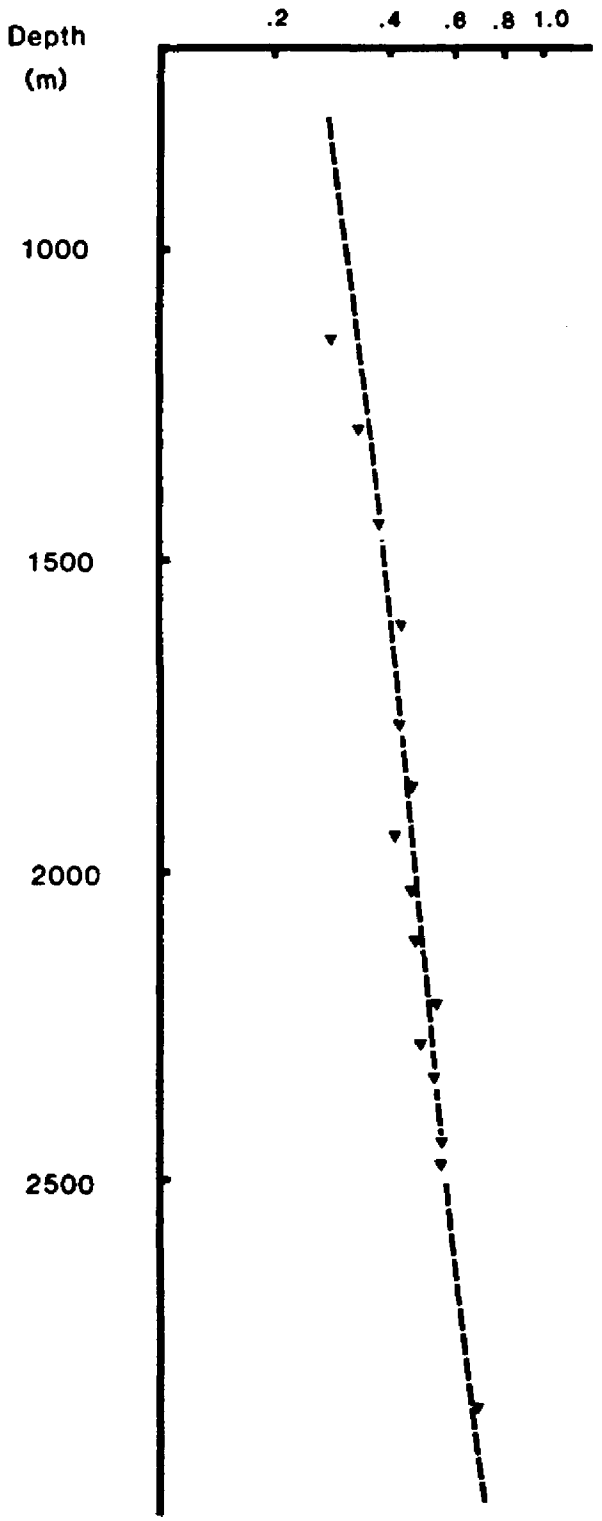


FIG. II.1

Table II 1. VITRINITE REFLECTANCE DATA WELL 30/9-5
Average values

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth	Group/Fm	Population I	Population II	Population III
1020.00	HORDALAND	1.68 (1)		
1120.00	HORDALAND	0.28 (10)	0.52 (3)	
1280.00	HORDALAND	0.33 (18)	0.46 (2)	
1430.00	HORDALAND	0.37 (9)	0.55 (2)	
1590.00	HORDALAND	0.42 (6)	0.55 (2)	0.71 (1)
1590.00	HORDALAND	0.92 (1)		
1750.00	HORDALAND	0.42 (6)	0.57 (2)	0.82 (3)
1750.00	HORDALAND	0.96 (1)		
1850.00	HORDALAND	0.45 (2)	0.67 (2)	1.22 (1)
1930.00	BALDER	0.41 (9)	0.83 (2)	1.21 (2)
2020.00	LISTA	0.45 (10)	0.64 (3)	0.84 (5)
2103.00	LISTA	0.46 (11)	0.70 (8)	1.21 (1)
2194.00	SHETLAND	0.54 (1)	0.85 (11)	0.99 (1)
2194.00	SHETLAND	1.18 (7)		
2266.00	DRAKE	0.47 (16)	0.66 (4)	0.90 (2)
2320.00	DRAKE	0.51 (16)	0.69 (5)	
2425.00	DRAKE	0.53 (30)	0.72 (2)	0.85 (1)
2462.35	COOK	0.53 (16)	0.73 (11)	1.03 (1)

Table II 1. **VITRINITE REFLECTANCE DATA WELL 30/9-5** (cont'd)
Average values

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth	Group/Fm	Population I	Population II	Population III
2853.00	STATFJORD	0.67 (1)	0.86 (2)	1.21 (3)
2853.00	STATFJORD	1.51 (1)		

Table III.1 EXTRACTION DATA I WELL 30/9-5

Petroleum Geochemistry Group
Research Center Bergen
HYDRO

Depth(m)	Group/Fm	EOM(mg)	EOM(%)	Hydrocarbons SAT(%)	ARO(%)	TOTAL(%)	Non Hydrocarbons NSO(%)	ASPH(%)	TOTAL(%)
2237.00	BRENT	9.50	0.04	30.00	10.00	40.00	32.00	28.40	60.40
2240.00		6.20	0.04	34.00	12.00	46.00	23.00	30.60	53.60
2242.00	BRENT	10.30	0.05	30.00	12.00	42.00	26.00	32.00	58.00
2245.00	BRENT	8.70	0.04	31.00	9.00	40.00	31.00	28.70	59.70
2452.00	COOK	6.10	0.05					34.40	34.40
2455.00	COOK	15.00	0.08	36.00	28.00	64.00	9.00	26.70	35.70
2608.00	STATFJORD	8.20	0.04	36.00	10.00	46.00	34.00	19.50	53.50
2615.00	STATFJORD	8.50	0.04					60.00	60.00
2624.65	STATFJORD	2.90	0.01					62.00	62.00

Table III.2. Molecular parameters from distribution of aliphutiz hydrocarbons

Fm	Depth	CPI-1	CPI-2	Pr/uC_{17}	Pr/uC_{18}	Pr/Ph	uC_{17}/uC_{27}
Brent	2237	1.00	0.79	0.73	0.53	1.61	4.80
Brent	2240	1.06	0.76	0.84	0.57	1.15	5.36
Brent	2242		1.10	0.75	0.55	1.15	2.33
Brent	2245	1.12	0.95	0.71	0.51	1.53	3.68
Cook	2455	1.10	1.03	0.53	0.19	2.54	2.55
Statfj.	2608	1.14	0.70	1.05	1.08	0.9	1.75

Table III.3. Biomarker parameters of sandstone extracts

Fm	Depth (m)	TRITERPANES					STERANES	
		TS/T_m	$\frac{C_{29}}{C_{29}+C_{30}}$	$\frac{C_{28}}{C_{28}+C_{29}}$	$\frac{C_{30}\beta\alpha}{C_{30}\alpha\beta}$	22S	αββ	20S
Brent	2237	0.65	0.36	0.32	0.19	0.55	0.46	0.37
Brent	2240	0.88	0.35	0.33	0.19	0.55	0.47	0.44
Brent	2242	0.81	0.40	0.26	0.19	0.55	0.47	0.44
Brent	2245	0.71	0.37	0.26	0.21	0.55	0.45	0.40
Cook	2452	0.50	0.44	0.08	0.30	0.78	0.34	0.29
Cook	2455	0.42	0.40	-	0.27	0.54	0.32	0.31
Statfj.	2608	0.56	0.47	0.13	0.10	0.60	0.51	0.53
Statfj.	2615	0.75	0.38	-	0.19	-	-	-
Statfj.	2624.6	0.55	0.54	0.13	0.14	0.61	0.51	0.49
		Source maturity	Source	Source	Source maturity	Maturity	Maturity	Maturity

APPENDIX I

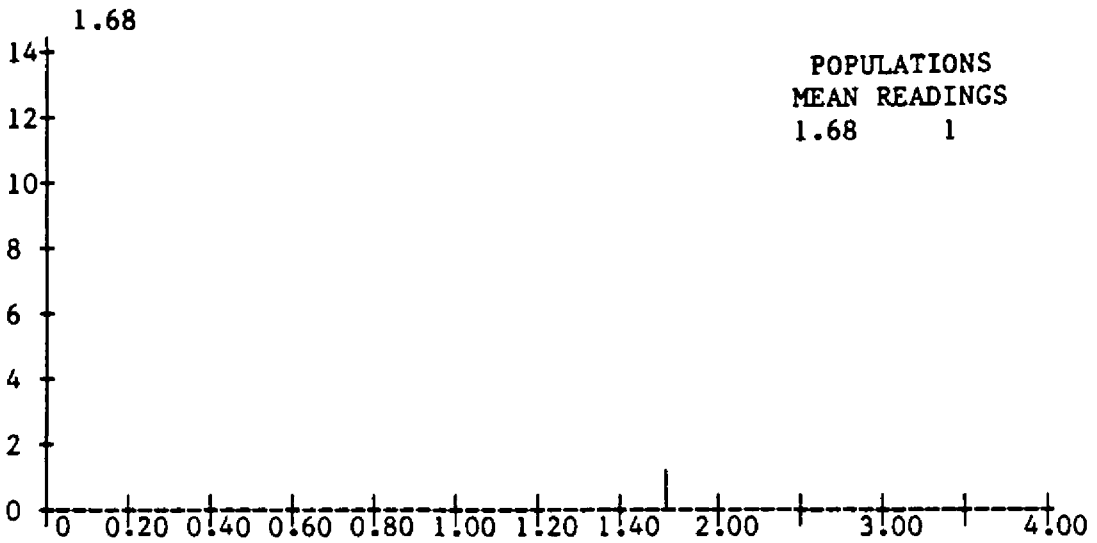
VITRINITE REFLECTANCE HISTOGRAMS

FIGURE 1a

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

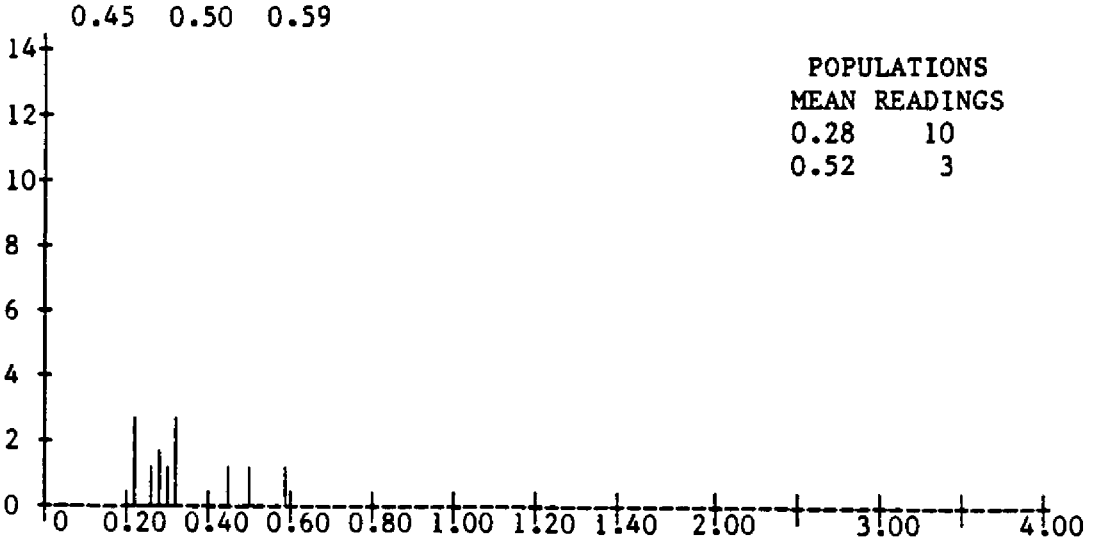
SAMPLE 1507-001B DEPTH 1020 VITRINITE REFLECTANCE VALUES



REMARKS VIRTUALLY BARREN

SAMPLE 1507-002A DEPTH 1120 VITRINITE REFLECTANCE VALUES

0.22 0.23 0.23 0.26 0.28 0.28 0.30 0.32 0.32 0.32
0.45 0.50 0.59



REMARKS LIGNITE IN SAMPLE AS LOOSE BLOCKY PARTICLES

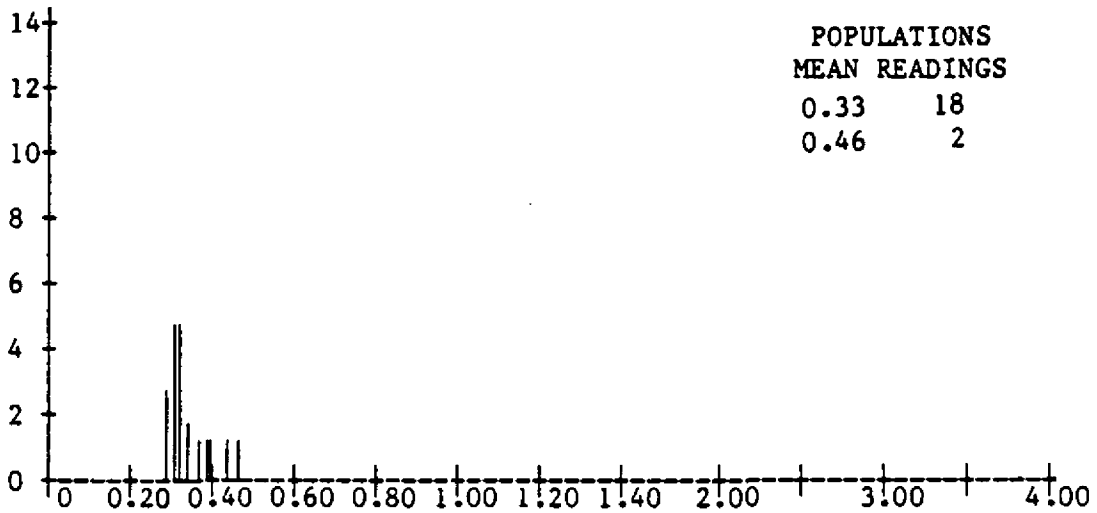
FIGURE 1b

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-003A DEPTH 1280 VITRINITE REFLECTANCE VALUES

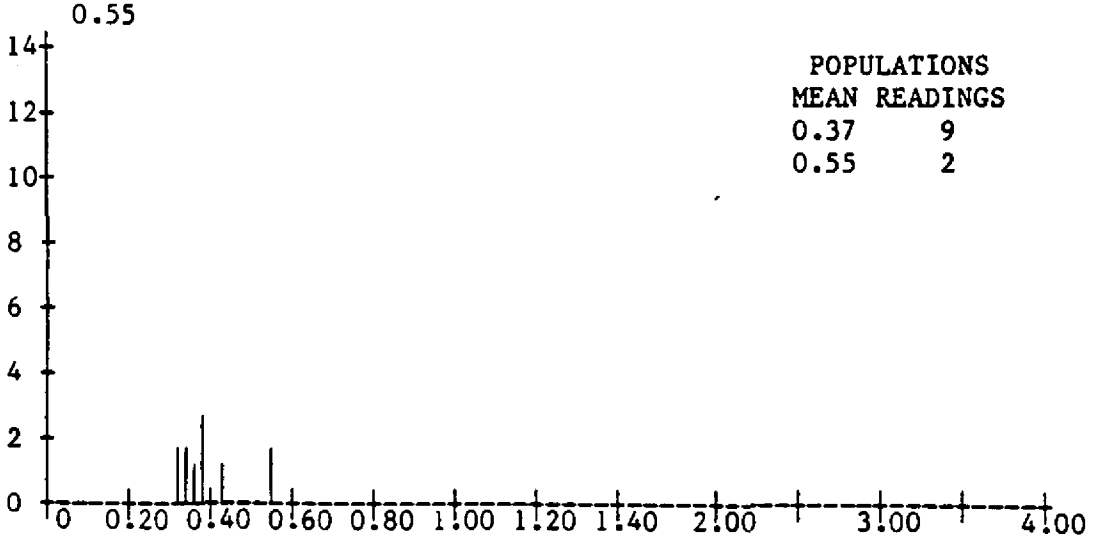
0.29 0.29 0.29 0.31 0.31 0.31 0.31 0.31 0.32 0.32
0.33 0.33 0.33 0.34 0.34 0.37 0.39 0.40 0.44 0.47



REMARKS SMALL PARTICLES ,DIFFERENTIAL OFTEN DIFFICULT

SAMPLE 1507-004A DEPTH 1430 VITRINITE REFLECTANCE VALUES

0.32 0.33 0.34 0.35 0.36 0.38 0.38 0.39 0.43 0.55
0.55



REMARKS AS 003A

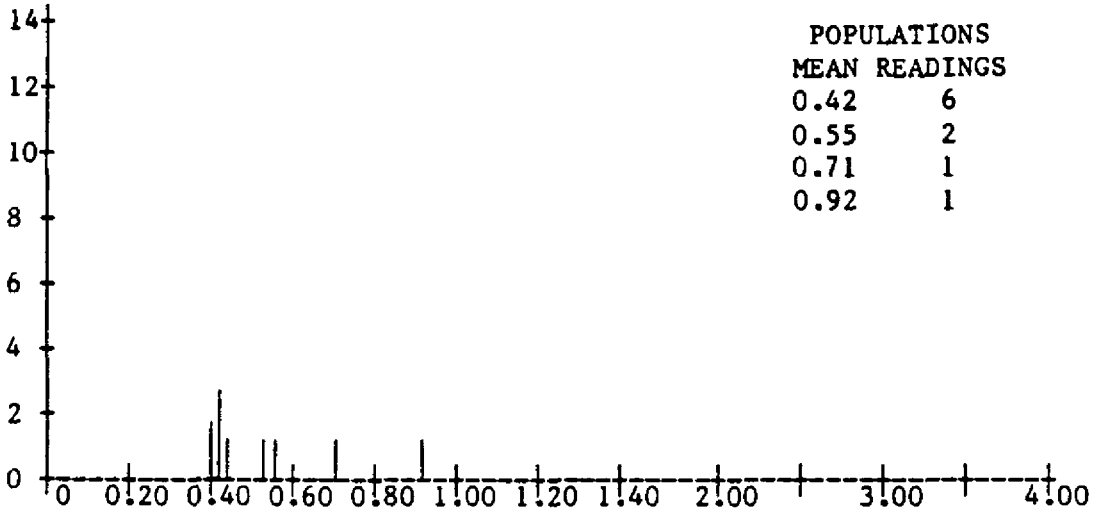
FIGURE 1c

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-005A DEPTH 1590 VITRINITE REFLECTANCE VALUES

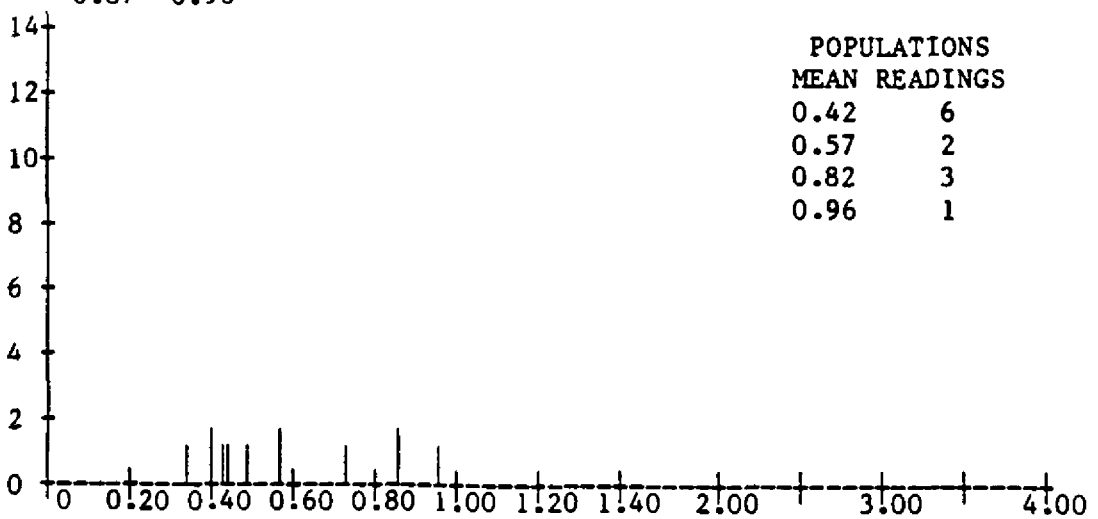
0.40 0.40 0.42 0.42 0.42 0.44 0.53 0.56 0.71 0.92



REMARKS MINOR VITRINITE

SAMPLE 1507-006A DEPTH 1750 VITRINITE REFLECTANCE VALUES

0.34 0.40 0.40 0.43 0.44 0.49 0.57 0.57 0.73 0.86
0.87 0.96



REMARKS MINOR VITRINITE, SIGNIFICANT TO DOMINANT INERTINITE

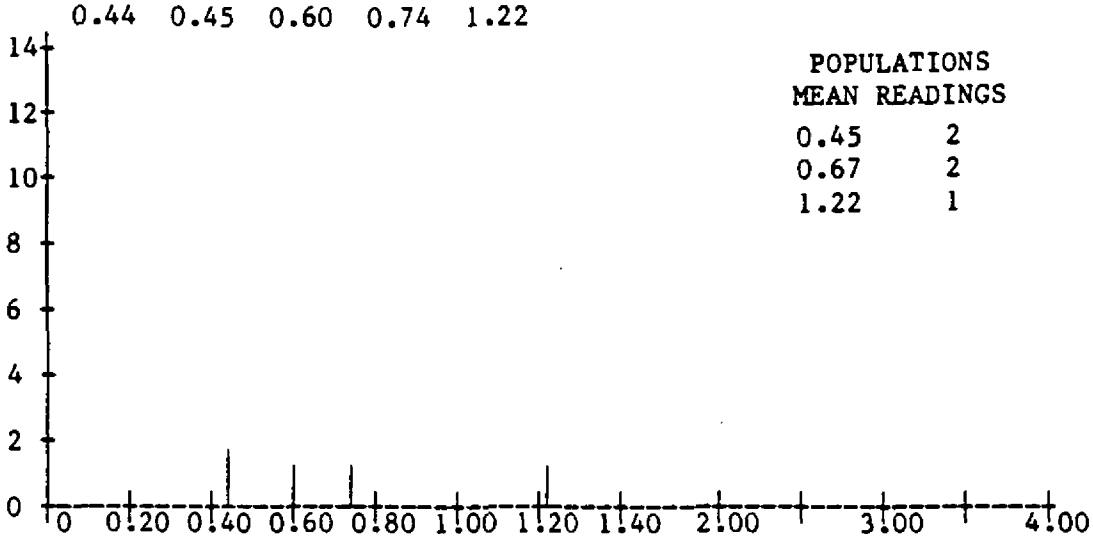
FIGURE 1d

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-007A DEPTH 1850 VITRINITE REFLECTANCE VALUES

0.44 0.45 0.60 0.74 1.22



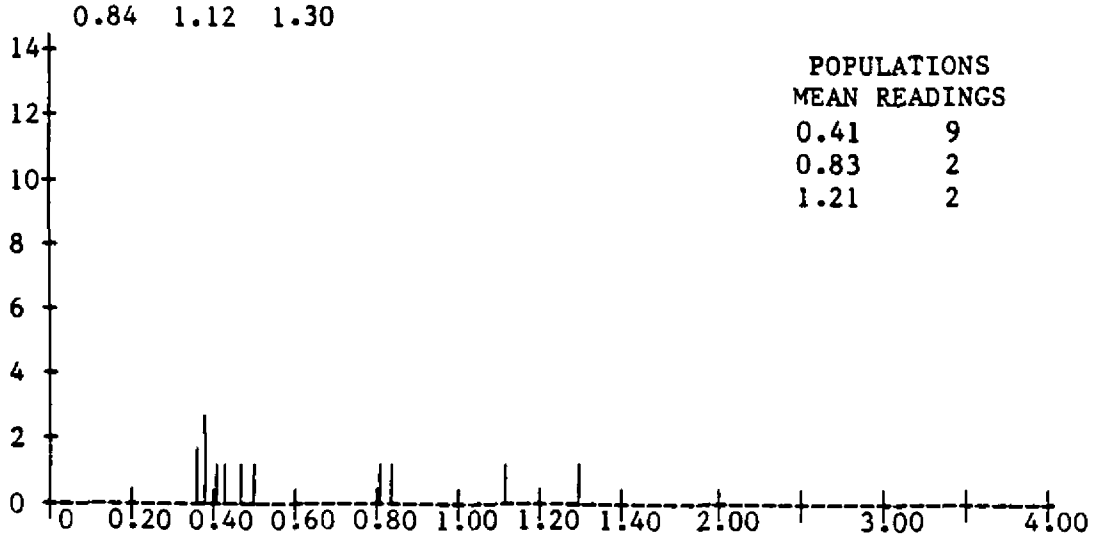
POPULATIONS

MEAN	READINGS
0.45	2
0.67	2
1.22	1

REMARKS LEAN, VARIABLE IN REFLECTANCE, SMALL PARTICLES

SAMPLE 1507-008A DEPTH 1930 VITRINITE REFLECTANCE VALUES

0.36 0.37 0.38 0.38 0.39 0.41 0.43 0.47 0.50 0.81
0.84 1.12 1.30



POPULATIONS

MEAN	READINGS
0.41	9
0.83	2
1.21	2

REMARKS MINOR VITRINITE ,VARIABLE IN REFLECTANCE

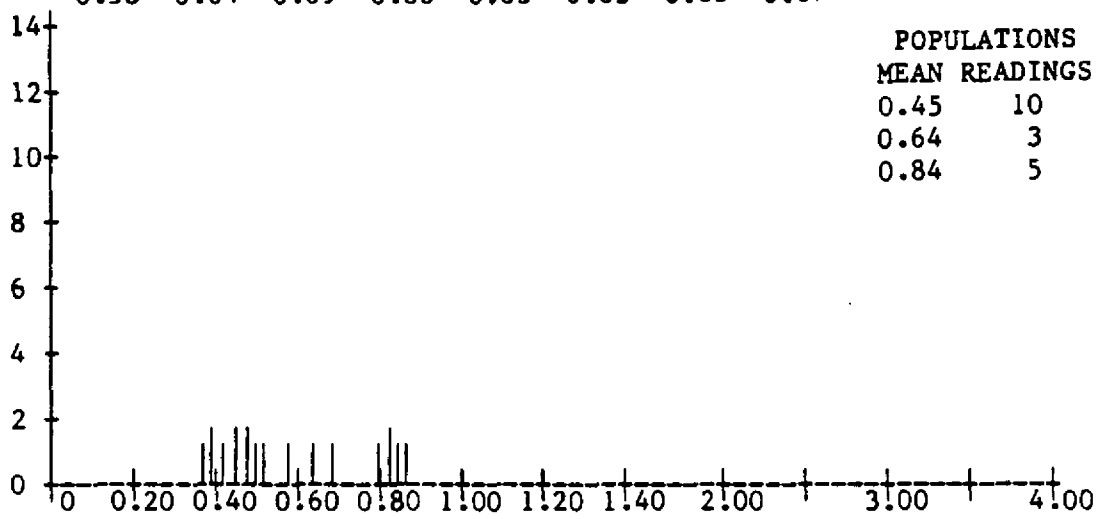
FIGURE 1e

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-009A DEPTH 2020 VITRINITE REFLECTANCE VALUES

0.37 0.39 0.39 0.42 0.45 0.45 0.48 0.48 0.50 0.52
0.58 0.64 0.69 0.80 0.83 0.83 0.85 0.87



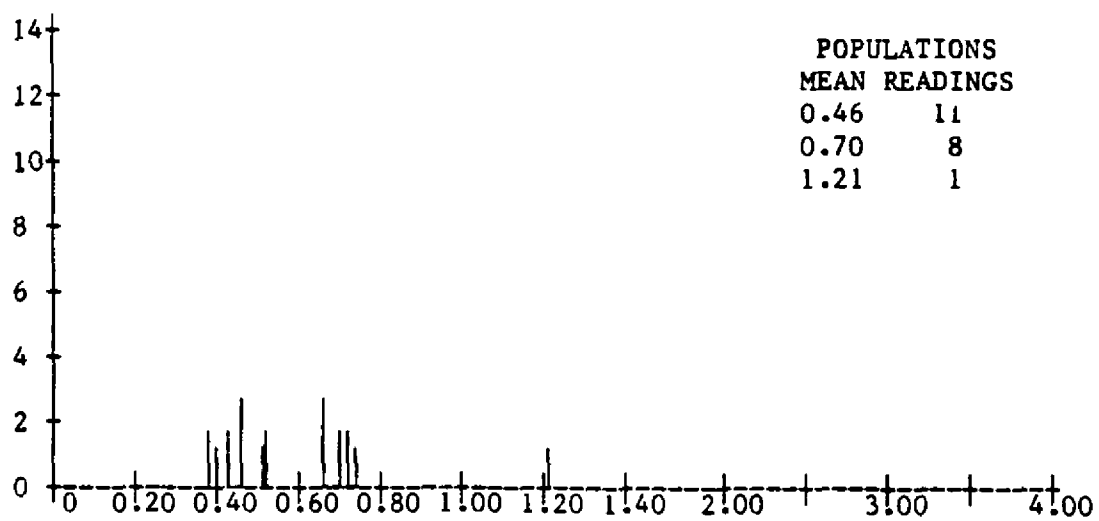
POPULATIONS

MEAN	READINGS
0.45	10
0.64	3
0.84	5

REMARKS AS 008A

SAMPLE 1507-010 DEPTH 2103 VITRINITE REFLECTANCE VALUES

0.38 0.39 0.40 0.43 0.43 0.46 0.46 0.47 0.51 0.52
0.53 0.66 0.66 0.67 0.70 0.71 0.72 0.72 0.74 1.21



POPULATIONS

MEAN	READINGS
0.46	11
0.70	8
1.21	1

REMARKS AS 008A

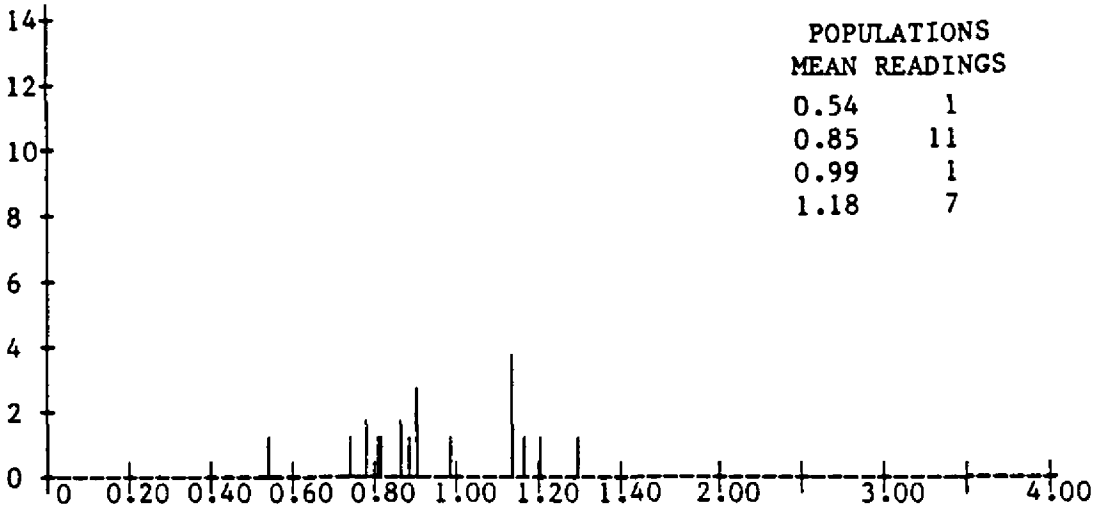
FIGURE 1f

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-011A DEPTH 2194 VITRINITE REFLECTANCE VALUES

0.54	0.74	0.78	0.79	0.81	0.82	0.87	0.87	0.89	0.91
0.91	0.91	0.99	1.14	1.15	1.15	1.15	1.17	1.21	1.30

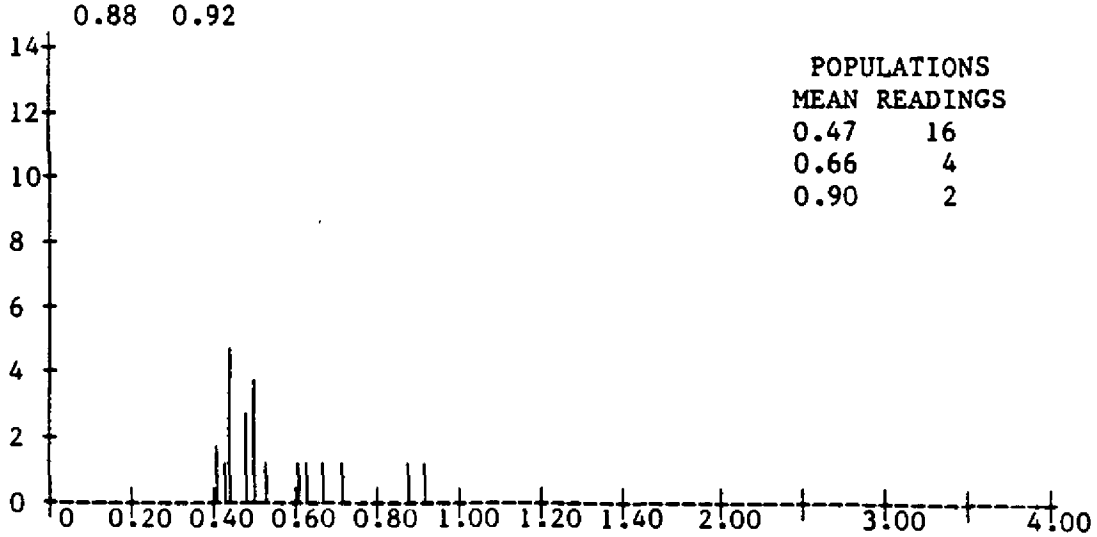


POPULATIONS MEAN	READINGS
0.54	1
0.85	11
0.99	1
1.18	7

REMARKS **DOMINANTLY REWORKED**

SAMPLE 1507-012A DEPTH 2266 VITRINITE REFLECTANCE VALUES

0.41	0.41	0.43	0.44	0.44	0.44	0.44	0.45	0.48	0.48
0.49	0.50	0.50	0.50	0.51	0.53	0.61	0.63	0.67	0.72
0.88	0.92								



POPULATIONS MEAN	READINGS
0.47	16
0.66	4
0.90	2

REMARKS **MINOR TO SIGNIFICANT VITRINITE**

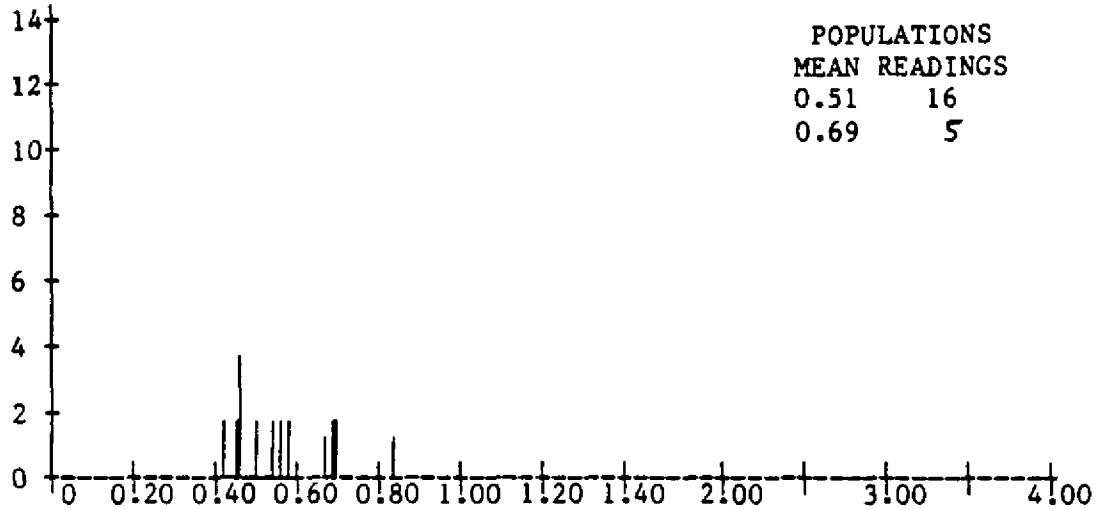
FIGURE 1g

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-013A DEPTH 2320 VITRINITE REFLECTANCE VALUES

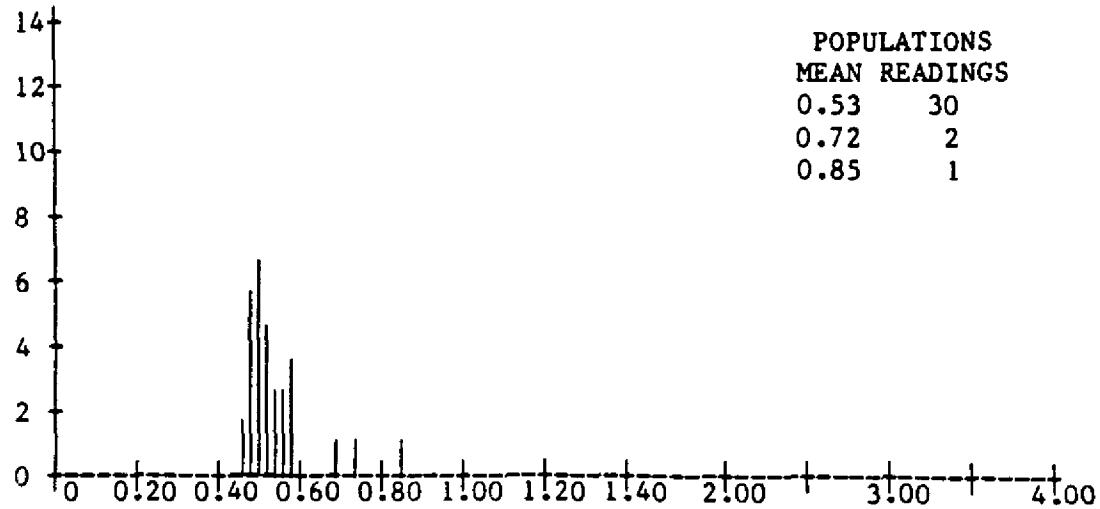
0.42	0.43	0.45	0.45	0.46	0.47	0.47	0.47	0.50	0.51
0.54	0.54	0.56	0.57	0.58	0.59	0.67	0.69	0.69	0.70
0.71									



REMARKS AS 012A

SAMPLE 1507-014A DEPTH 2425 VITRINITE REFLECTANCE VALUES

0.46	0.46	0.48	0.48	0.49	0.49	0.49	0.49	0.50	0.50
0.50	0.50	0.51	0.51	0.51	0.52	0.52	0.52	0.53	0.53
0.54	0.55	0.55	0.56	0.57	0.57	0.58	0.58	0.58	0.59
0.69	0.74	0.85							



REMARKS SIGNIFICANT VITRINITE

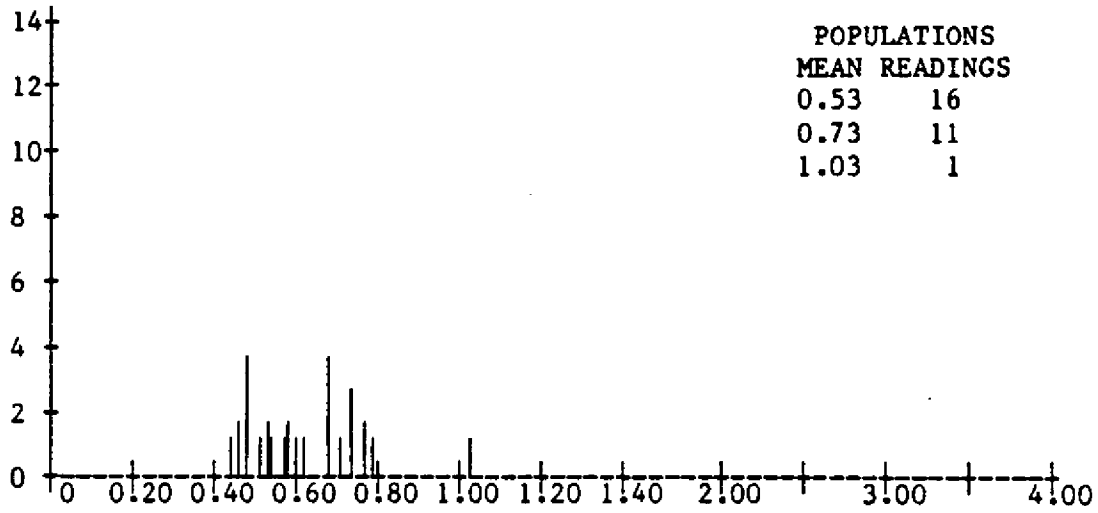
FIGURE 1h

WELL 30/9-5

VITRINITE REFLECTANCE HISTOGRAMS

SAMPLE 1507-015A DEPTH 2462 VITRINITE REFLECTANCE VALUES

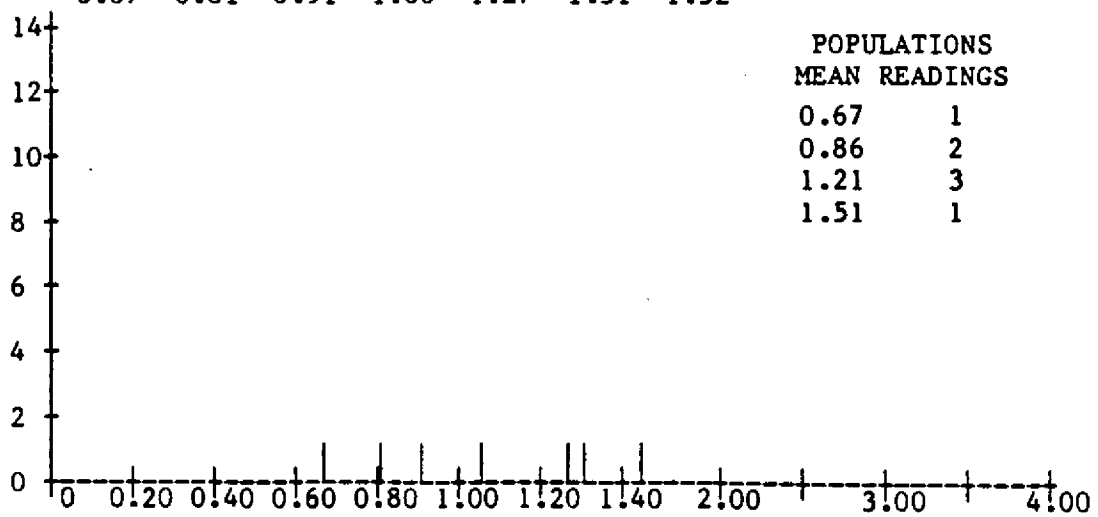
0.44 0.46 0.47 0.48 0.48 0.48 0.49 0.51 0.53 0.53
0.54 0.57 0.58 0.58 0.60 0.62 0.68 0.68 0.68 0.69
0.71 0.74 0.74 0.74 0.77 0.77 0.79 1.03



REMARKS MINOR VITRINITE

SAMPLE 1507-016A DEPTH 2853 VITRINITE REFLECTANCE VALUES

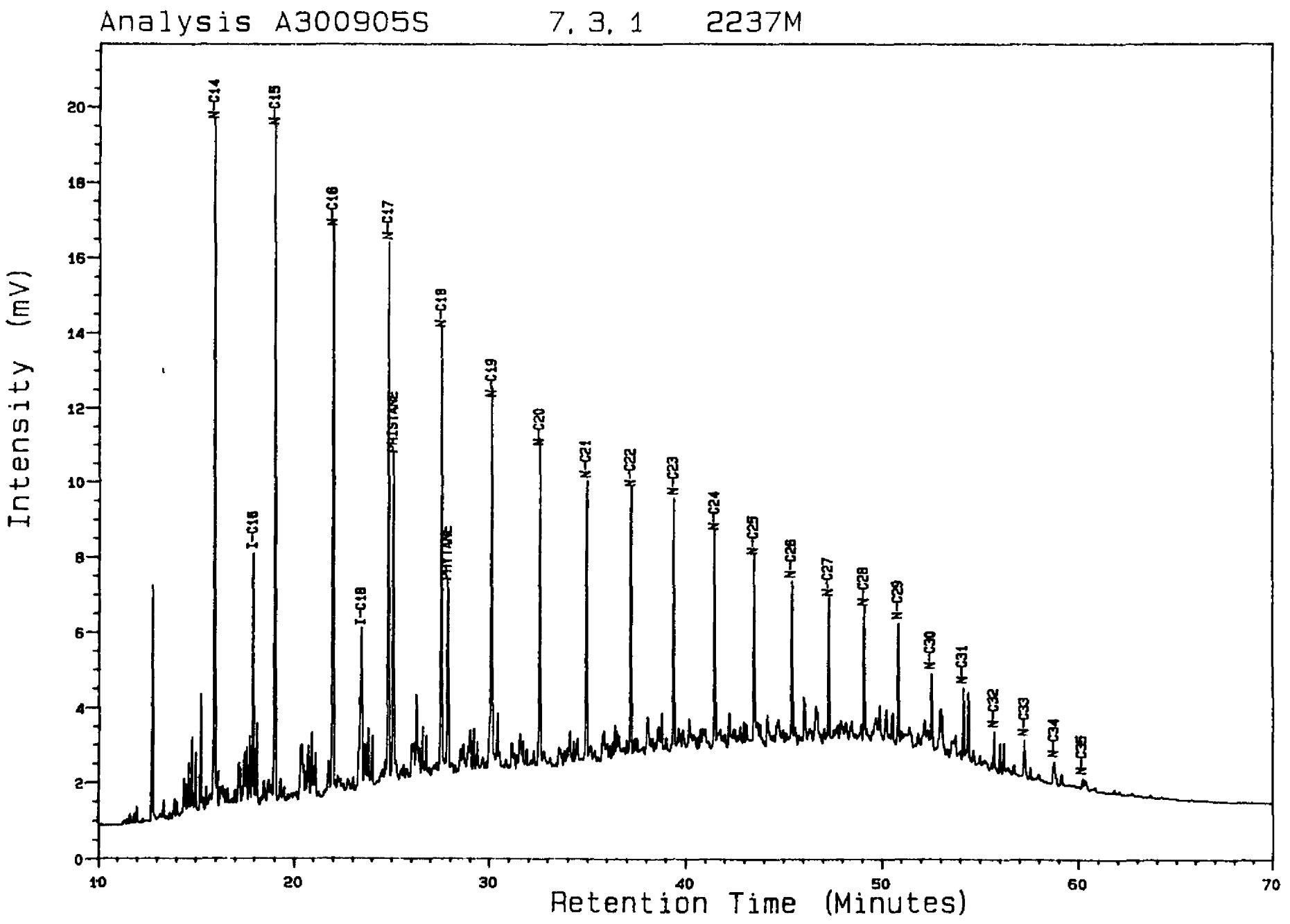
0.67 0.81 0.91 1.06 1.27 1.31 1.52

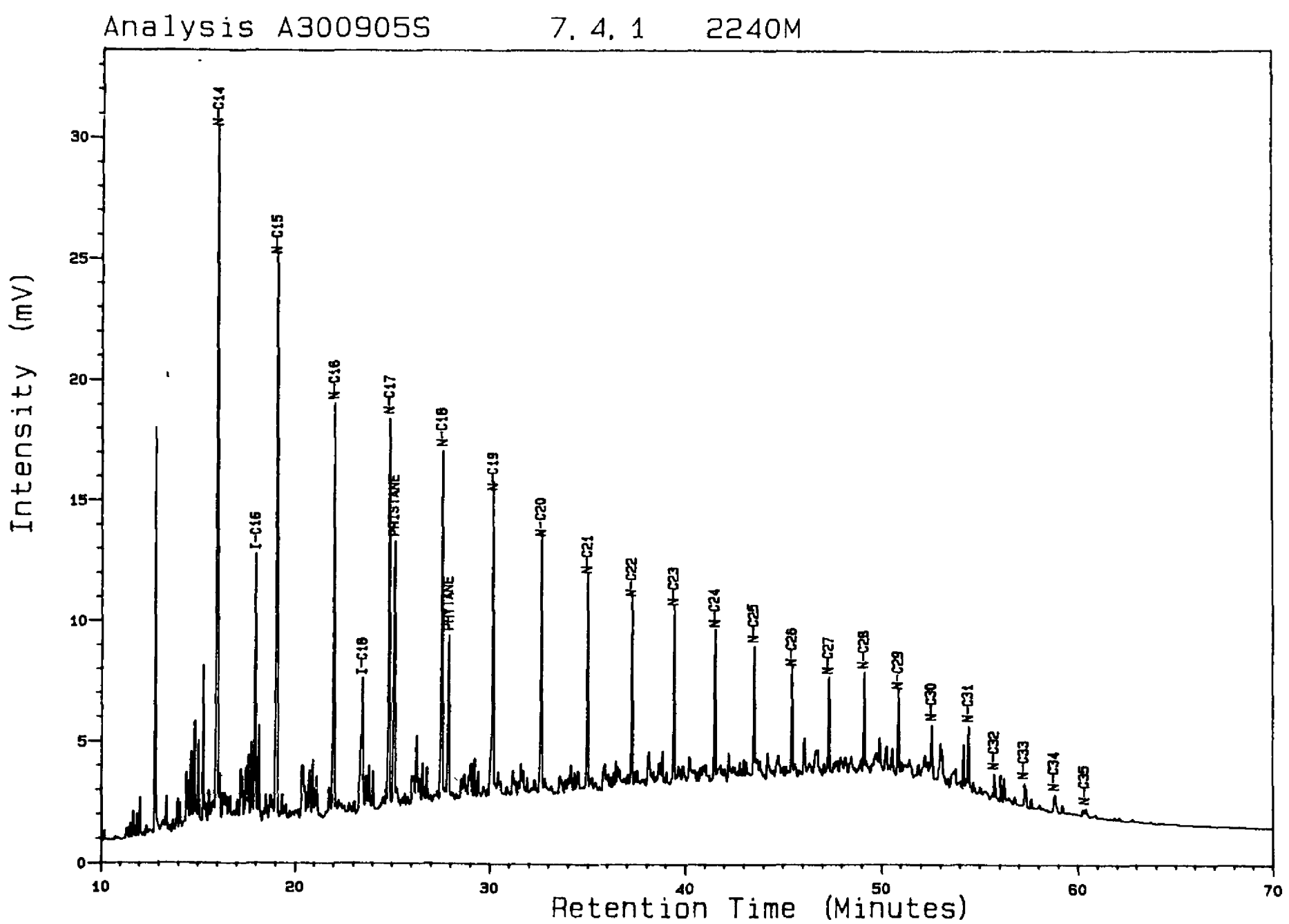


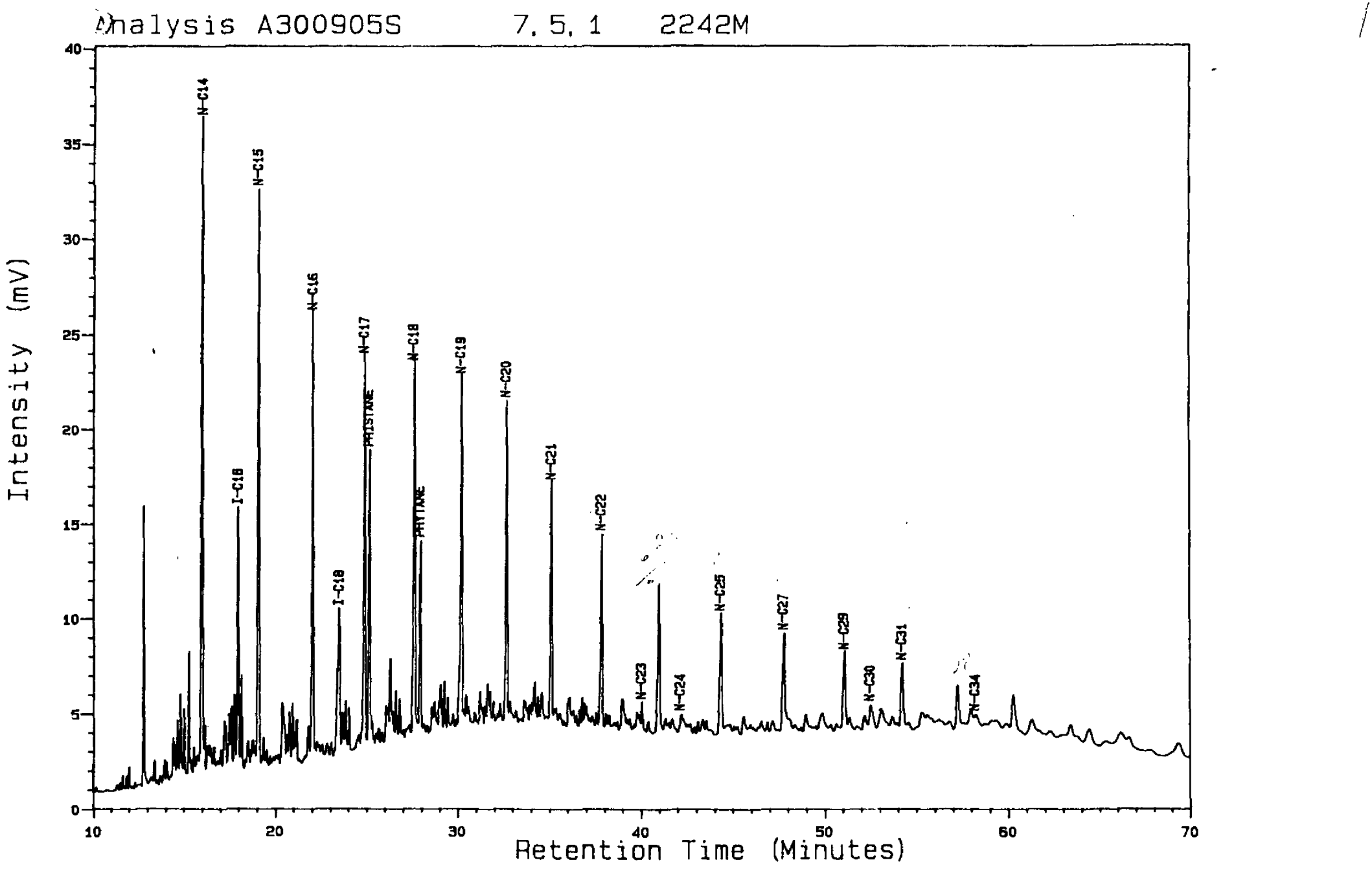
REMARKS REWORKED AND /OR INERTINITE

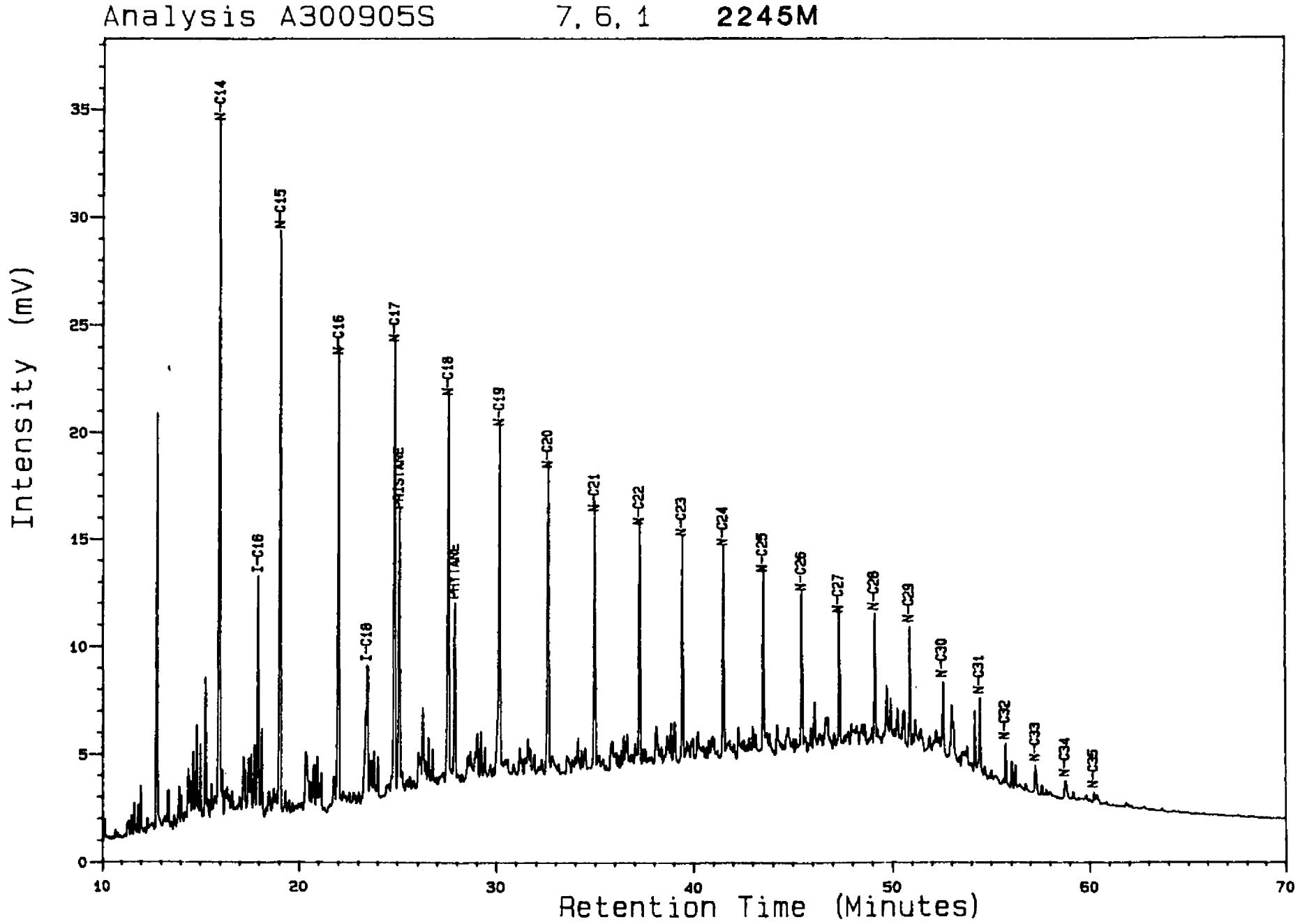
APPENDIX II

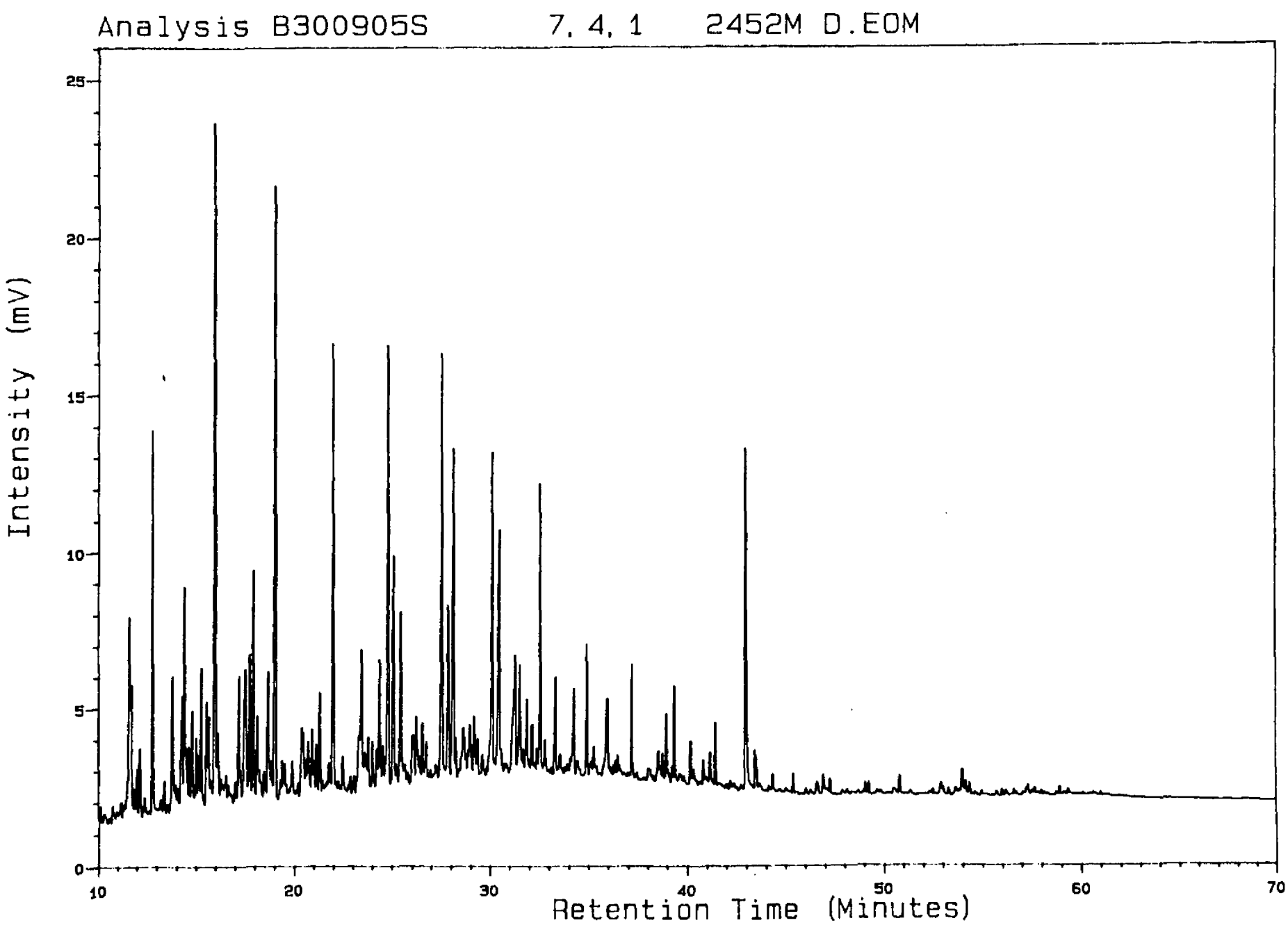
CHROMATOGRAMS OF SAT FRACTIONS

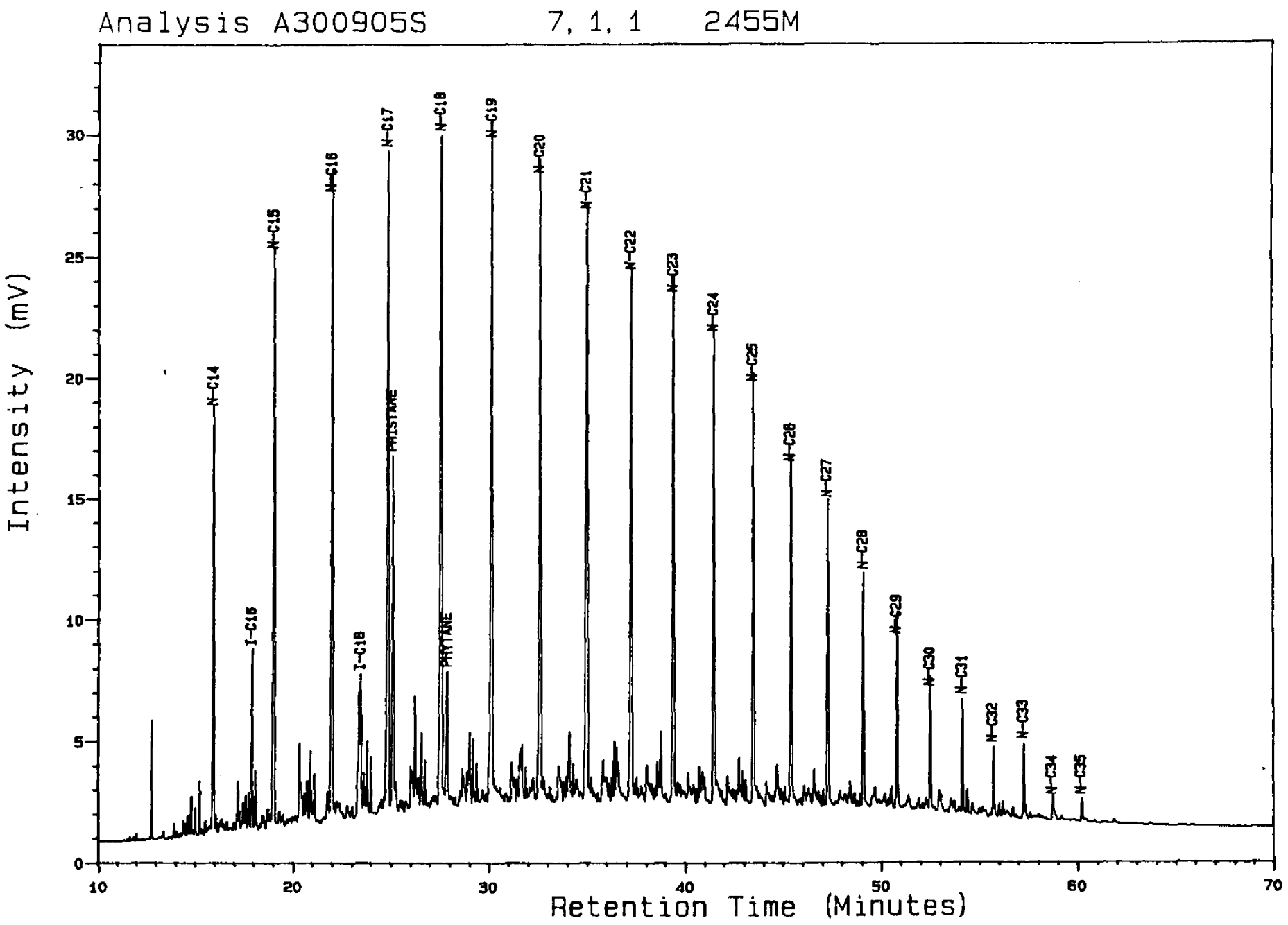

Analysis A300905S 7, 3, 1 2237M
Intensity (mV)
Retention Time (Minutes)
N-C14
N-C15
N-C16
N-C17
N-C18
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C26
N-C27
N-C28
N-C29
N-C30
N-C31
N-C32
N-C33
N-C34
N-C35
I-C16
I-C18
PRISTANE
PHYTANE

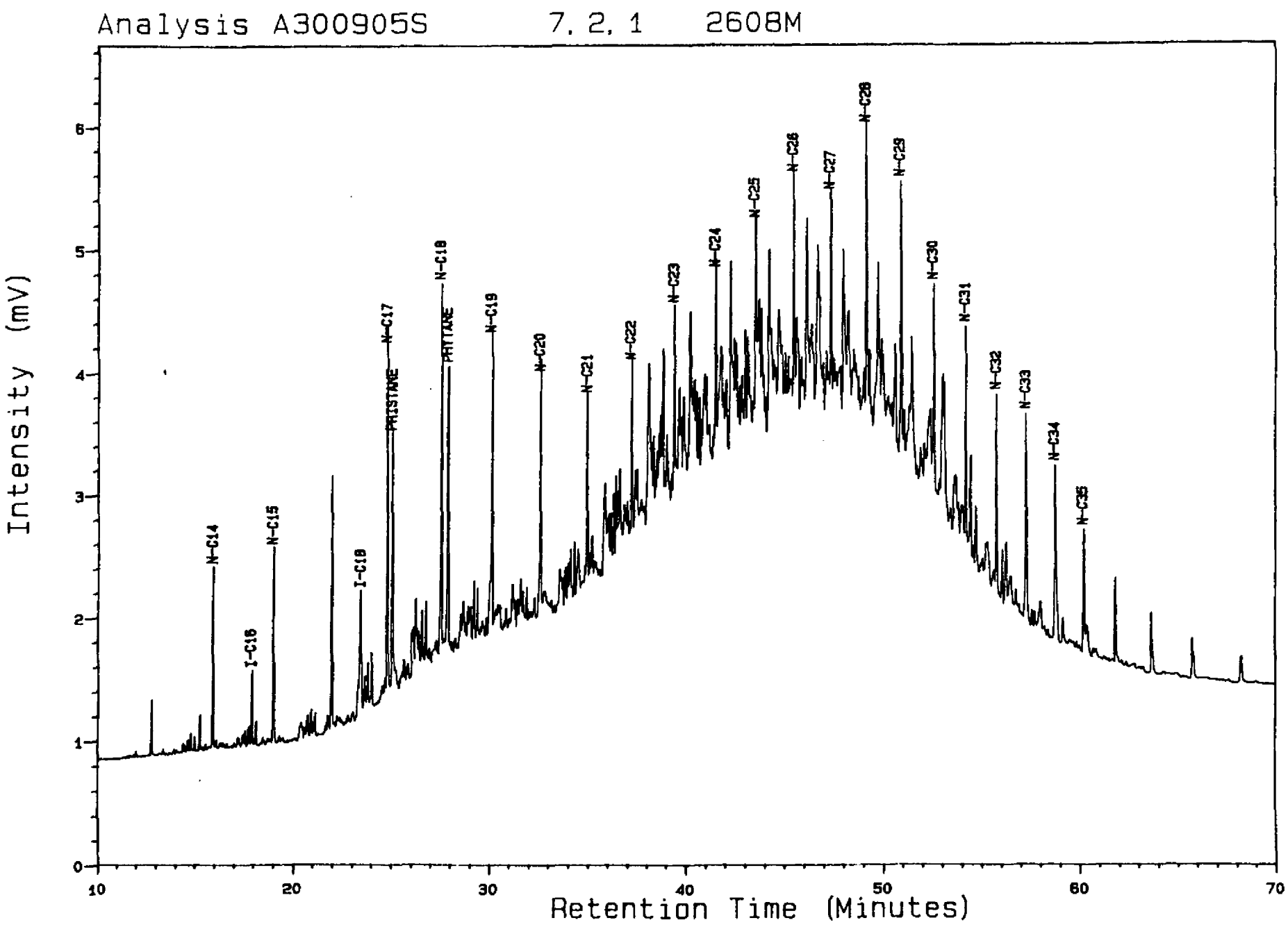

Analysis A300905S 7.4.1 2240M
Intensity (mV)
Retention Time (Minutes)
N-C14
I-C16
N-C15
N-C16
I-C18
PRISTANE
N-C17
PHYTANE
N-C18
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C26
N-C27
N-C28
N-C29
N-C30
N-C31
N-C32
N-C33
N-C34
N-C35

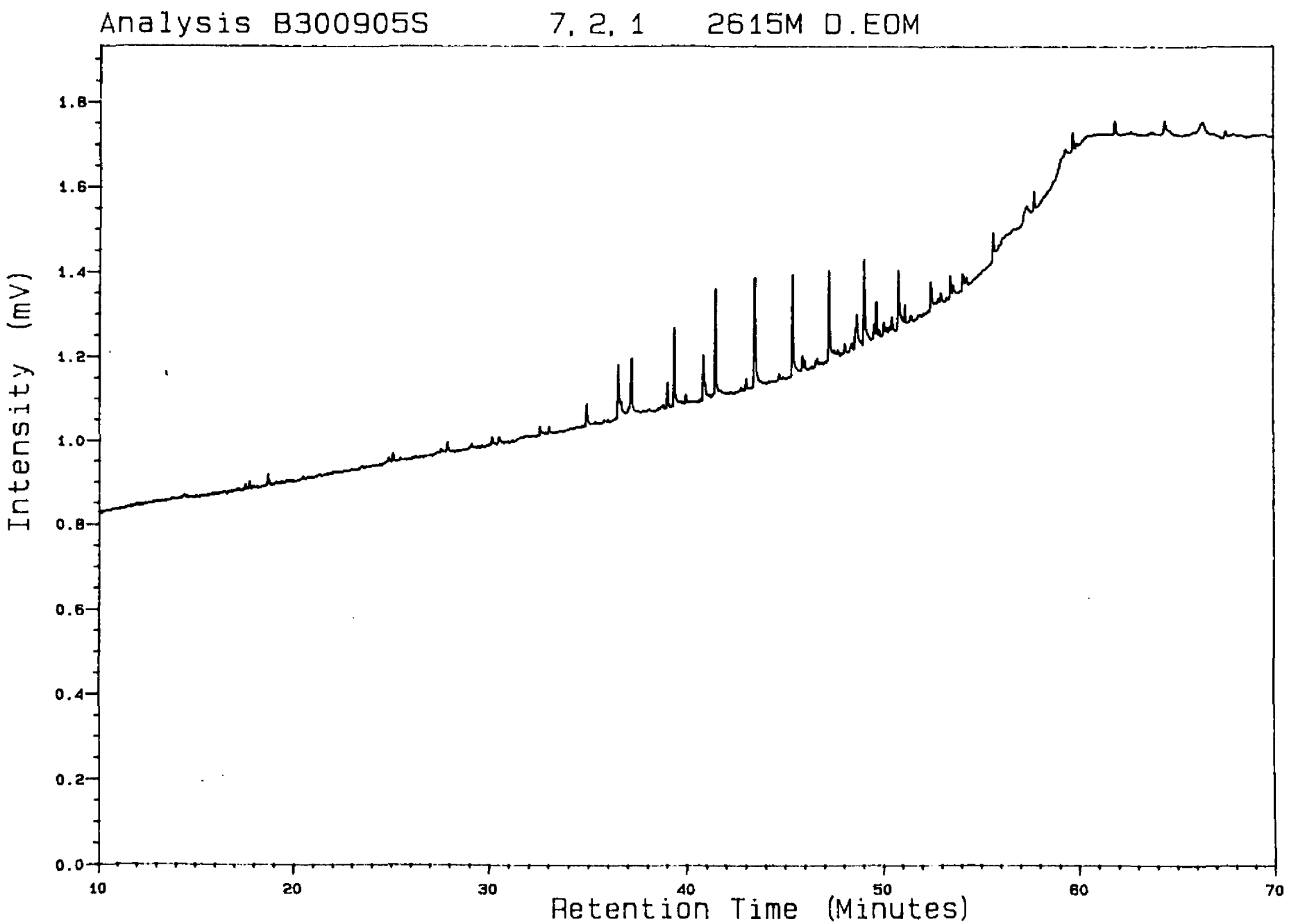

Analysis A300905S 7, 5, 1 2242M
Intensity (mV)
Retention Time (Minutes)
N-C14
N-C15
N-C16
N-C17
N-C18
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C27
N-C29
N-C30
N-C31
N-C34
I-C18
I-C18
PRISTANE
PHYTANE

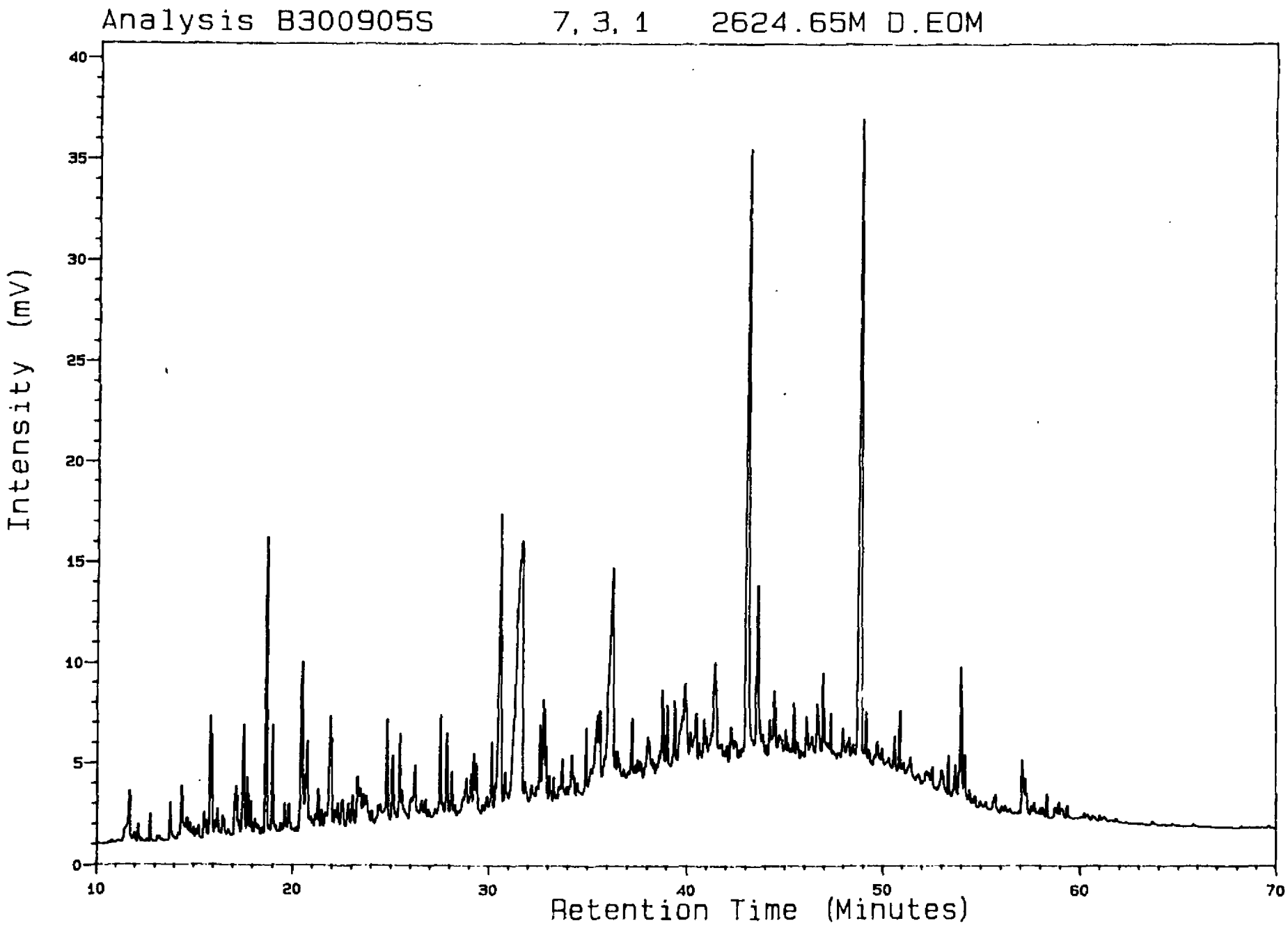

Analysis A300905S 7,6,1 2245M
Intensity (mV)
Retention Time (Minutes)
N-C14
N-C15
I-C16
N-C16
I-C18
PRISTANE
N-C17
PHYTANE
N-C18
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C26
N-C27
N-C28
N-C29
N-C30
N-C31
N-C32
N-C33
N-C34
N-C35


Analysis B300905S 7, 4, 1 2452M D.EOM
Intensity (mV)
0
5
10
15
20
25
10
20
30
40
50
60
70
Retention Time (Minutes)


Analysis A300905S 7, 1, 1 2455M
Intensity (mV)
Retention Time (Minutes)
N-C14
I-C16
N-C15
N-C16
I-C18
N-C17
PRISTANE
N-C18
PHYTANE
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C26
N-C27
N-C28
N-C29
N-C30
N-C31
N-C32
N-C33
N-C34
N-C35

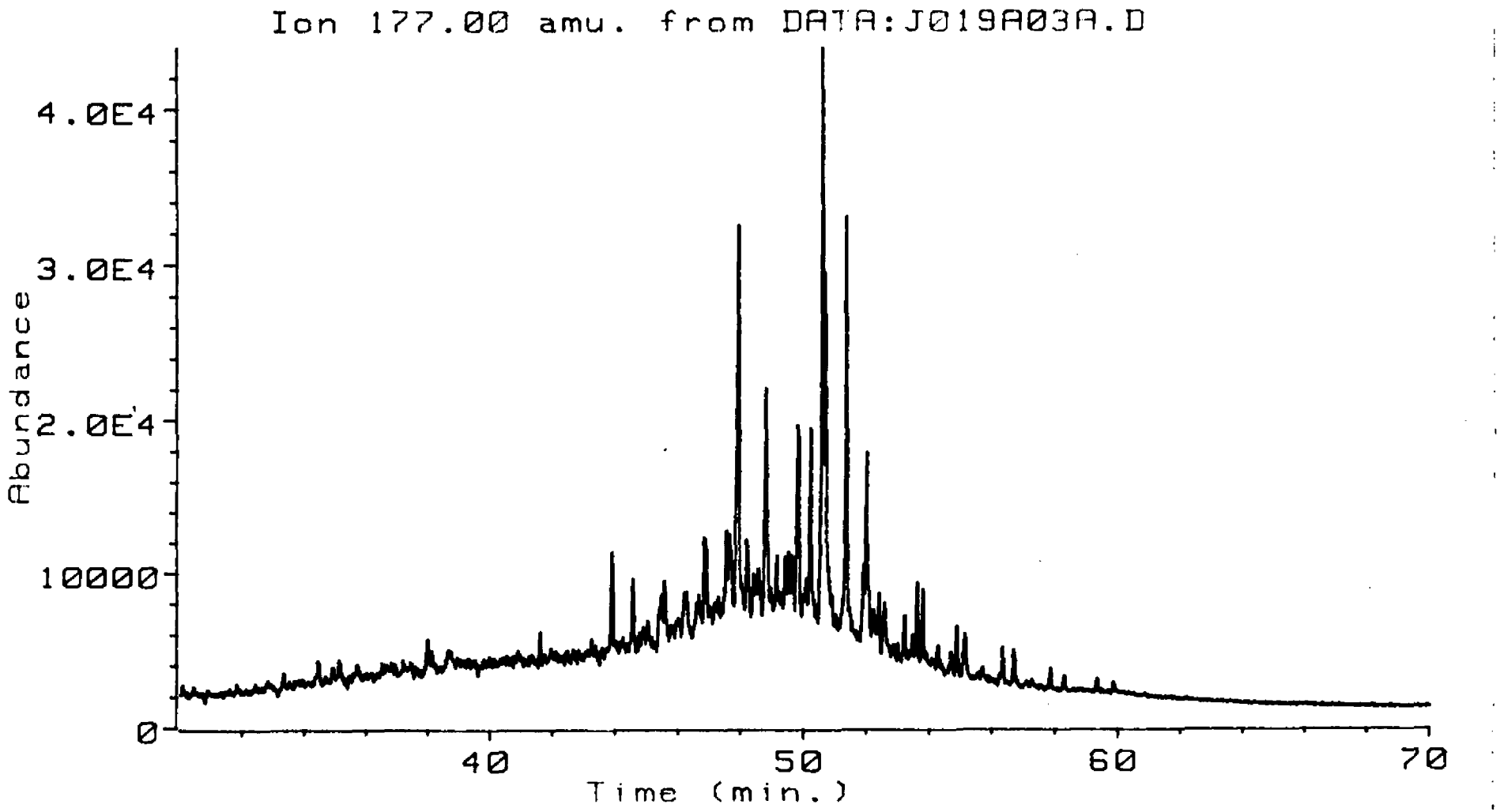

Analysis A300905S 7.2.1 2608M
Intensity (mV)
Retention Time (Minutes)
N-C14
I-C16
N-C15
I-C18
N-C17
PRISTANE
N-C18
PHYTANE
N-C19
N-C20
N-C21
N-C22
N-C23
N-C24
N-C25
N-C26
N-C27
N-C28
N-C29
N-C30
N-C31
N-C32
N-C33
N-C34
N-C35


Analysis B300905S 7, 2, 1 2615M D.EOM
Intensity (mV)
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
10
20
30
40
50
60
70
Retention Time (Minutes)

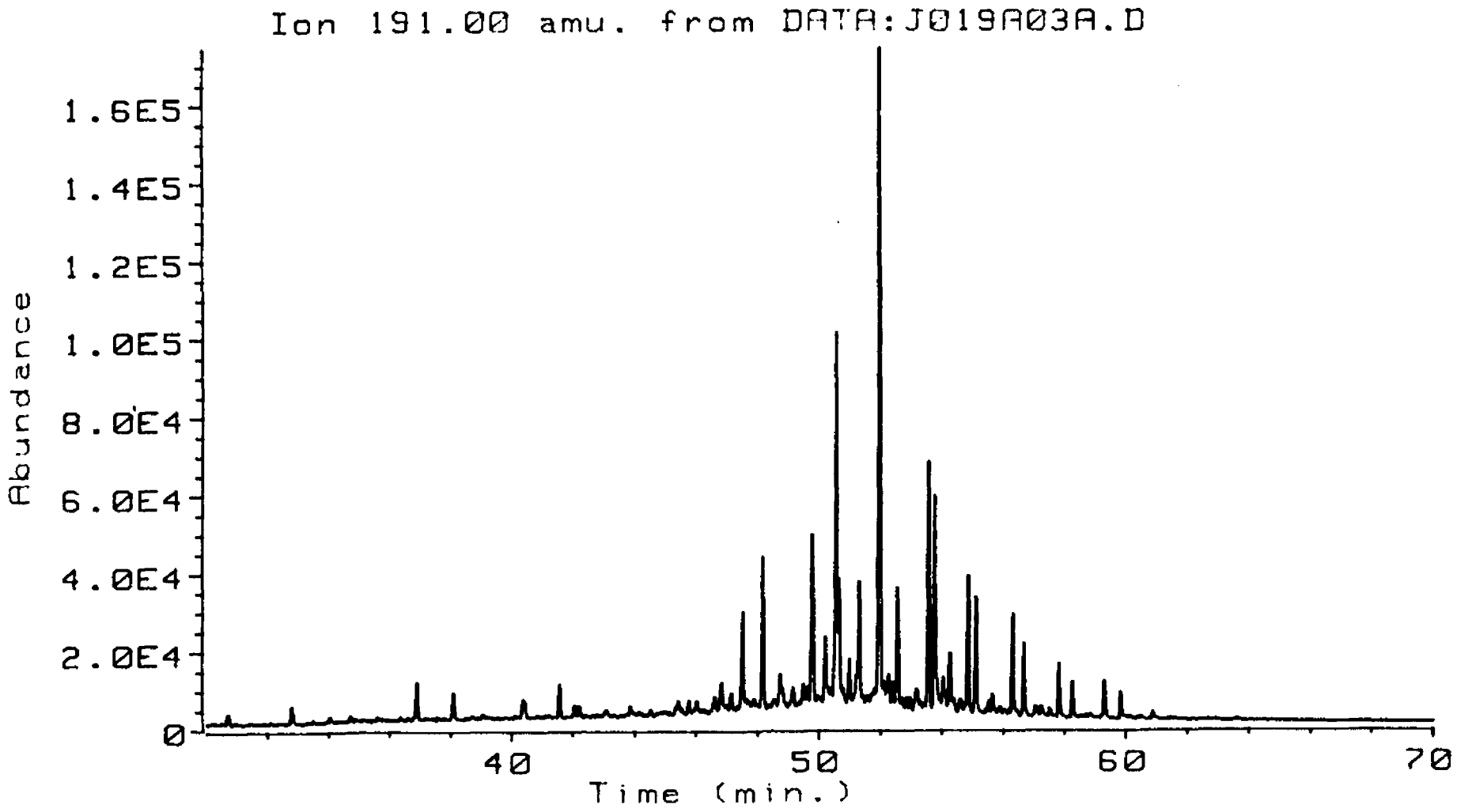

Analysis B300905S 7, 3, 1 2624.65M D.EOM
Intensity (mV)
0
5
10
15
20
25
30
35
40
10
20
30
40
50
60
70
Retention Time (Minutes)

APPENDIX III

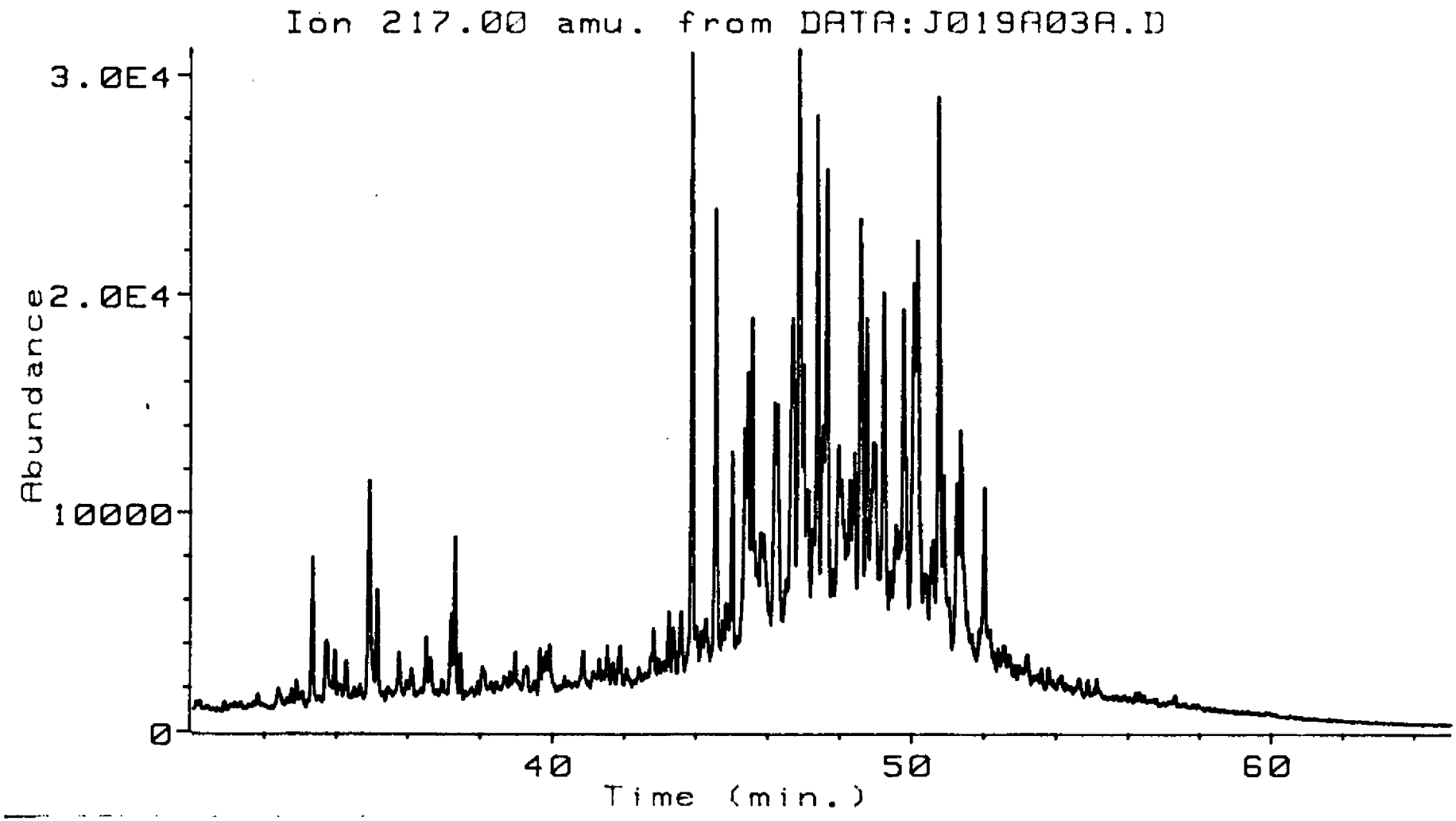
FRAGMENTOGRAMS OF TRITERPANES AND STERANES



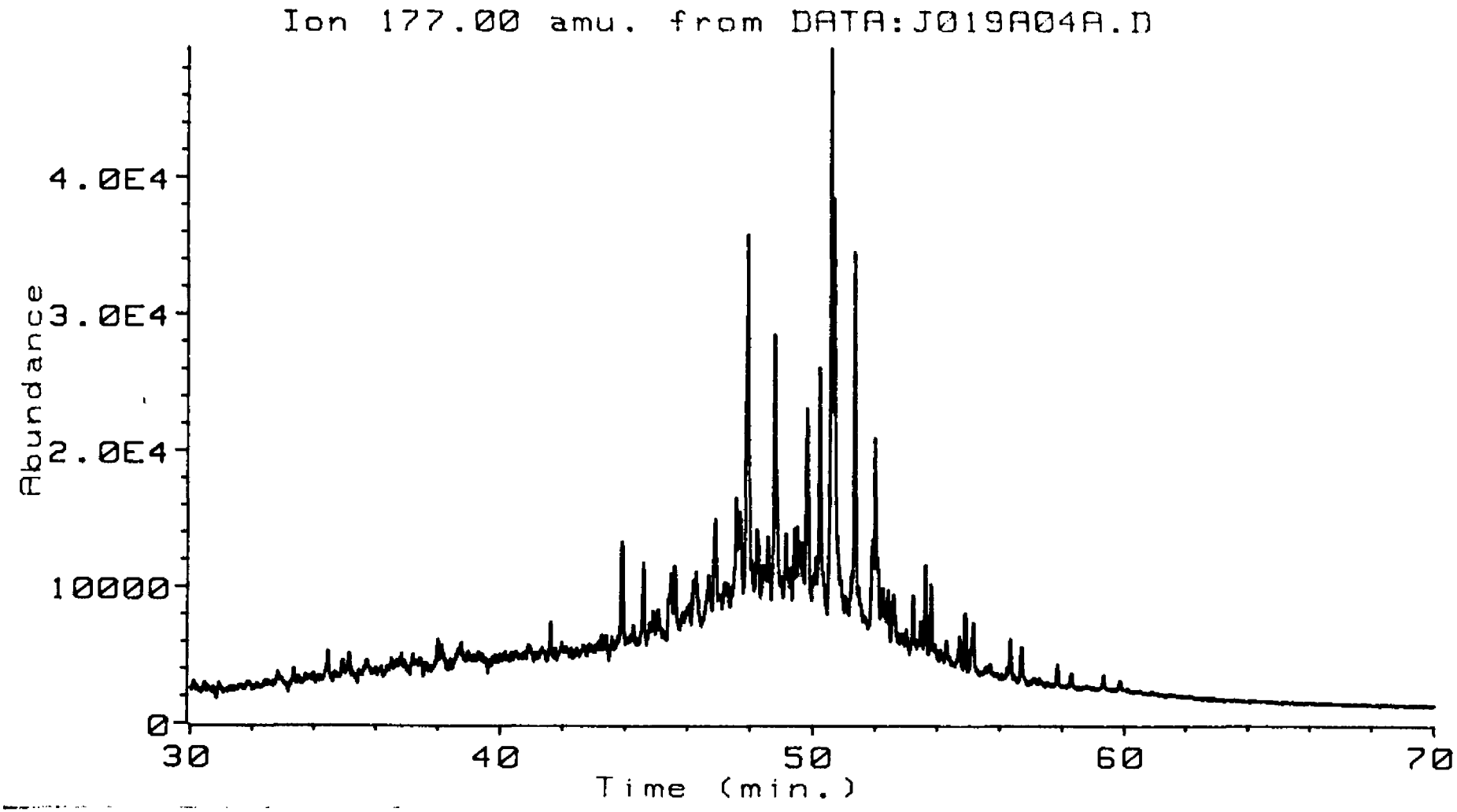
TRITERPANES 2237 M



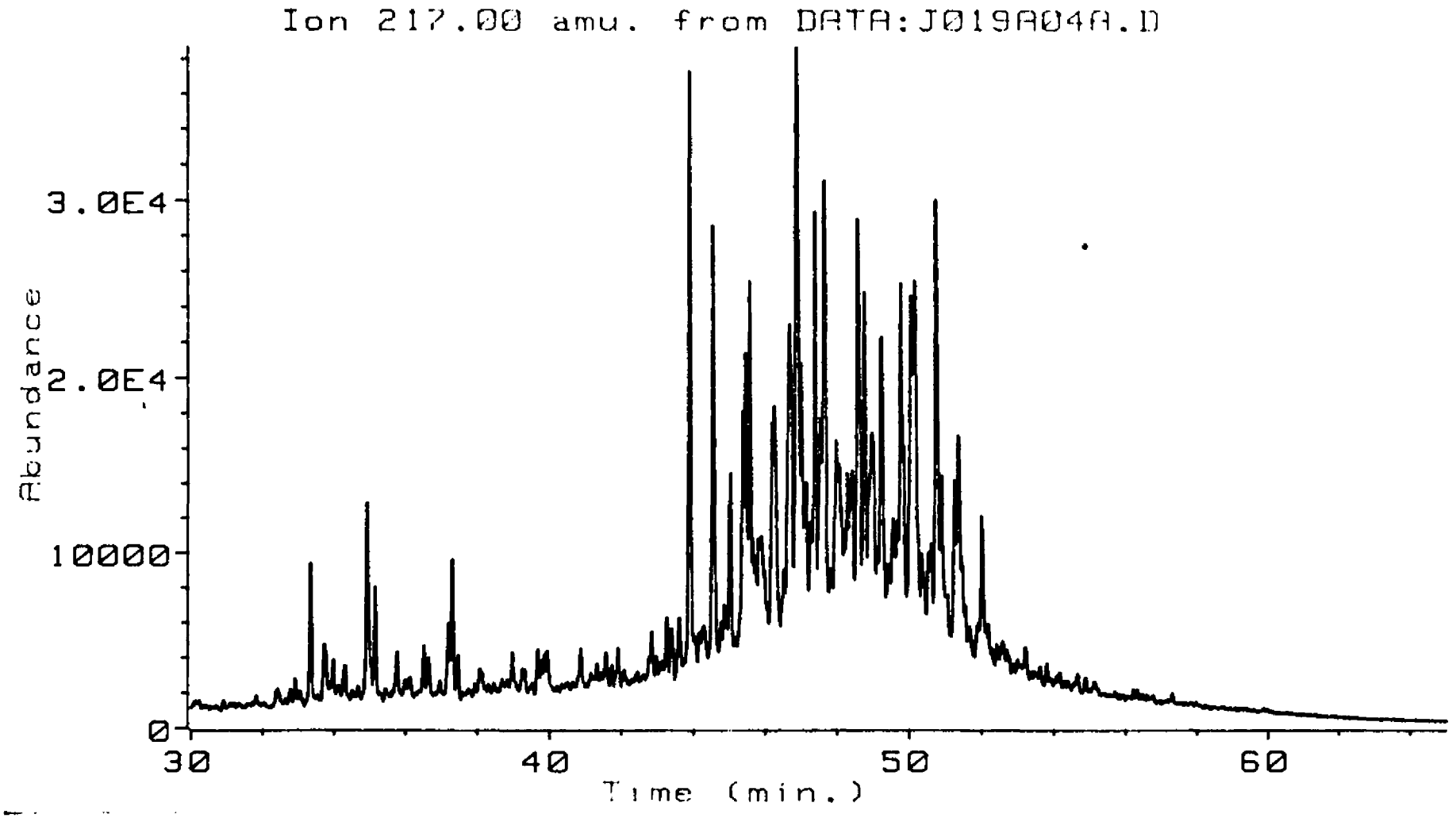
TRITERPANES 2237 M



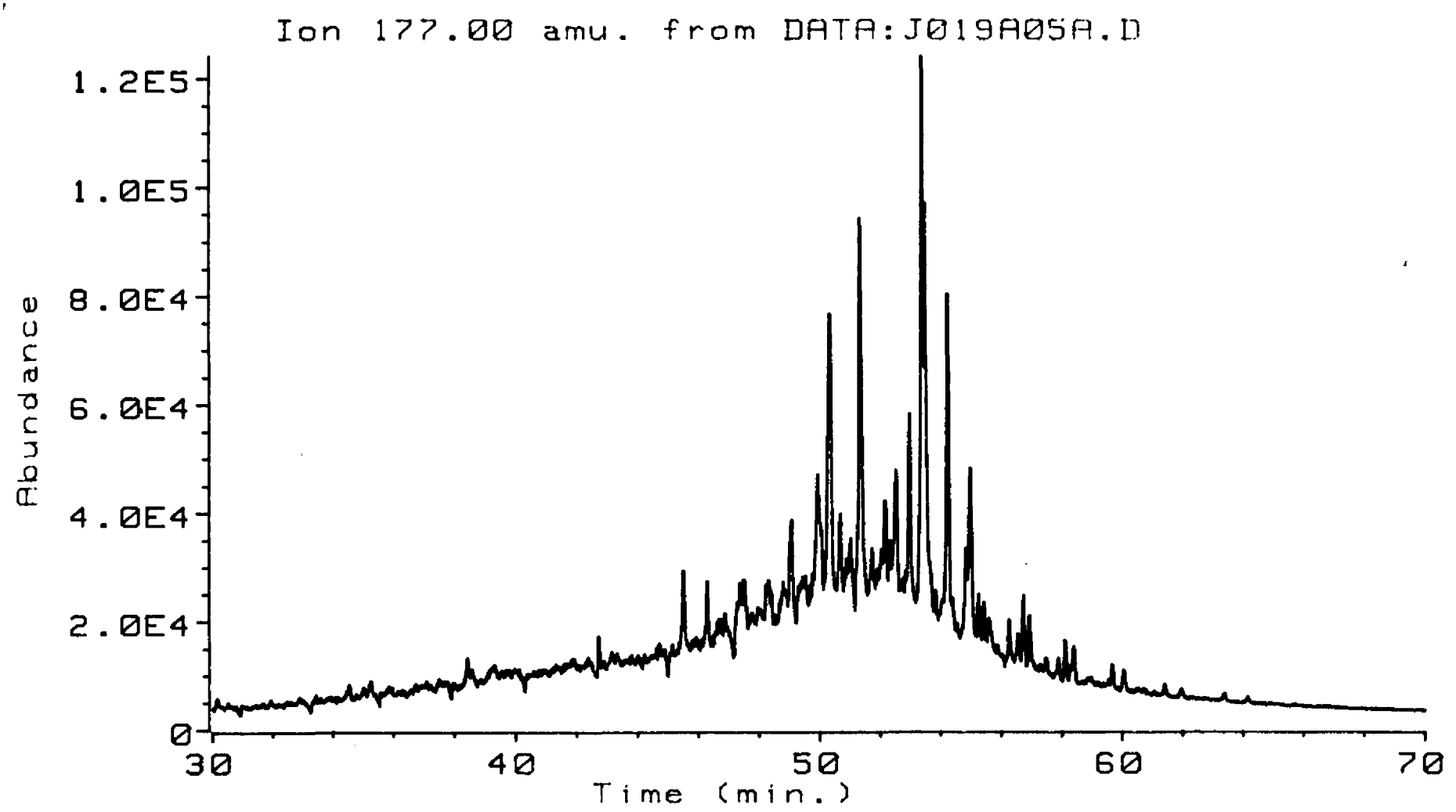
STERANES 2237 M



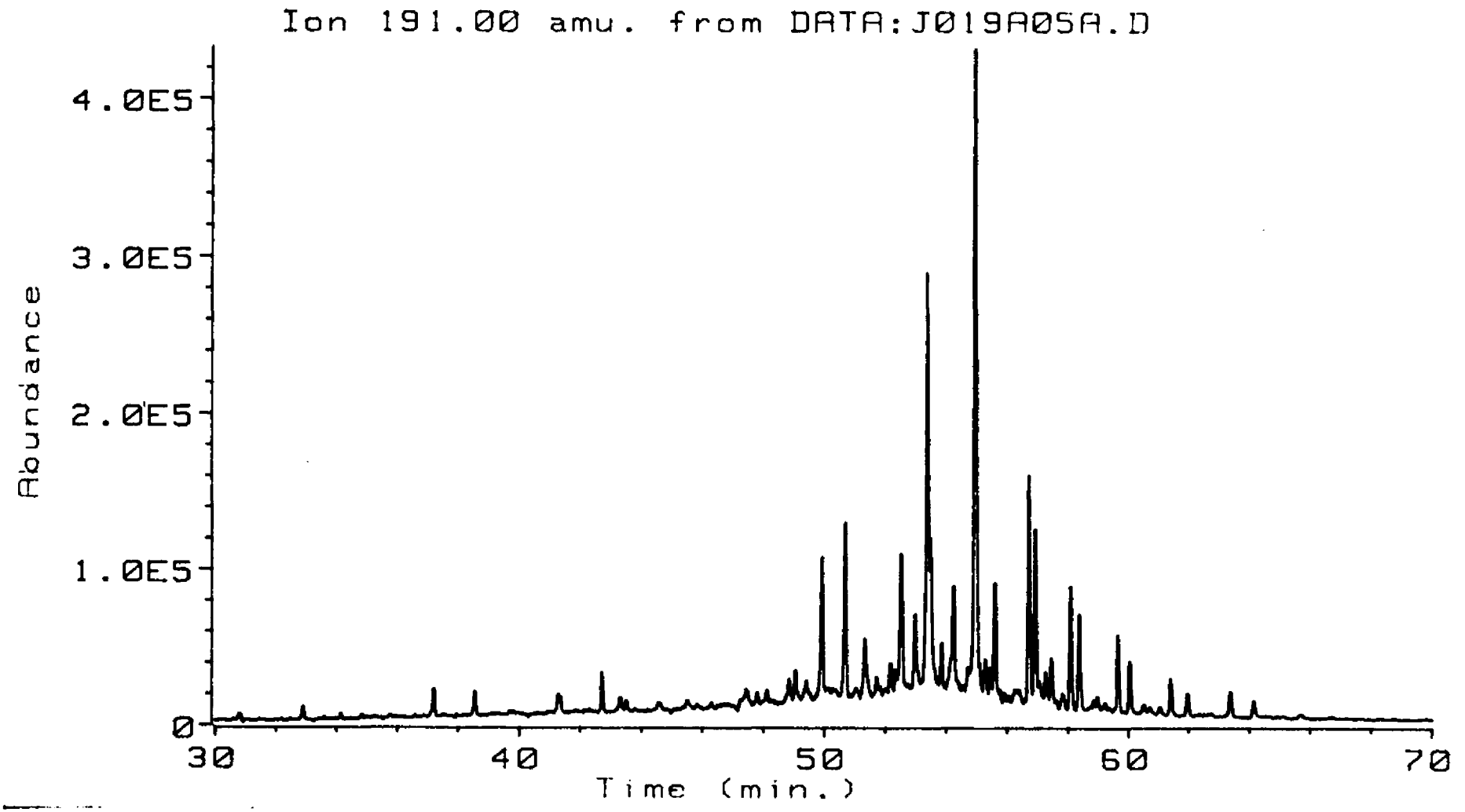
TRITERPANES 2240 M



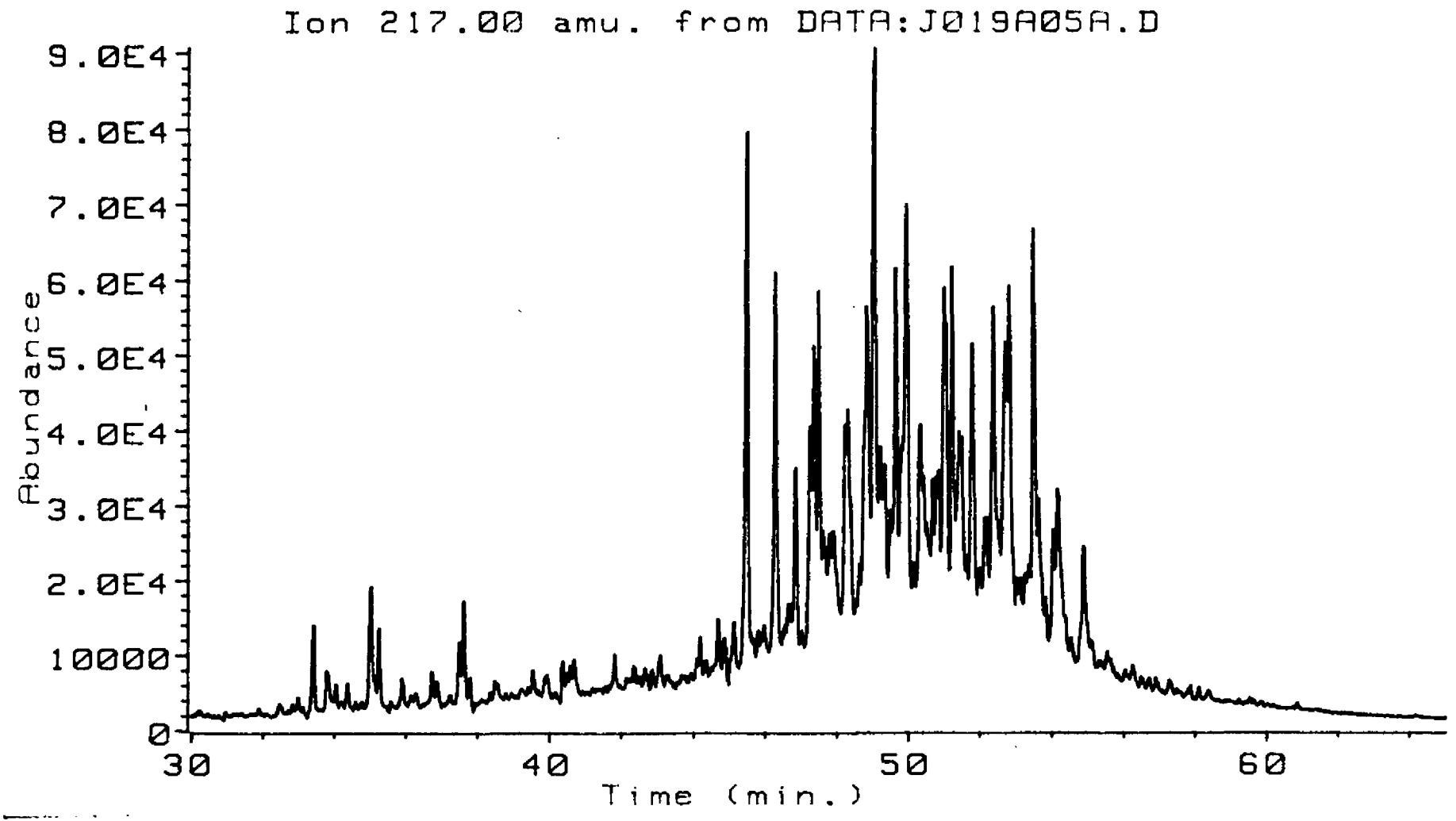
STERANES 2240 M



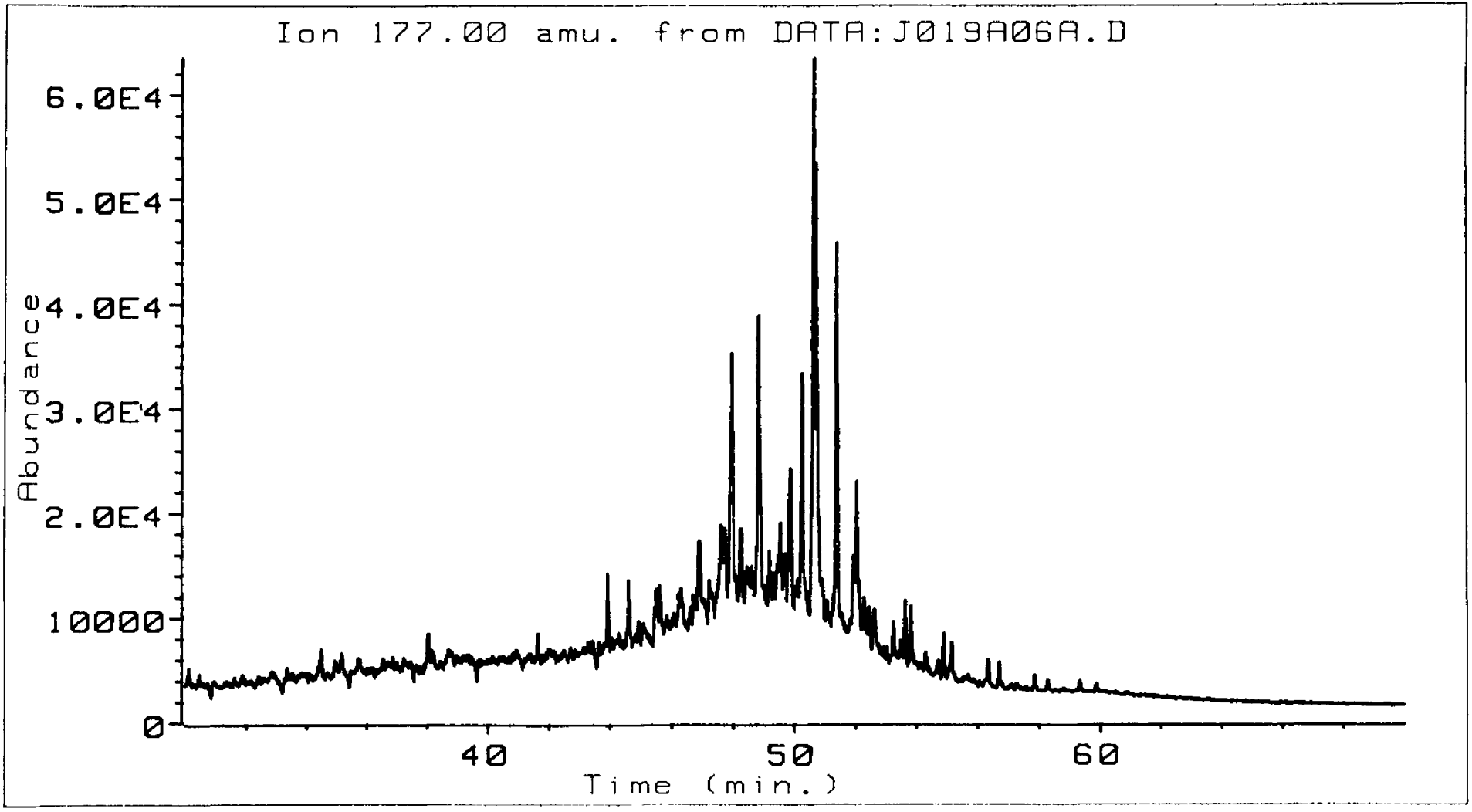
TRITERPANES 2242 M



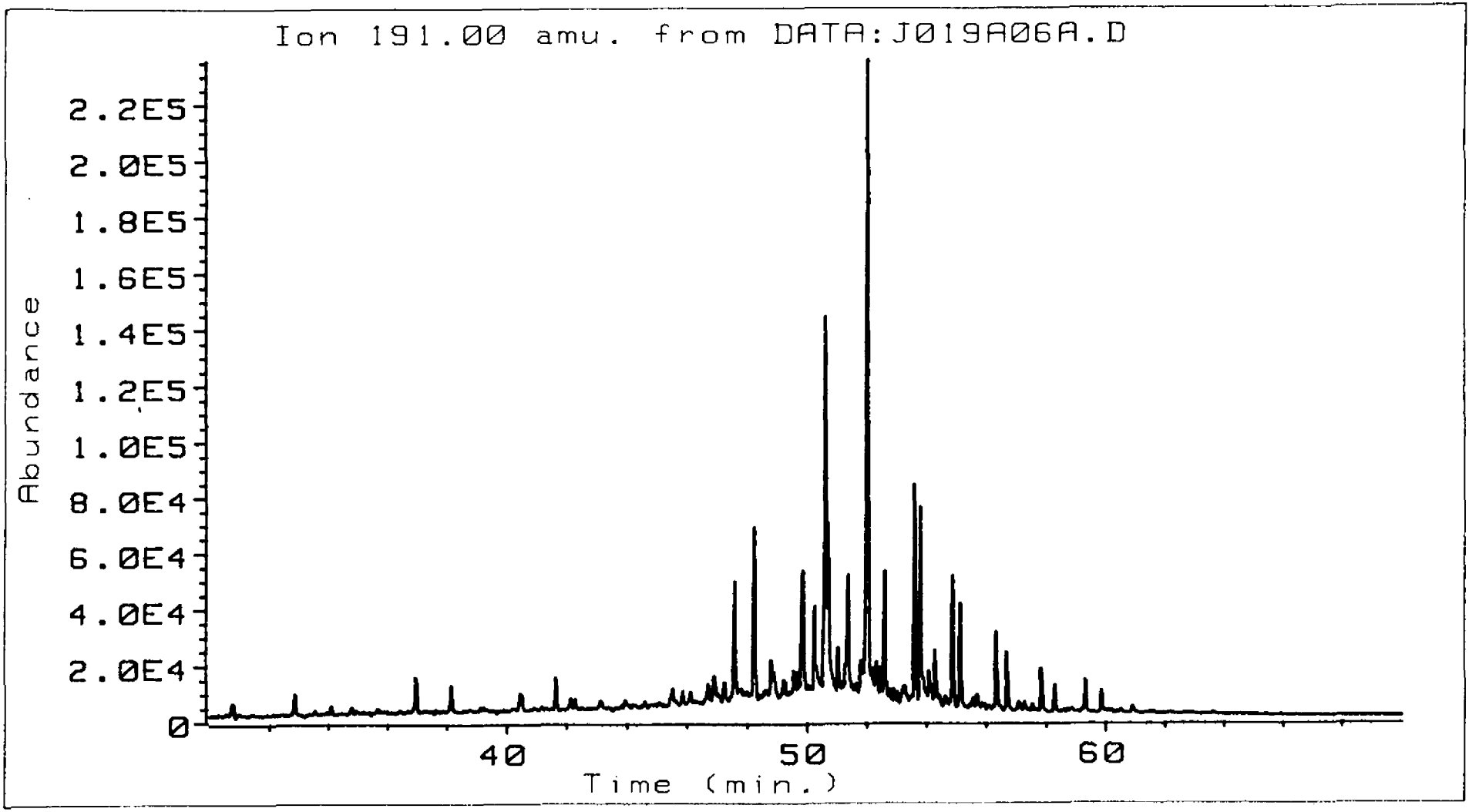
TRITERPANES 2242 M



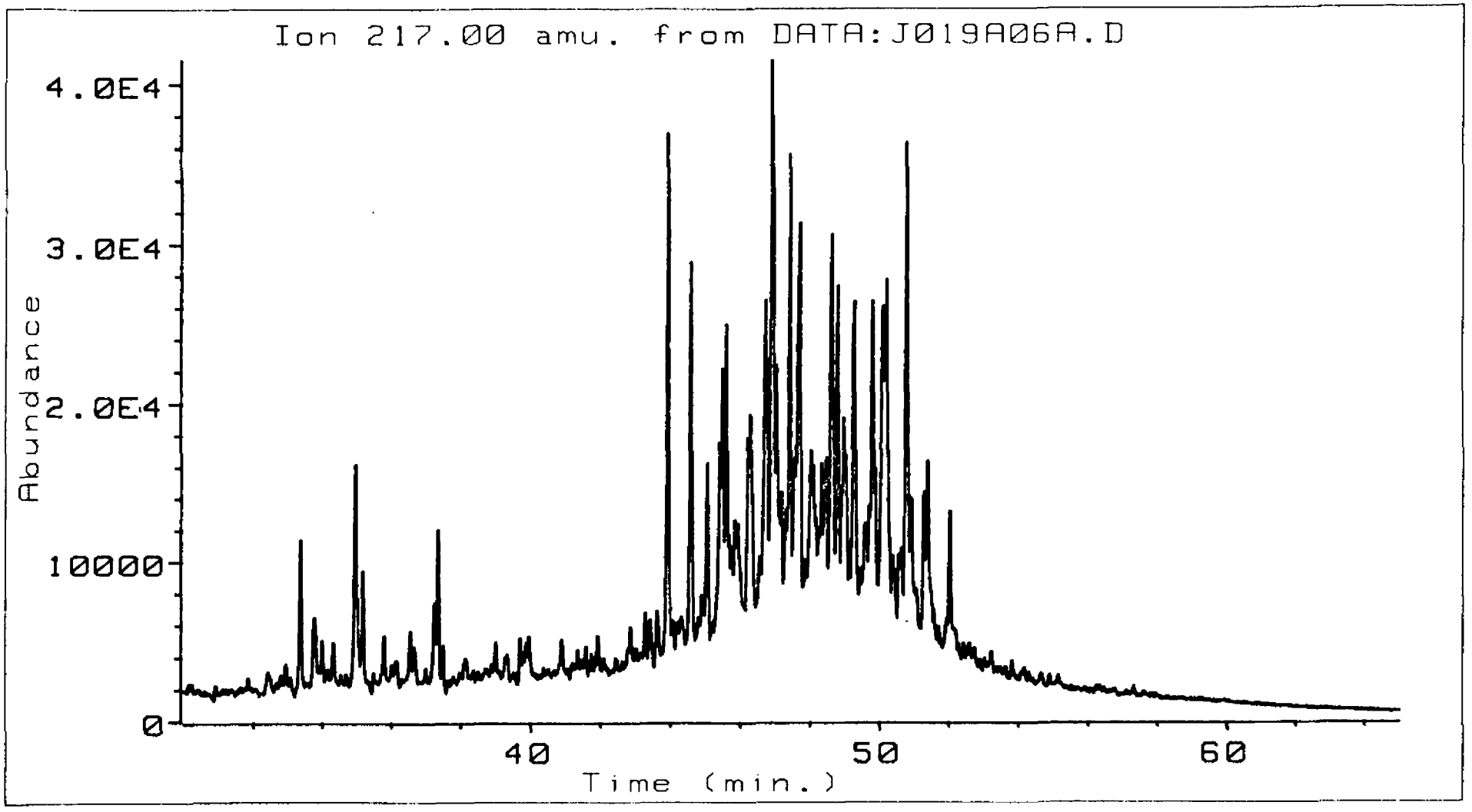
STERANES 2242 M



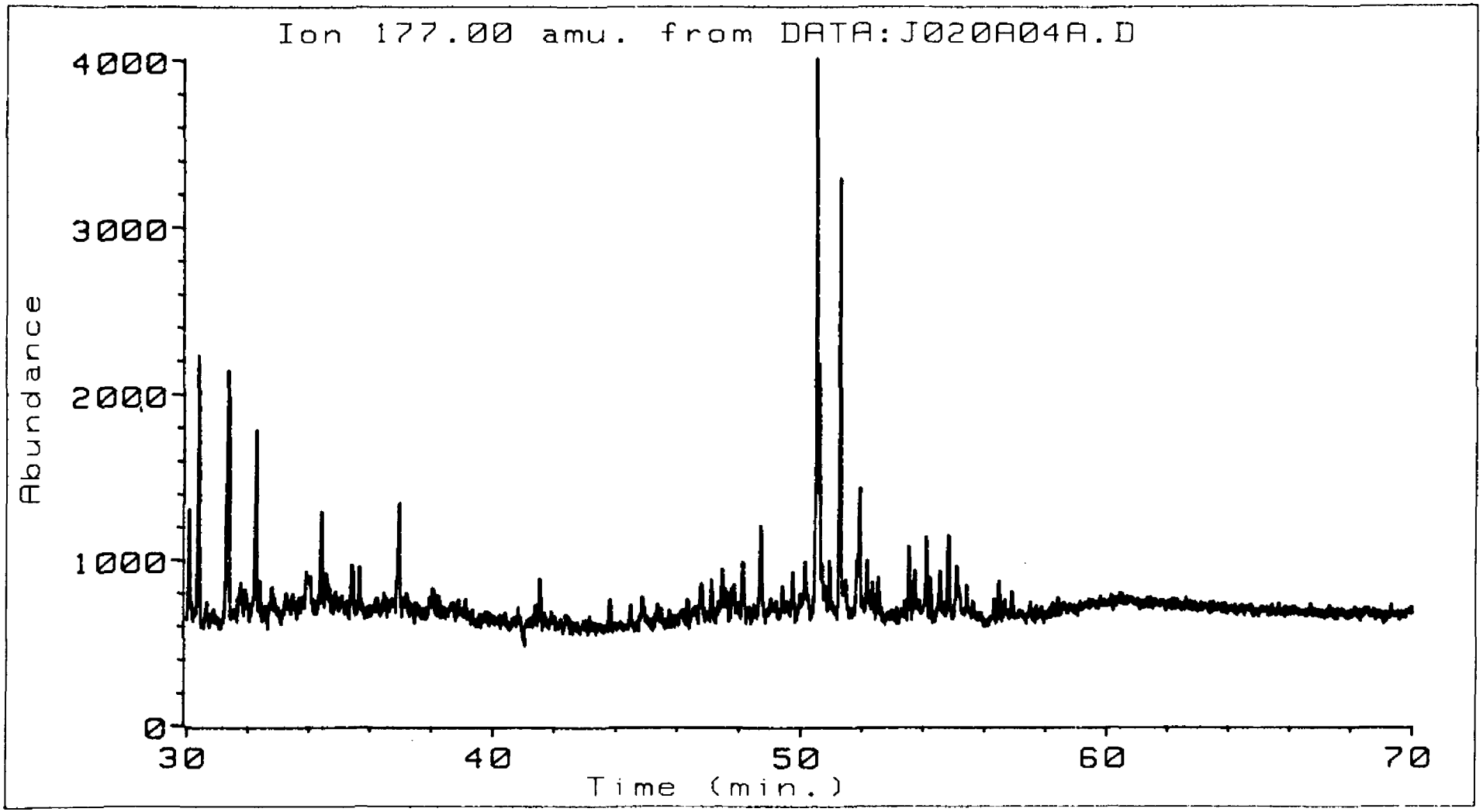
TRITERPANES 2245 M



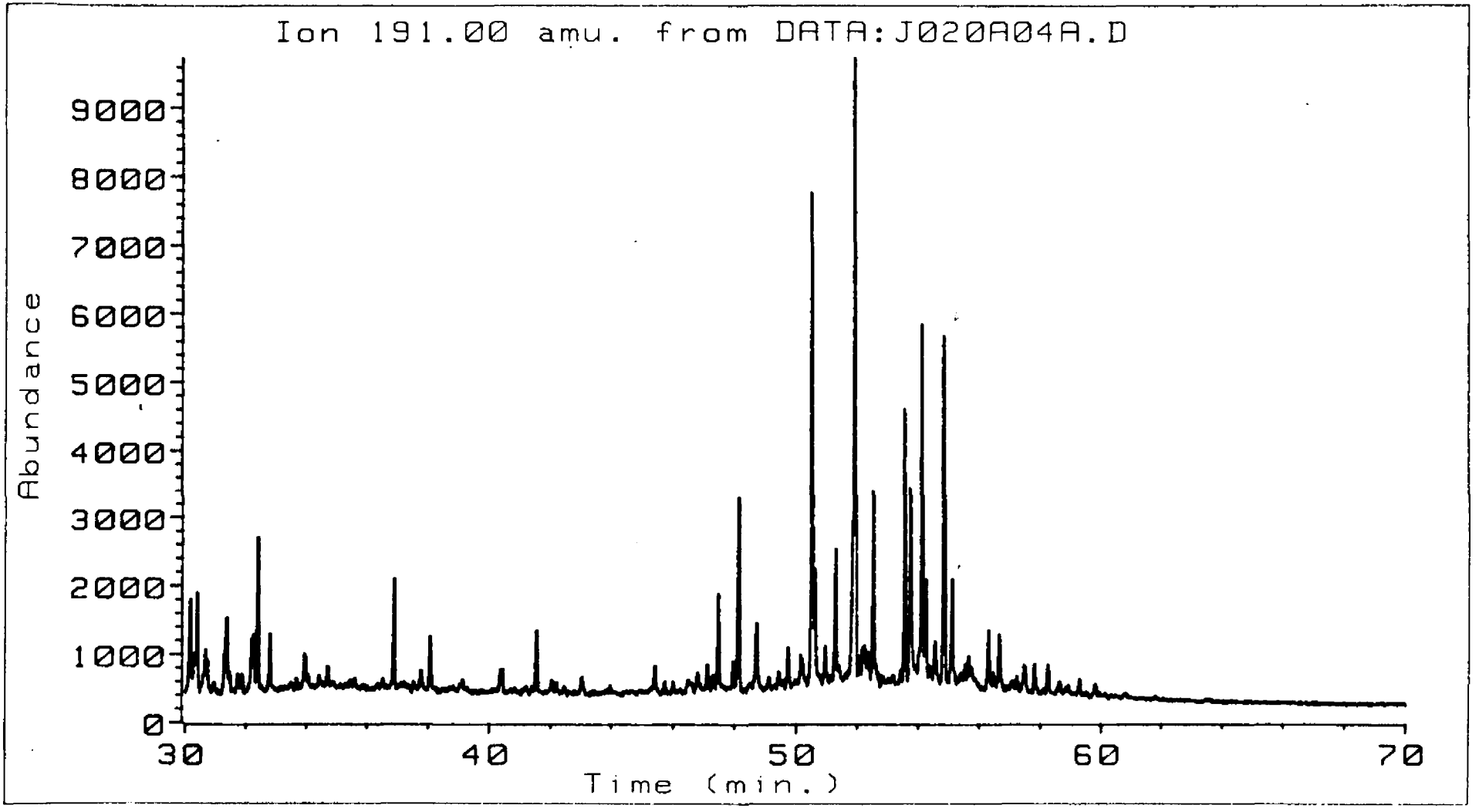
TRITERPANES 2245 M



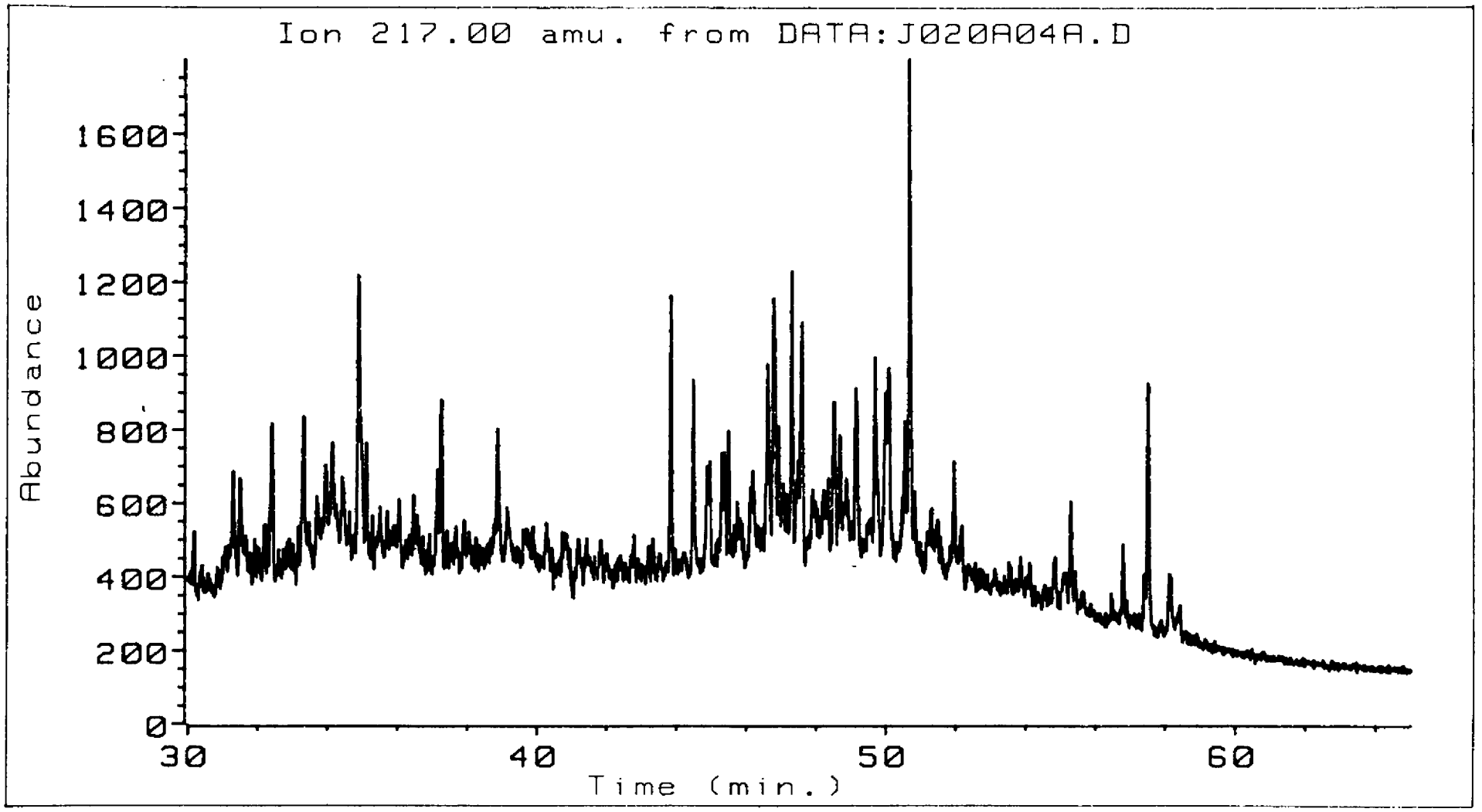
STERANES 2245 M



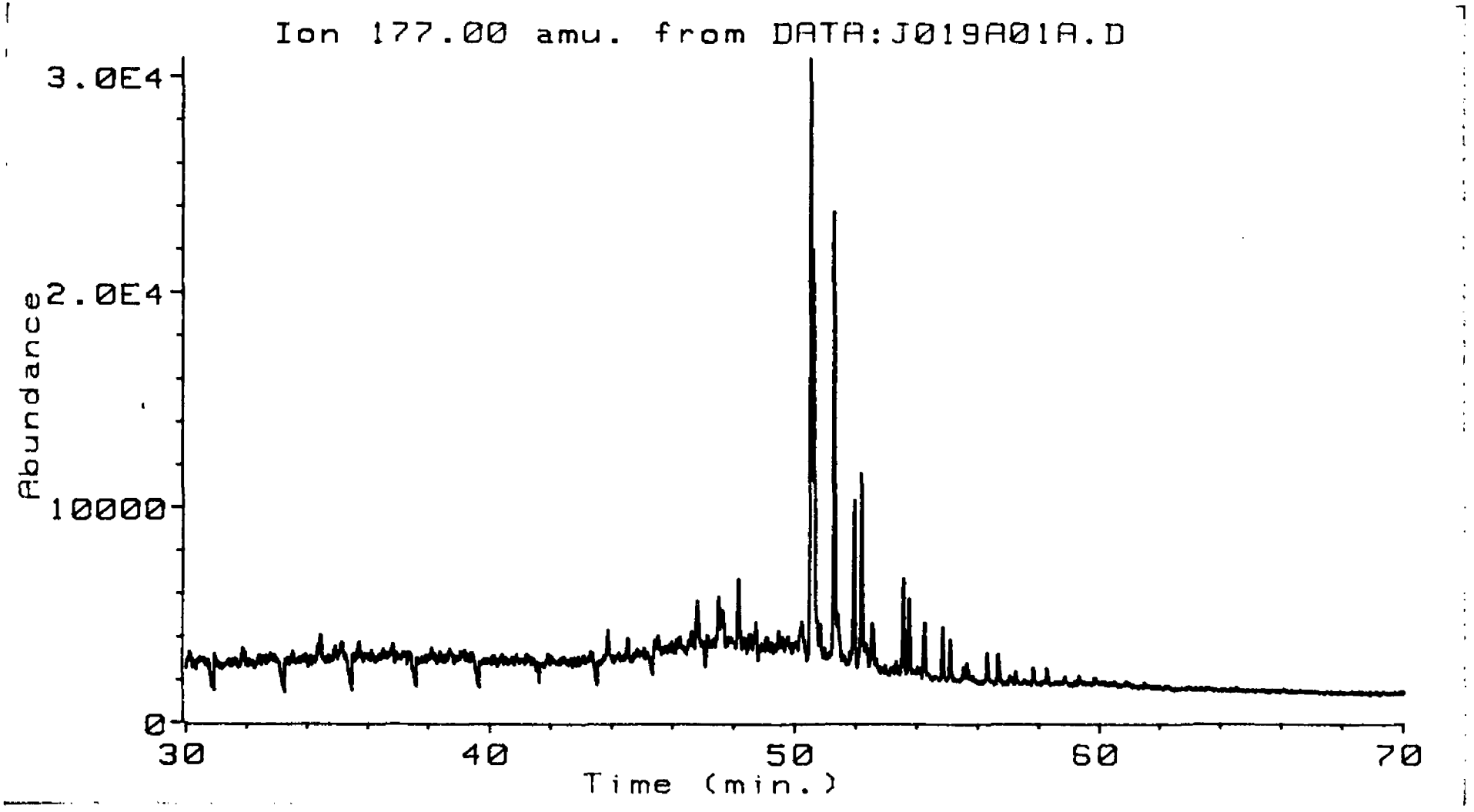
TRITERPANES 2452 M



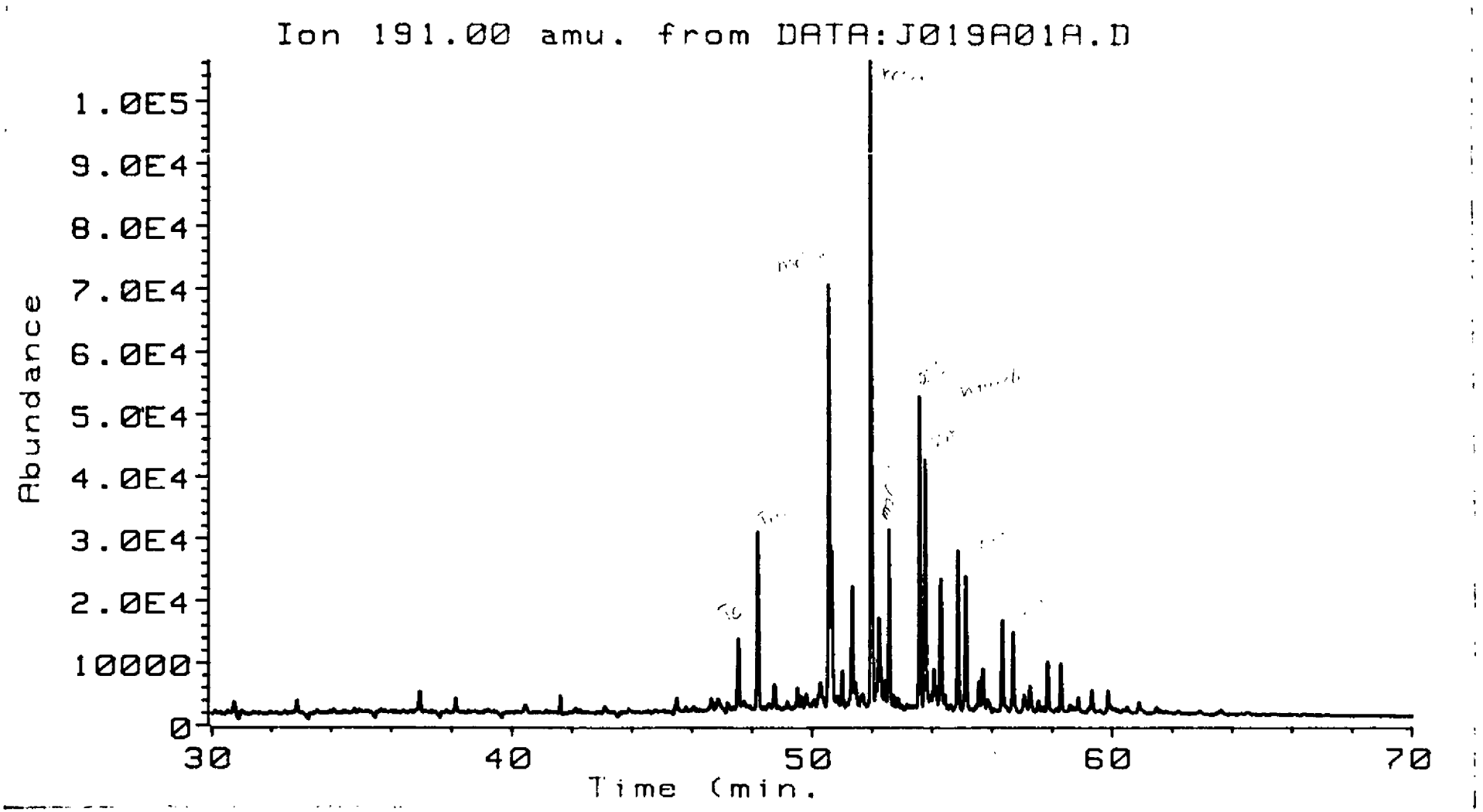
TRITERPANES 2452 M



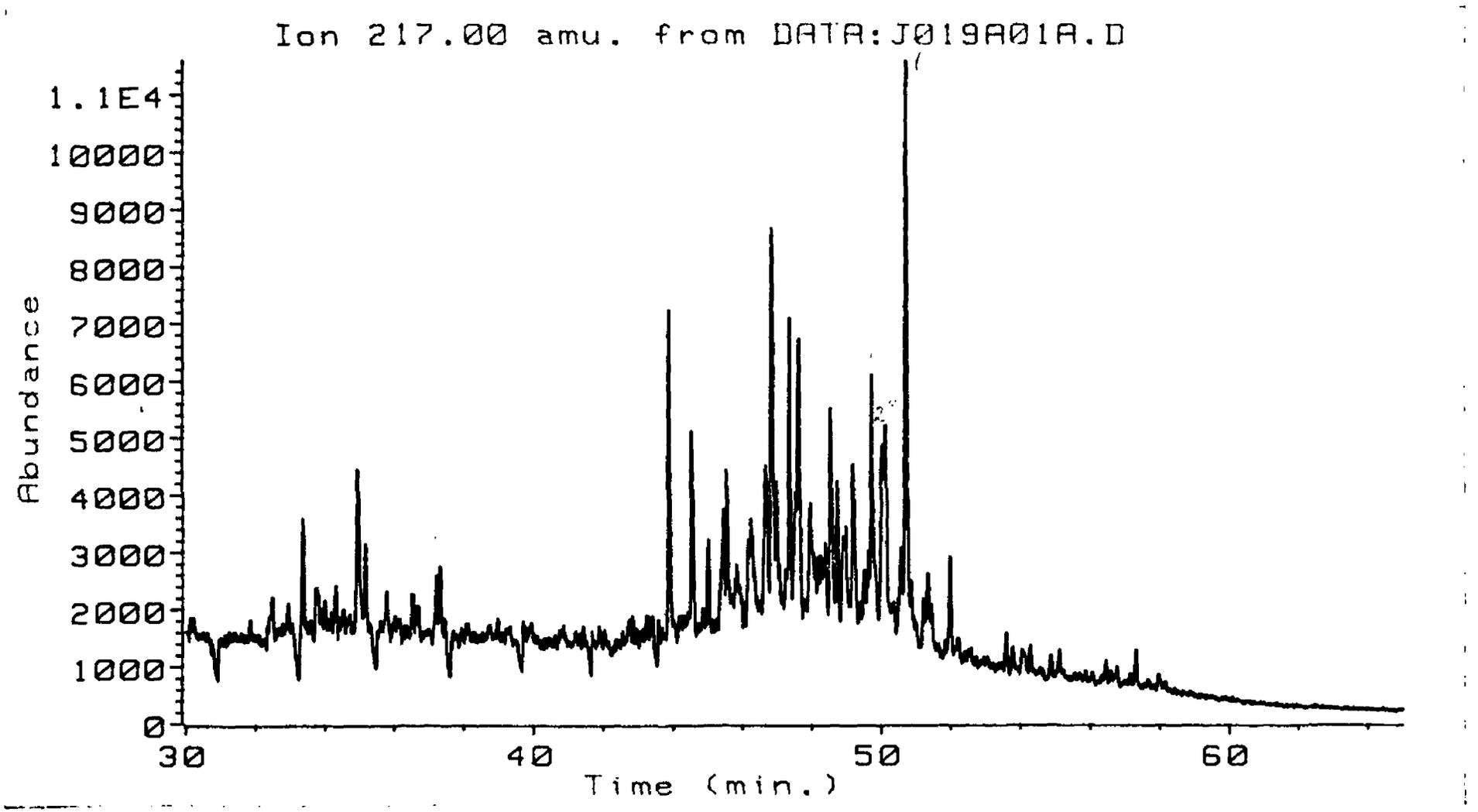
STERANES 2452 M



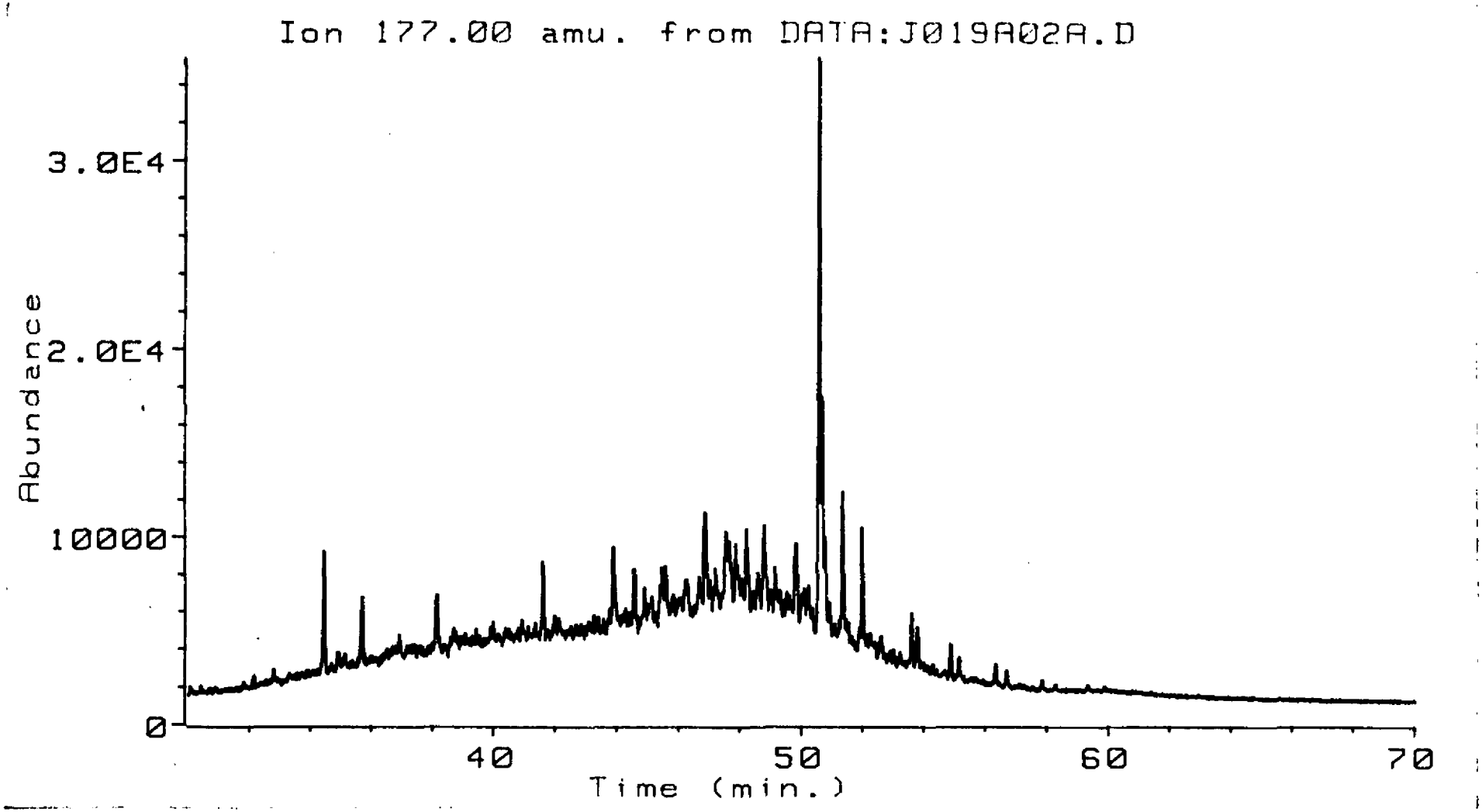
TRITERPANES 2455 M



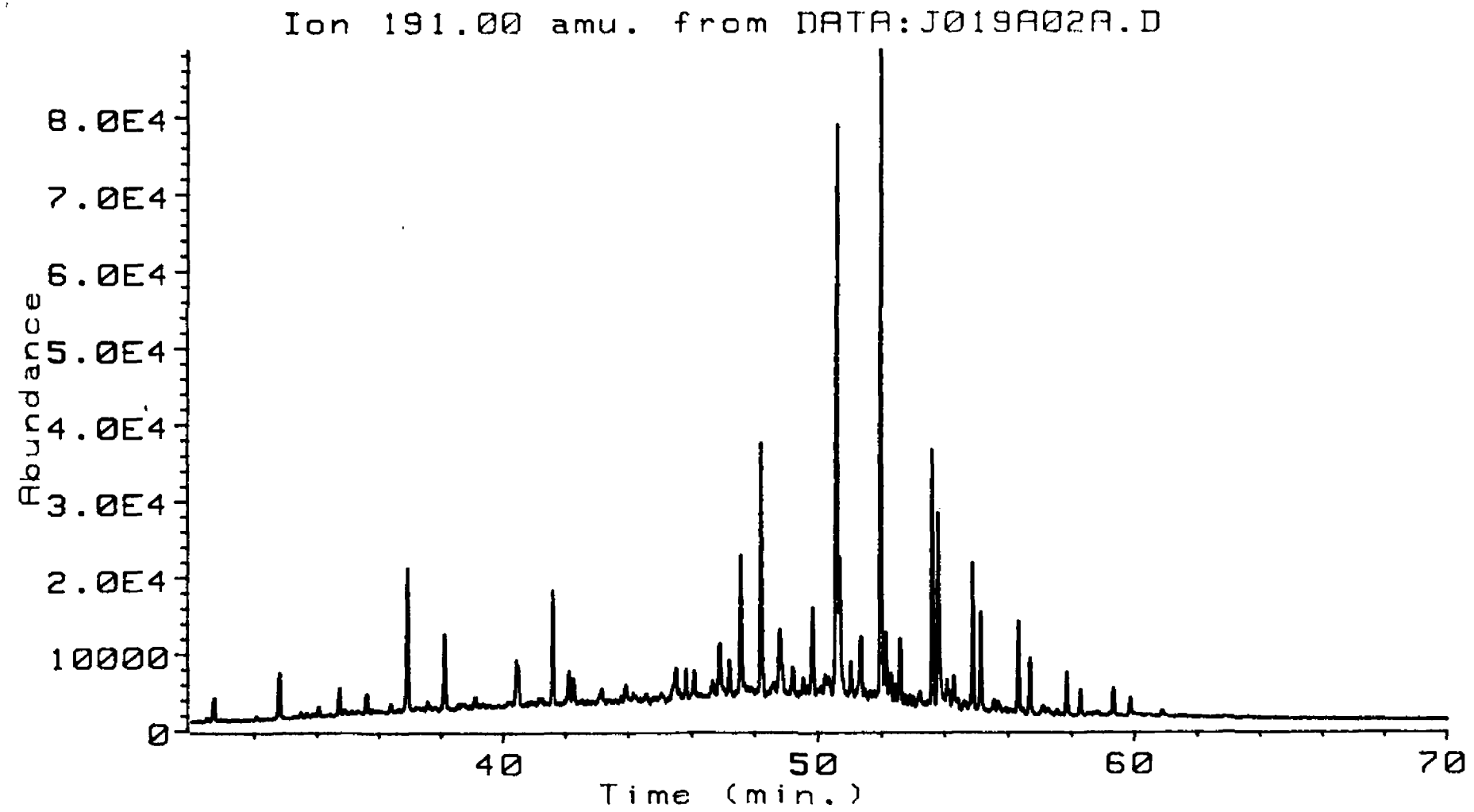
TRITERPANES 2455 M



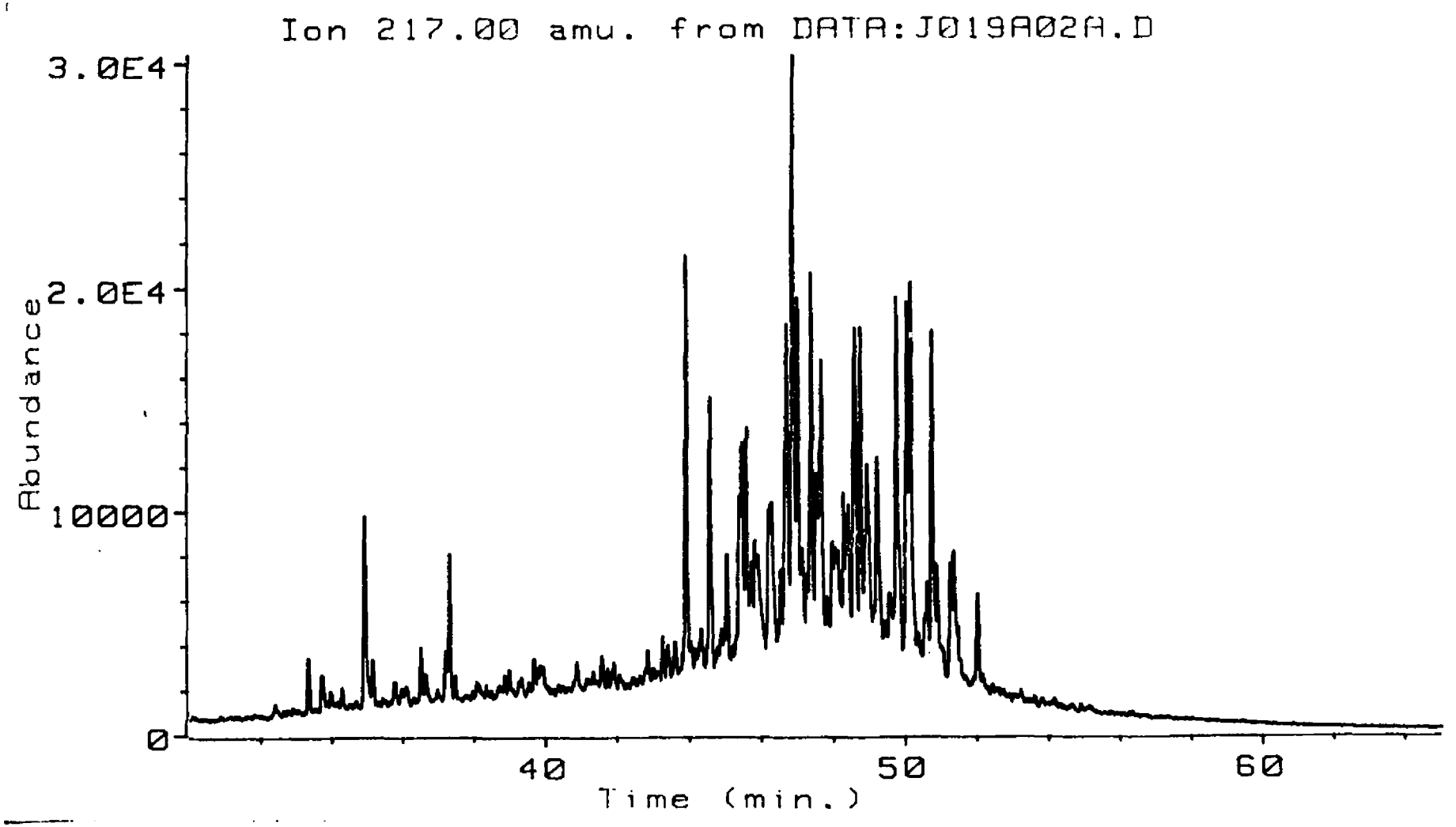
STERANES 2455 M



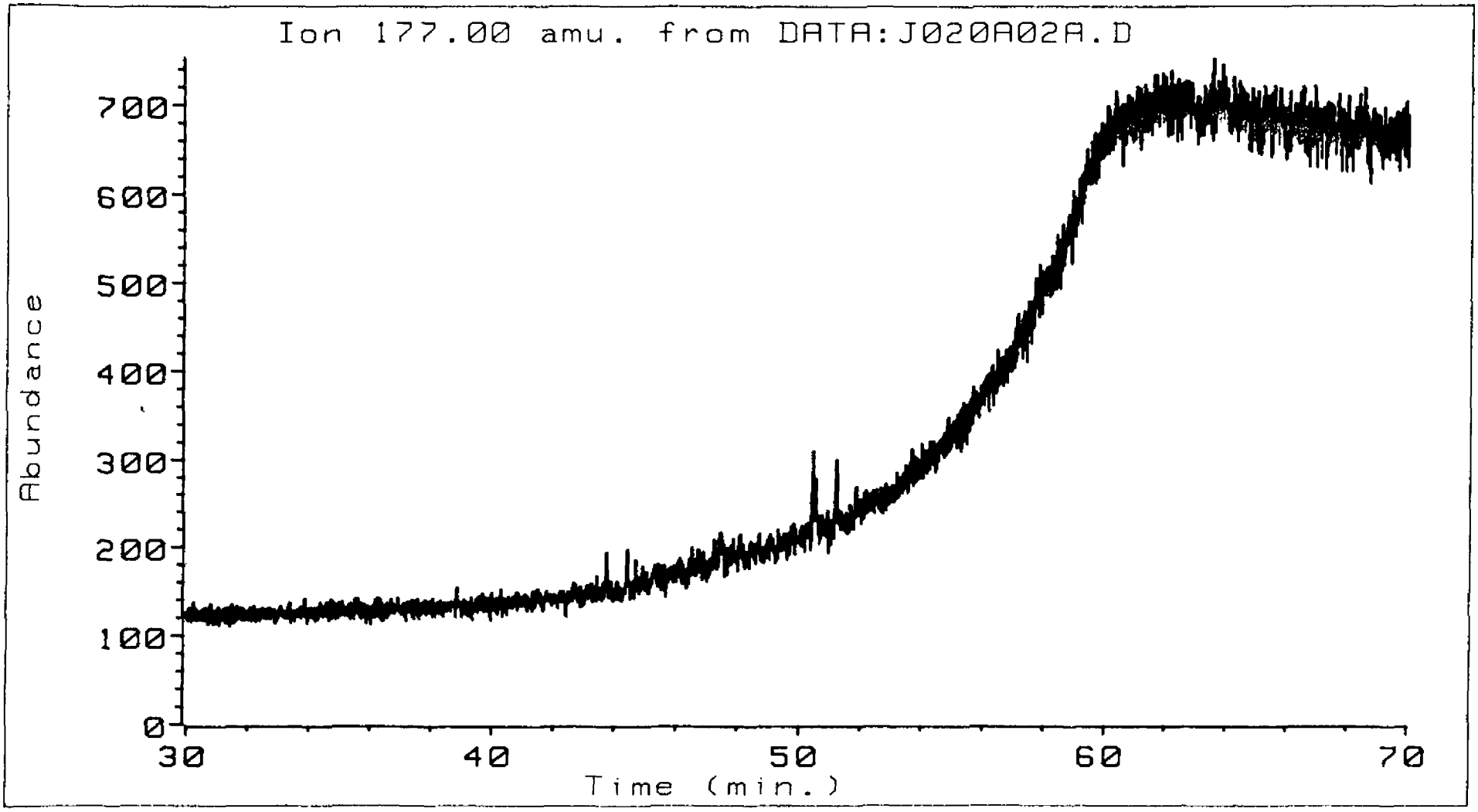
TRITERPANES 2608 M



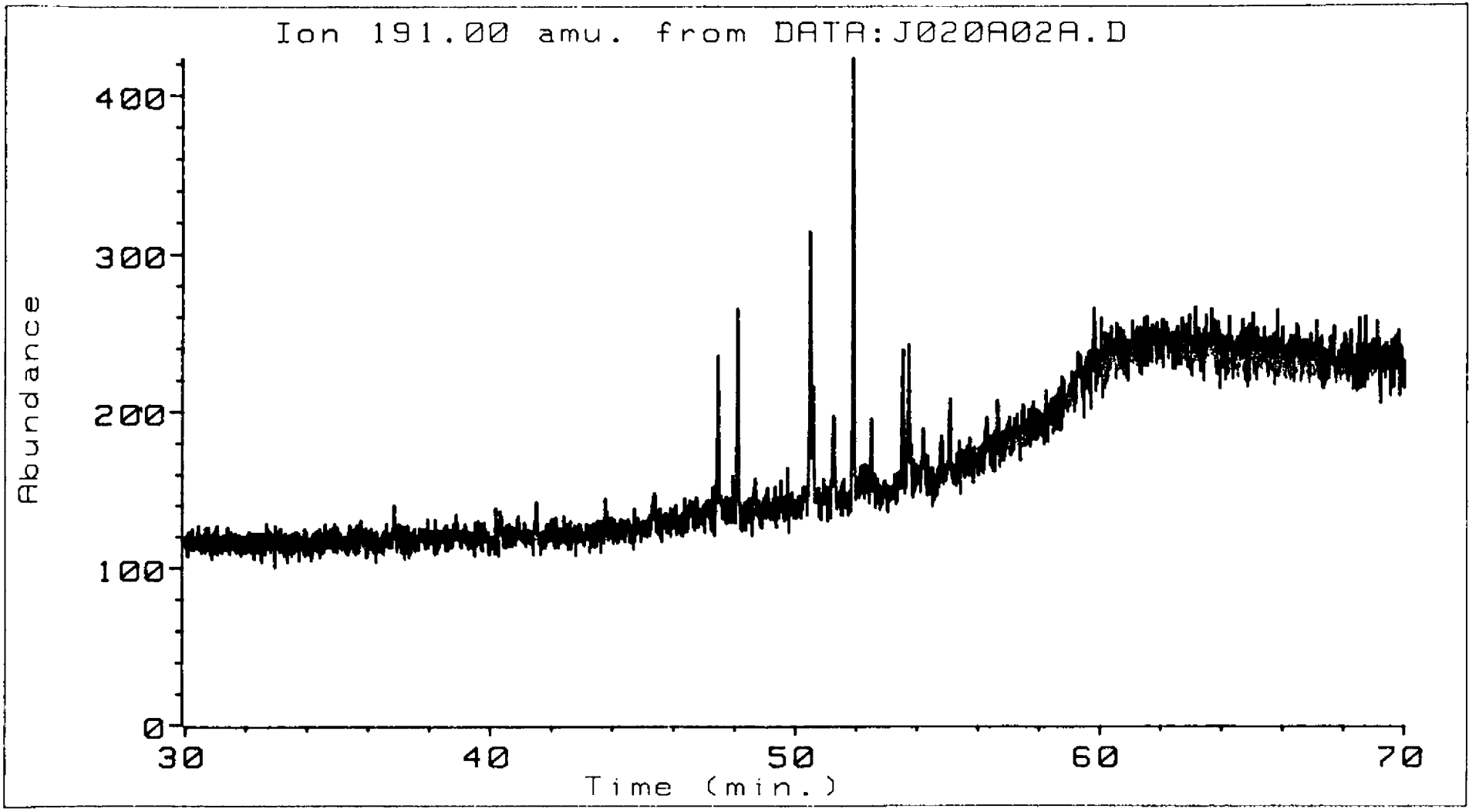
TRITERPANES 2608 M



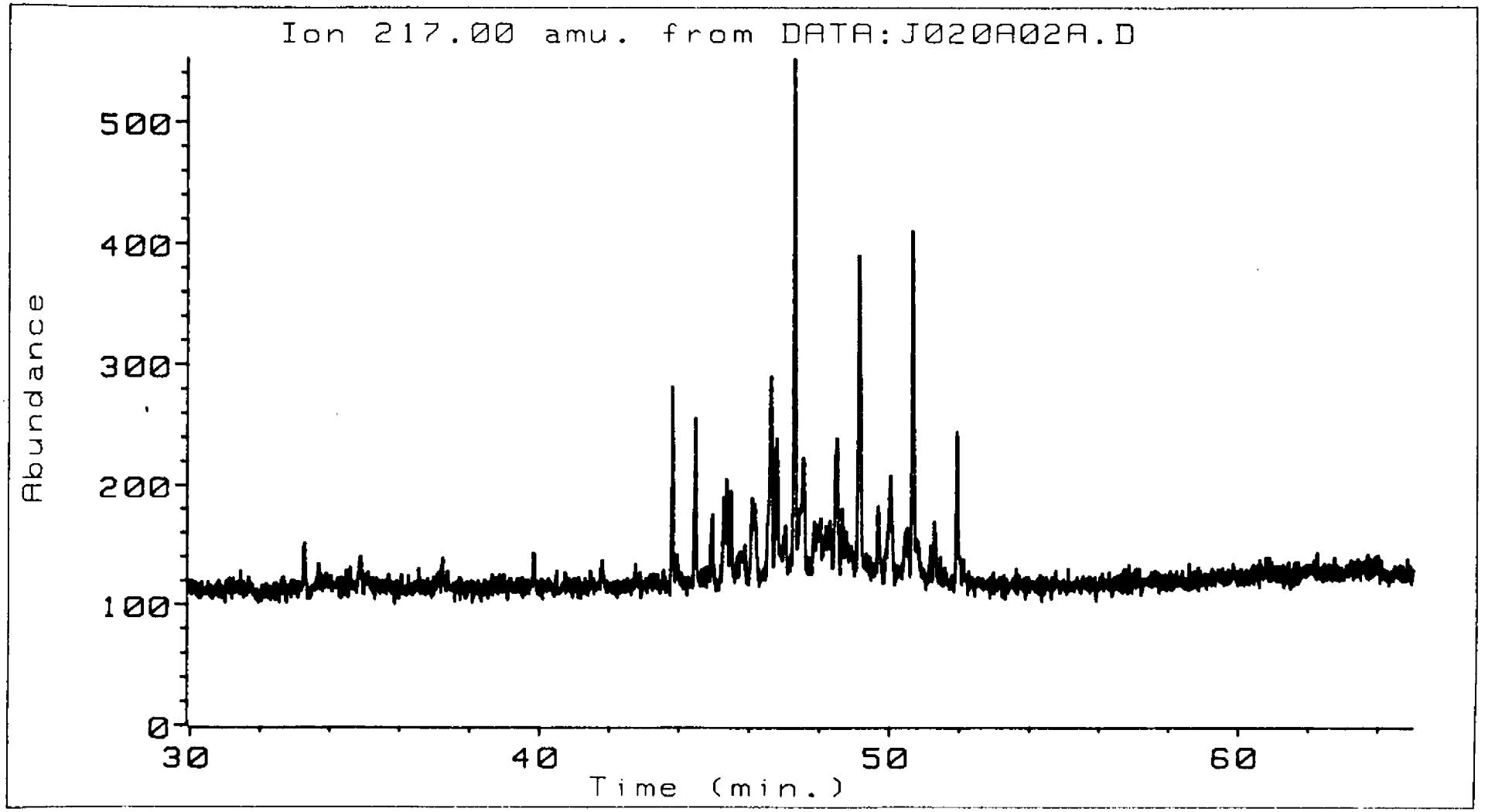
STERANES 2608 M



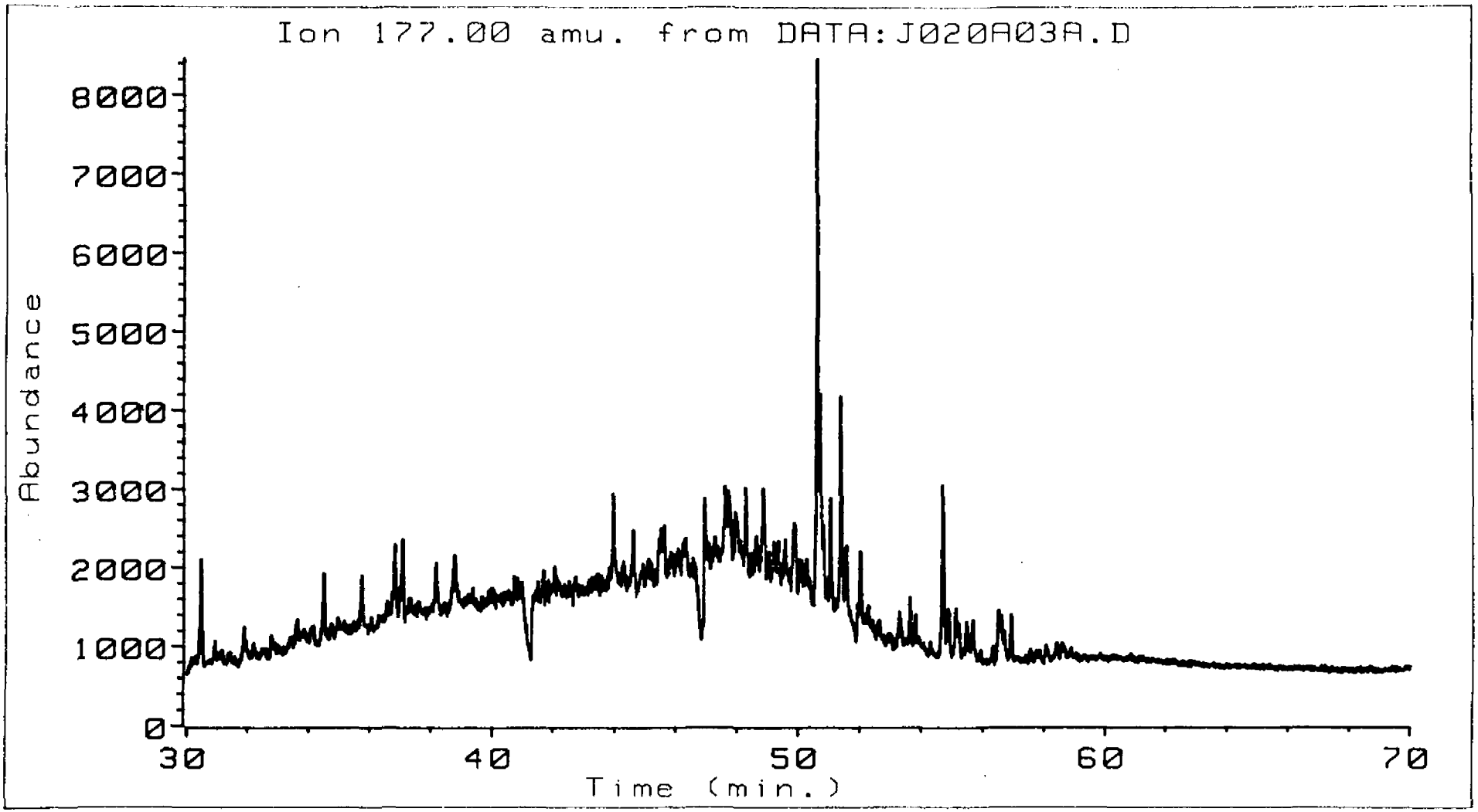
TRITERPANES 2615 M



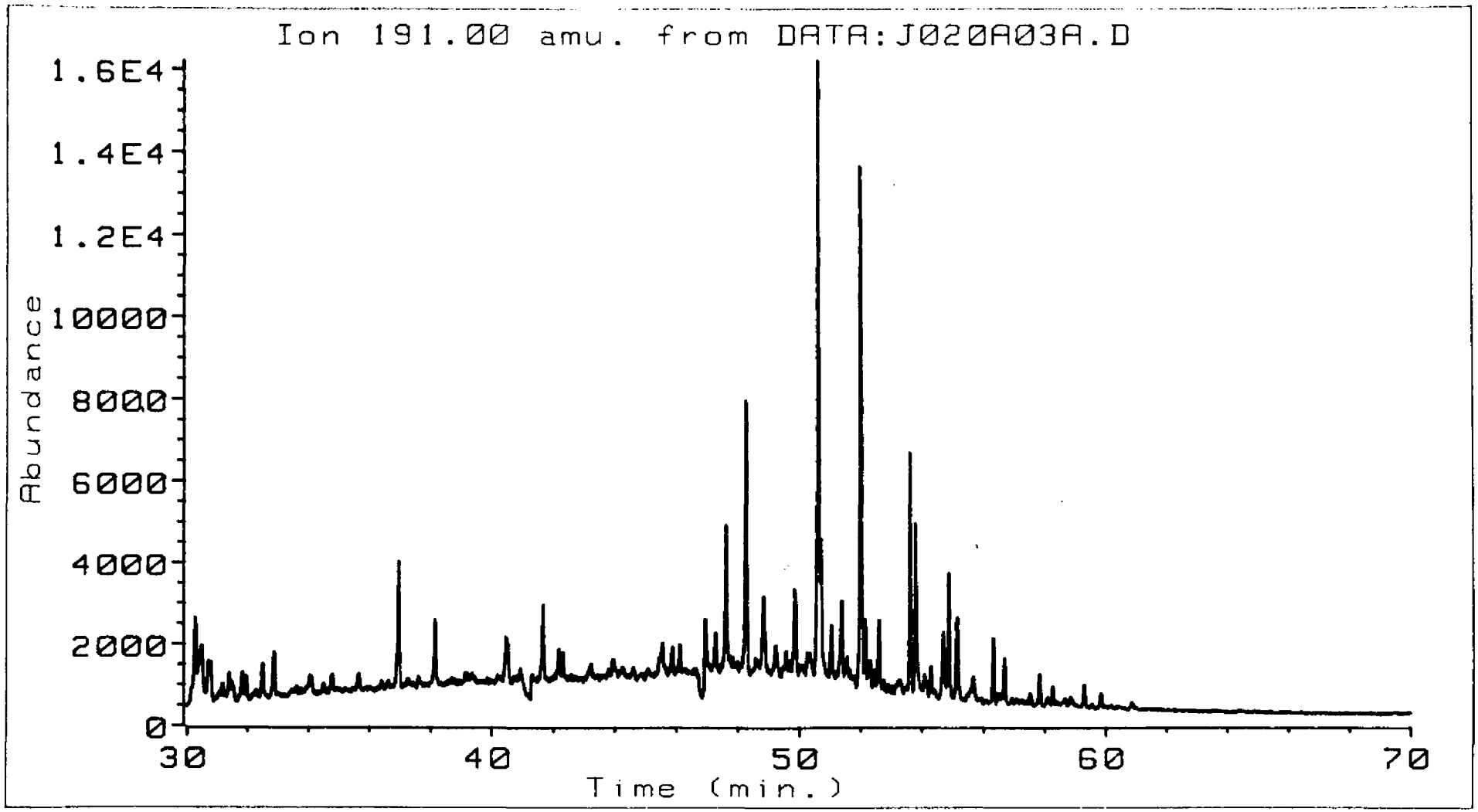
TRITERPANES 2615 M



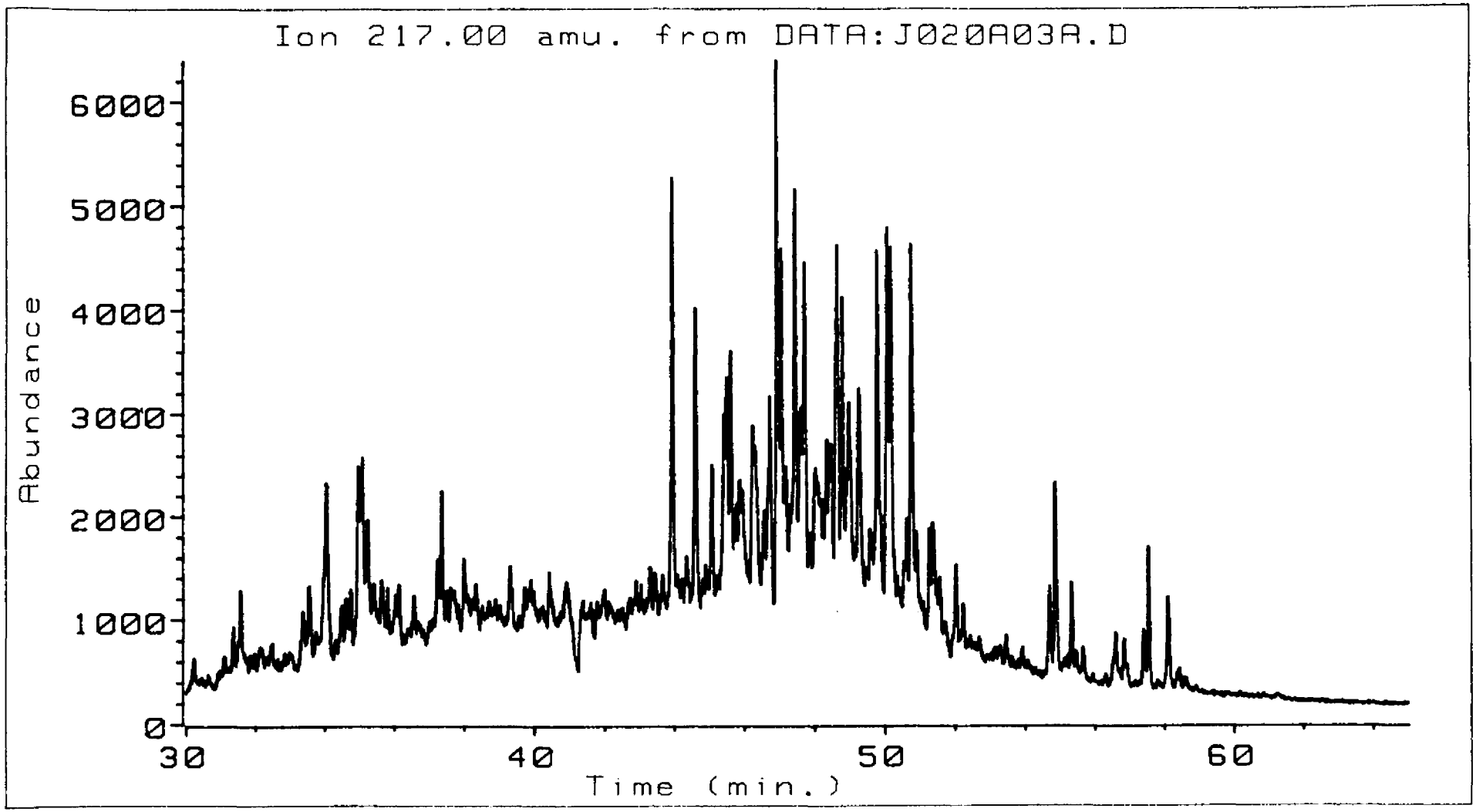
STERANES 2615 M



TRITERPANES 2624.65 M



TRITERPANES 2624.65 M



STERANES 2624.65 M