

REFERENCE

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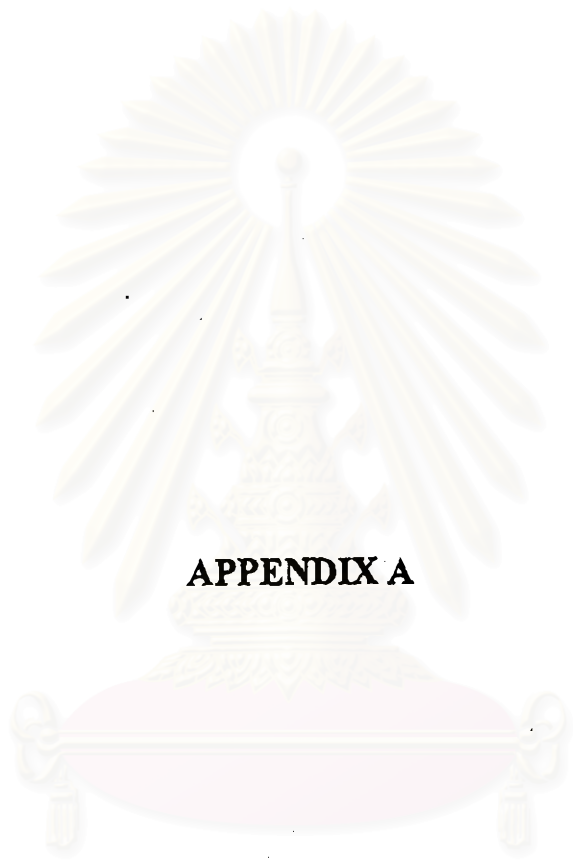
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สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย



APPENDIX A

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

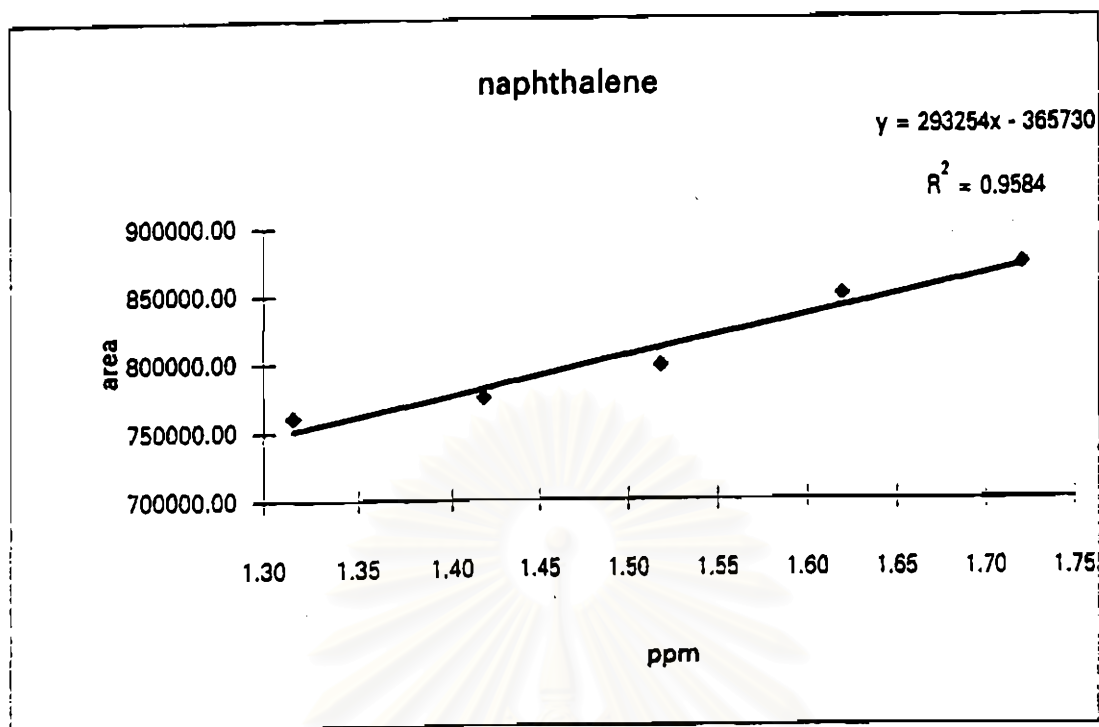


Figure A-1 Calibration curve of Naphthalene

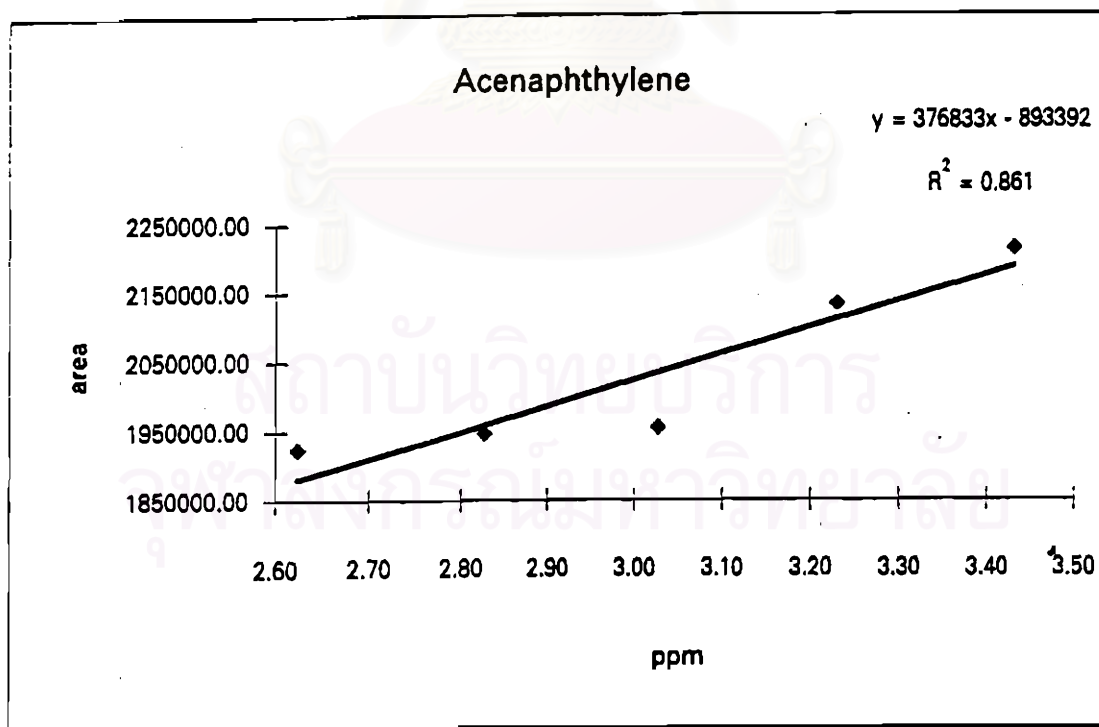


Figure A-2 Calibration curve of Acenaphthylene

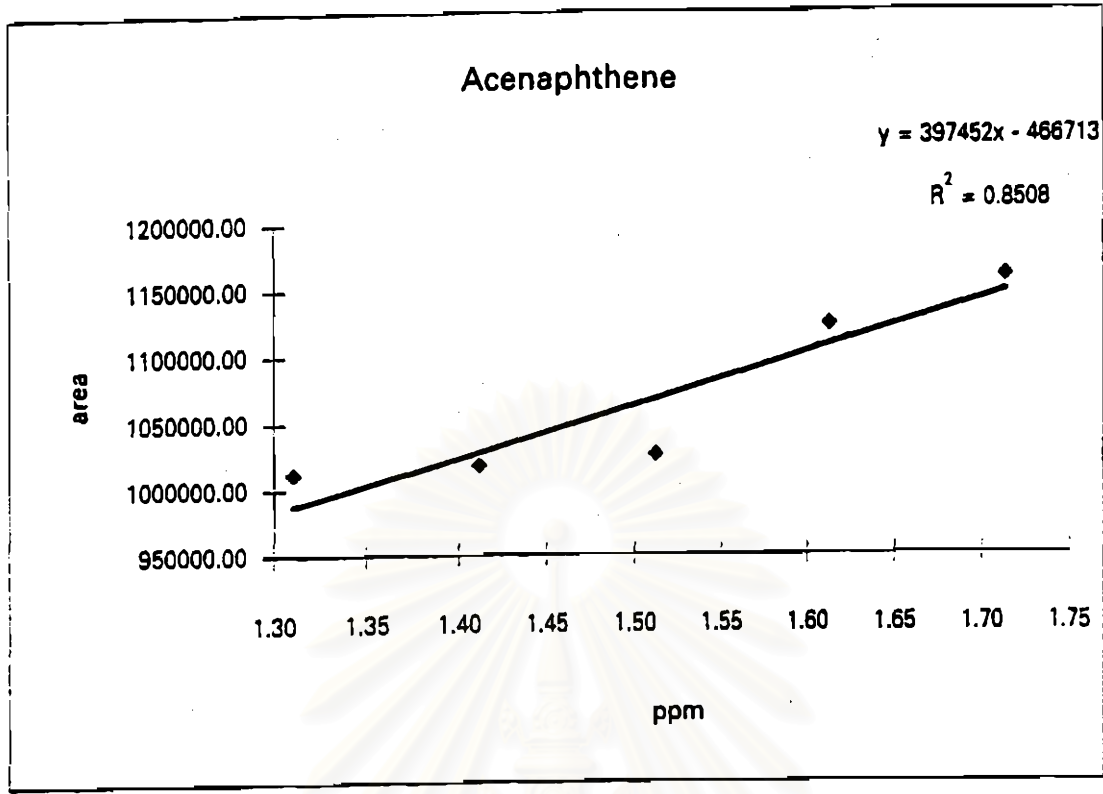


Figure A-3 Calibration curve of Acenaphthene

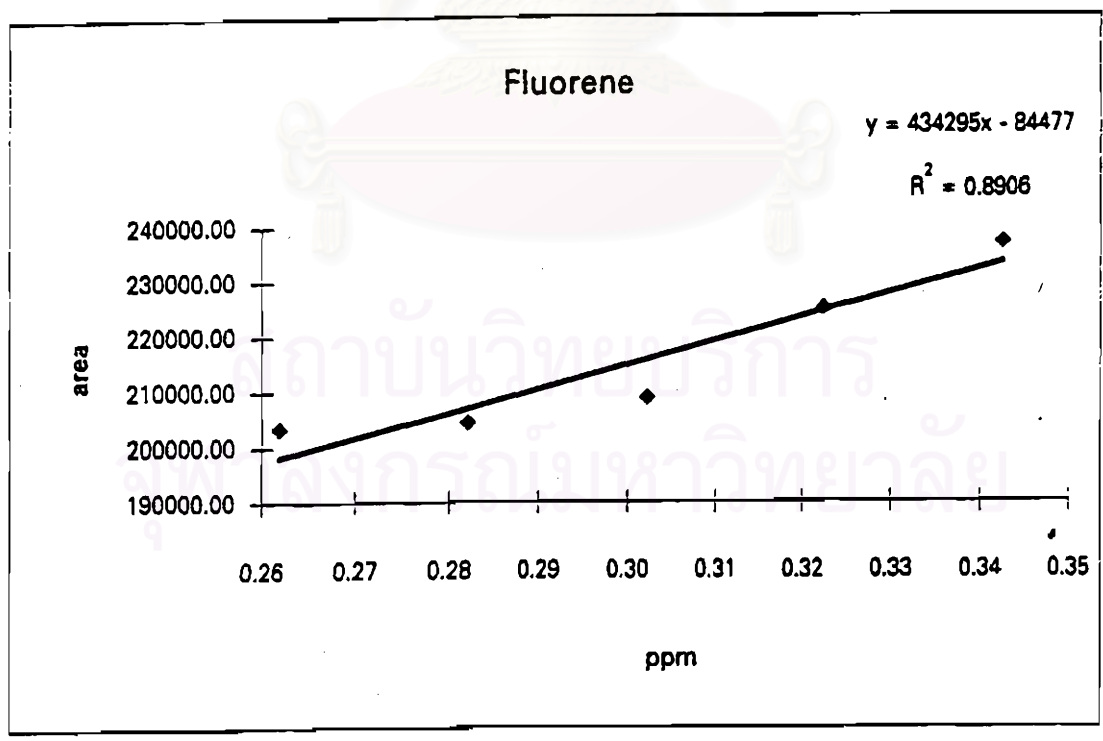


Figure A-4 Calibration curve of Fluorene

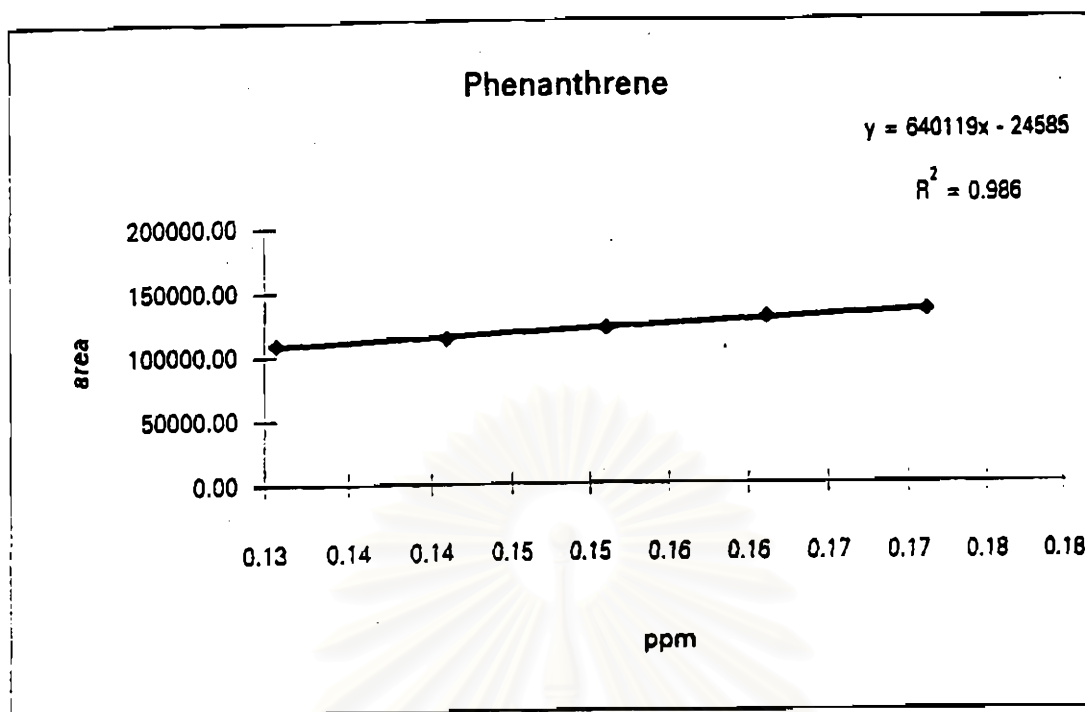


Figure A-5 Calibration curve of Phenanthrene

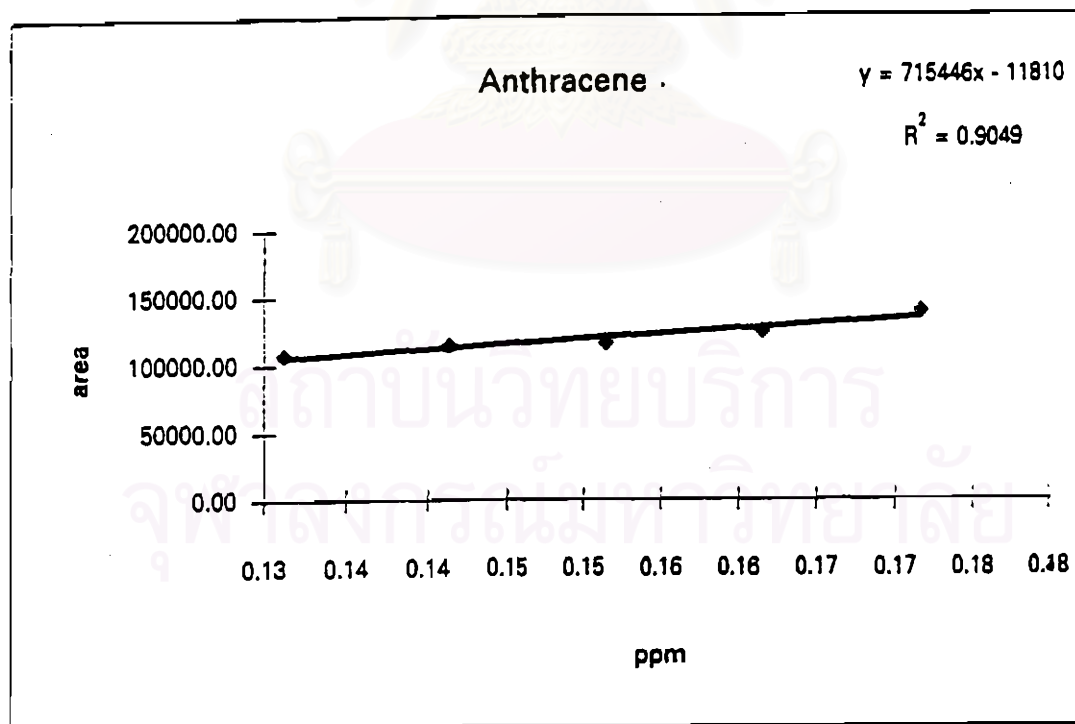


Figure A-6 Calibration curve of Anthracene

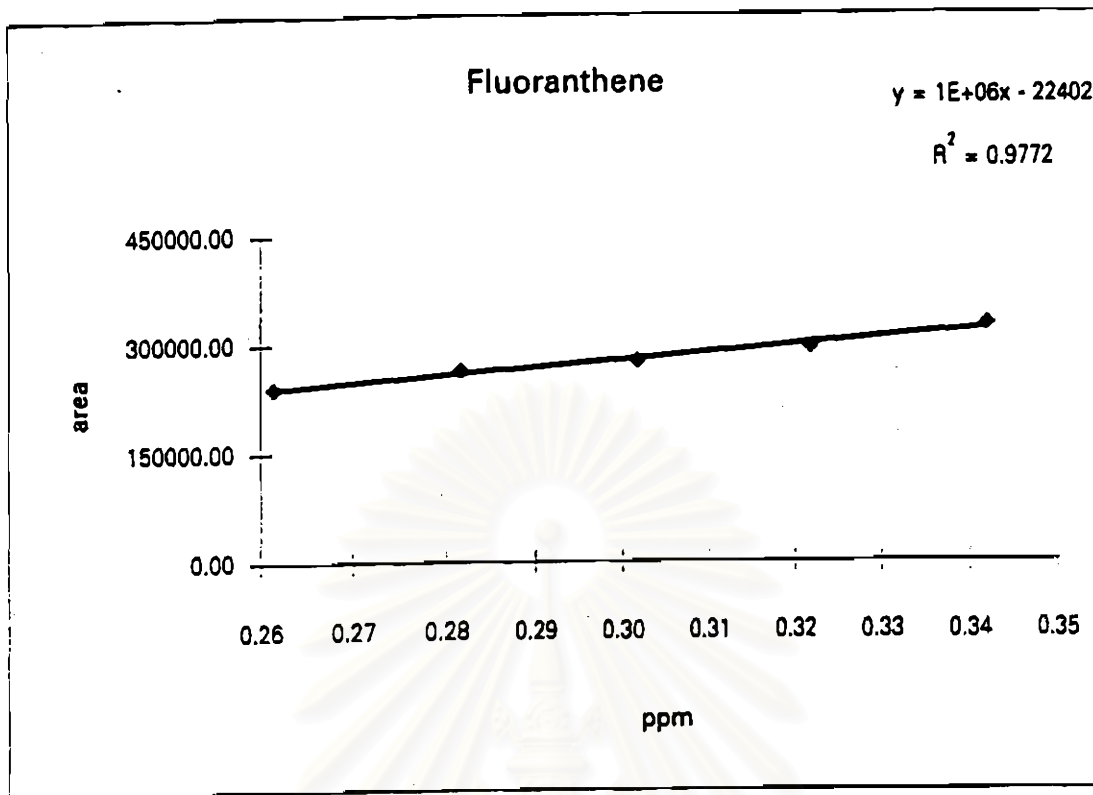


Figure A-7 Calibration curve of Fluoranthene

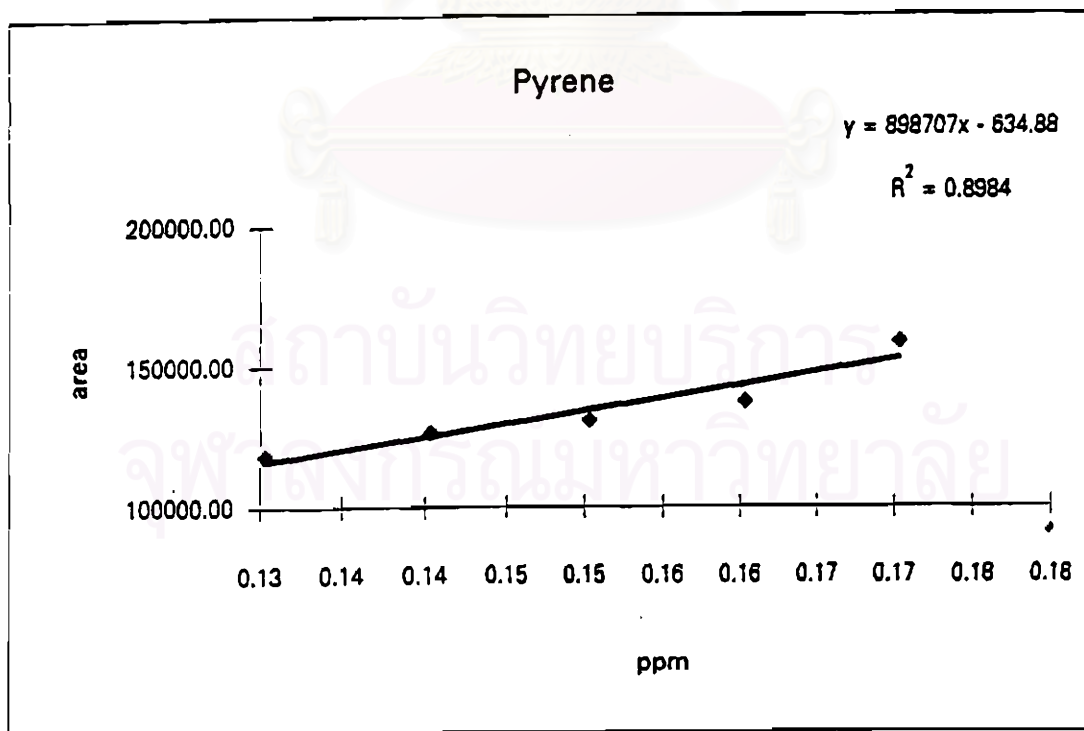


Figure A-8 Calibration curve of Pyrene

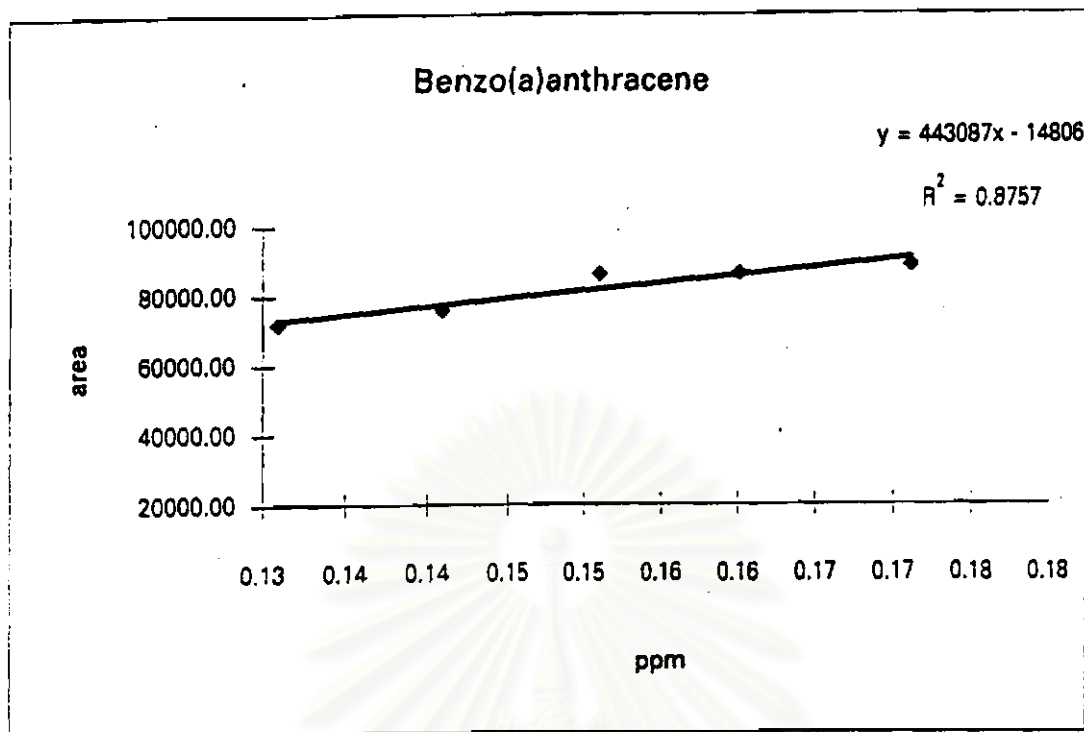


Figure A-9 Calibration curve of Benzo[a]anthracene

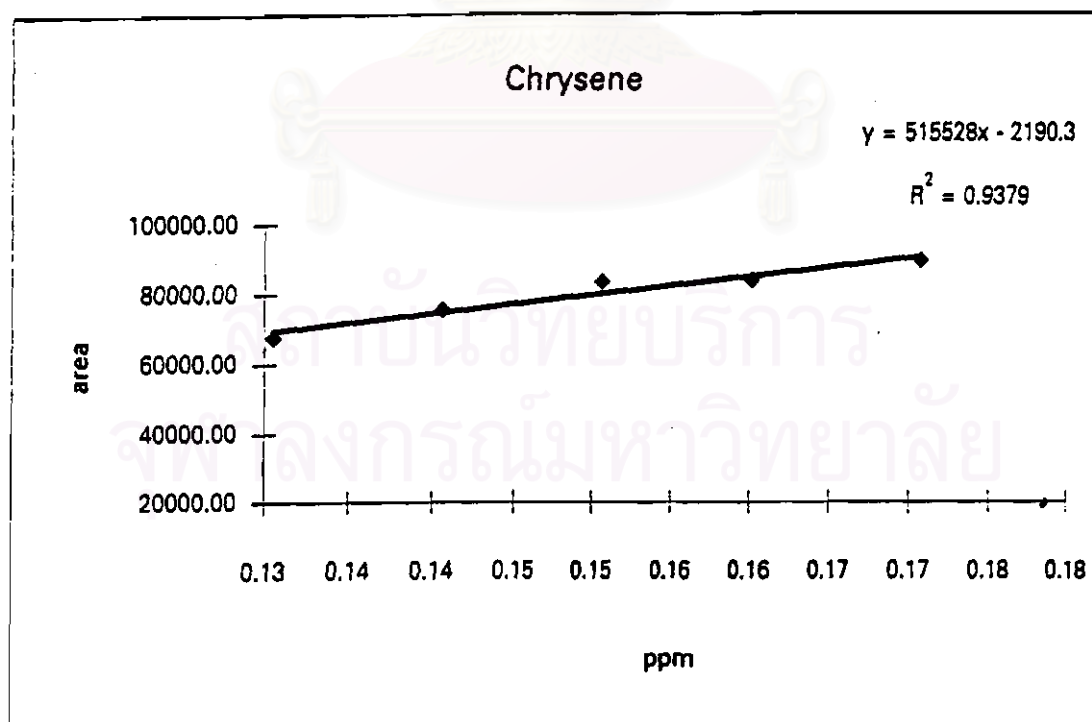


Figure A-10 Calibration curve of Chrysene

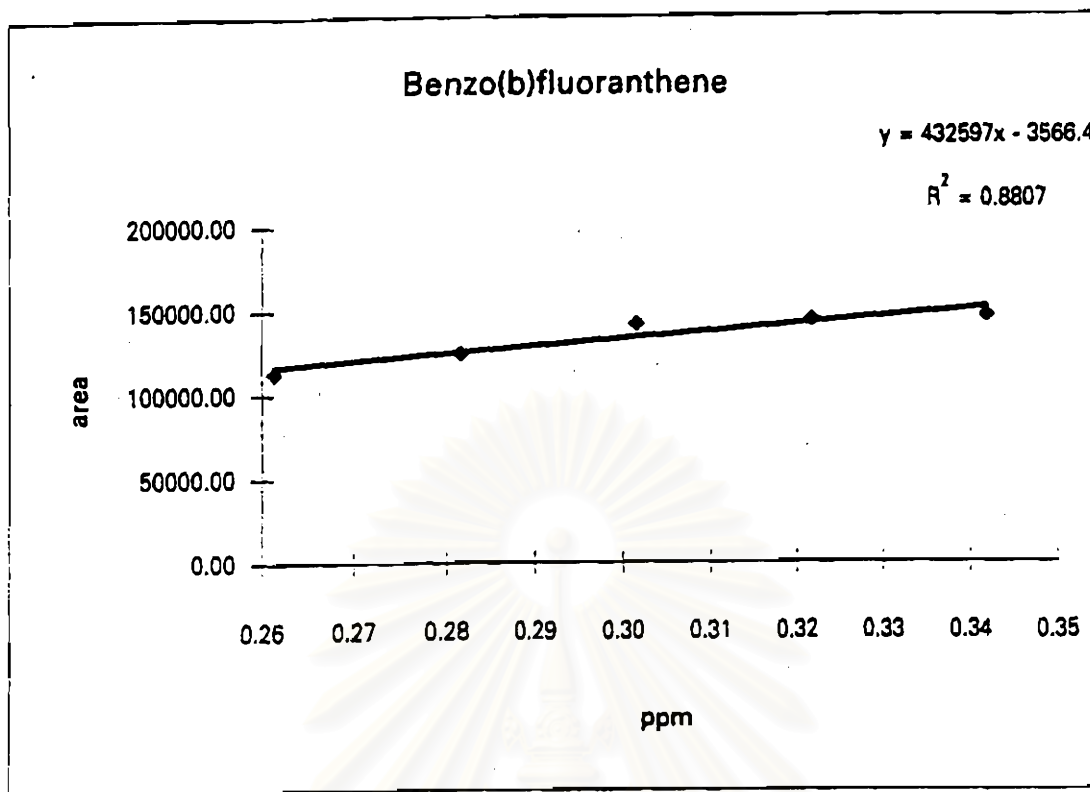


Figure A-11 Calibration curve of Benzo[b]fluoranthene

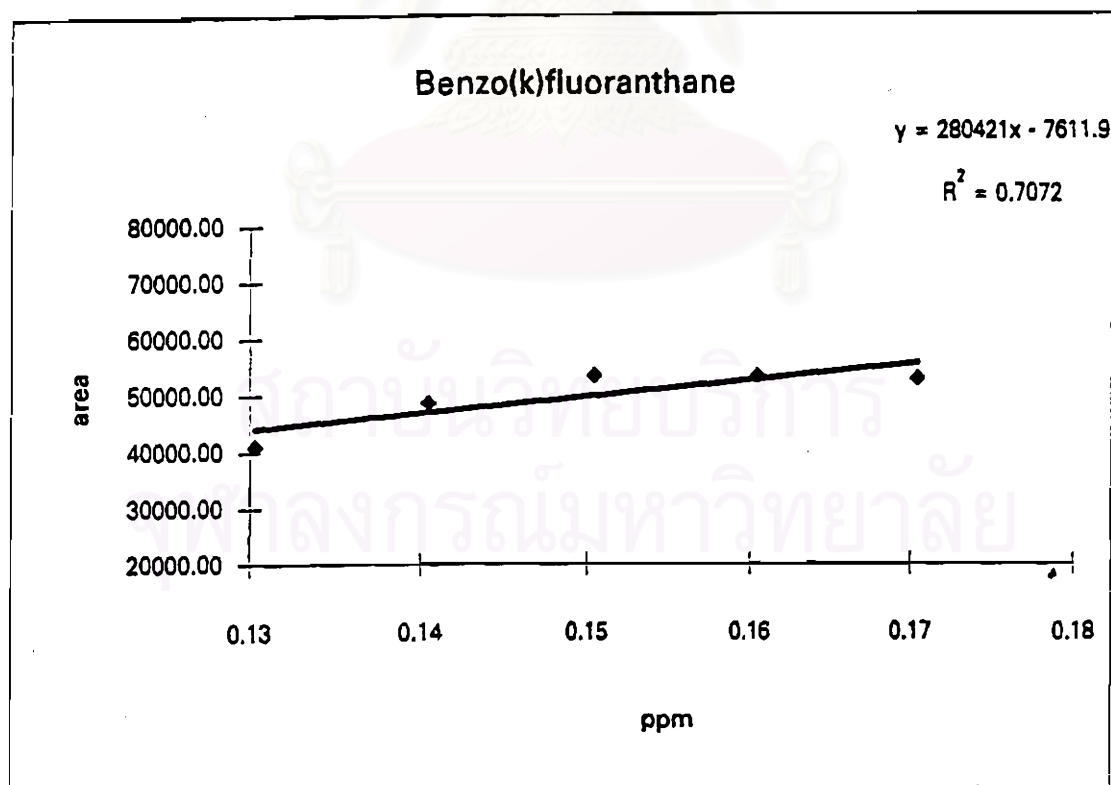


Figure A-12 Calibration curve of Benzo[k]fluoranthene

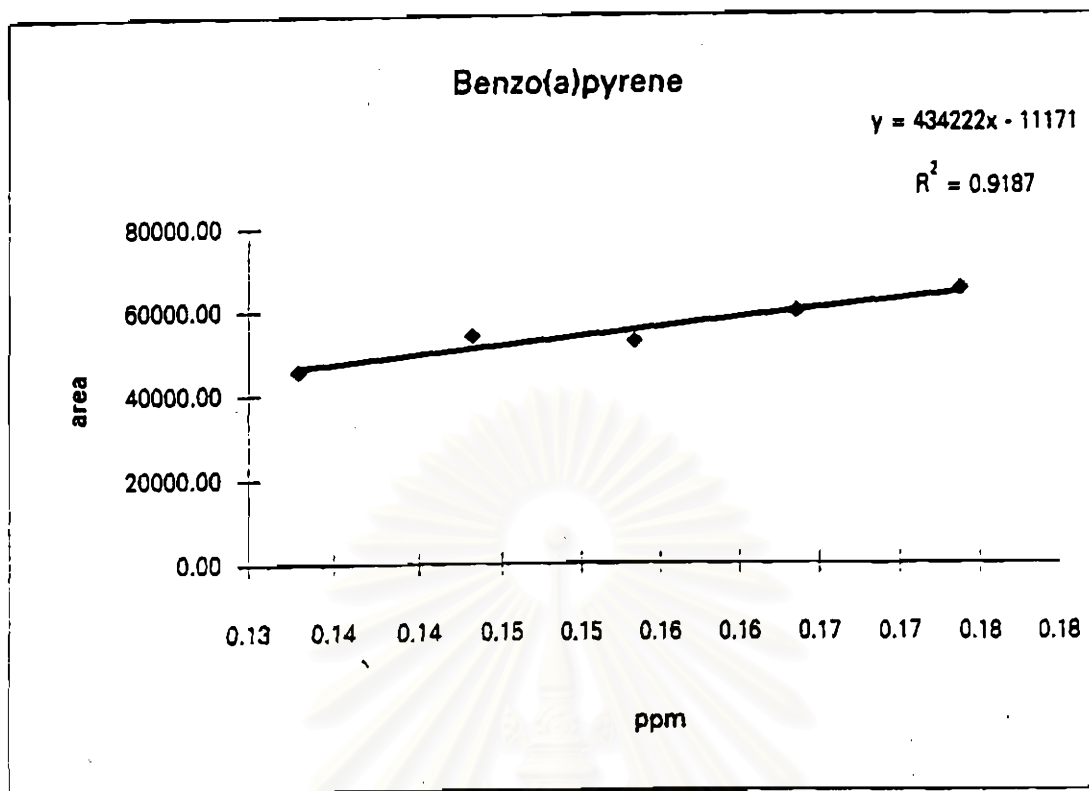


Figure A-13 Calibration curve of Benzo[a]pyrene

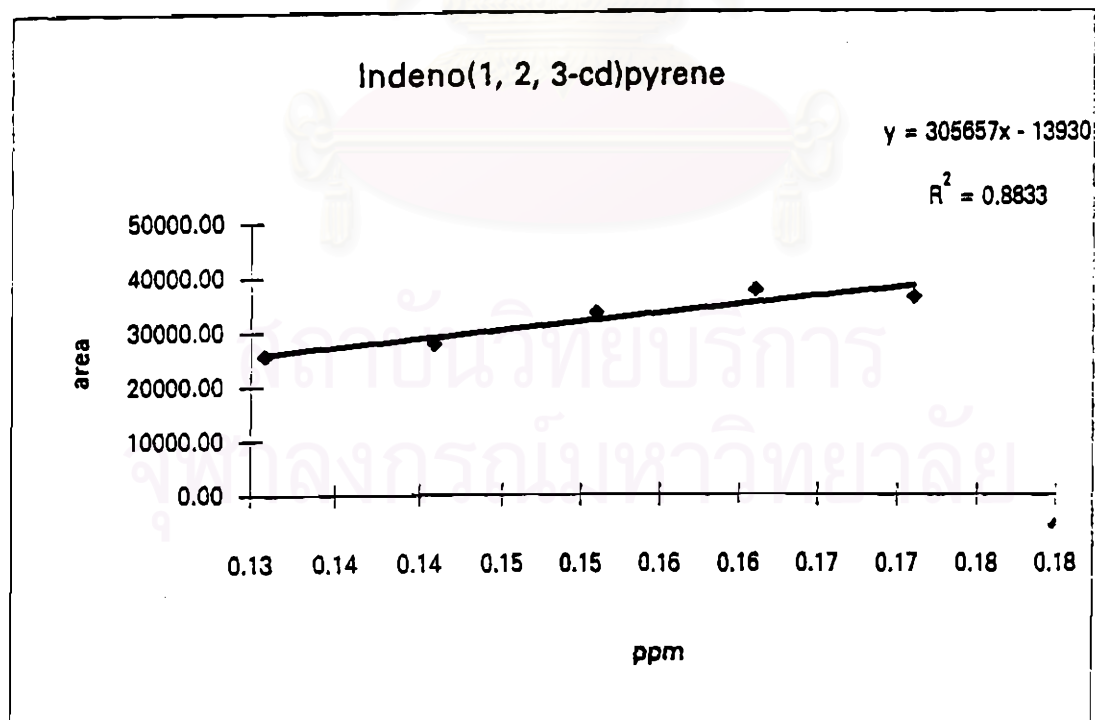


Figure A-14 Calibration curve of Indeo[1, 2, 3 -cd]pyrene

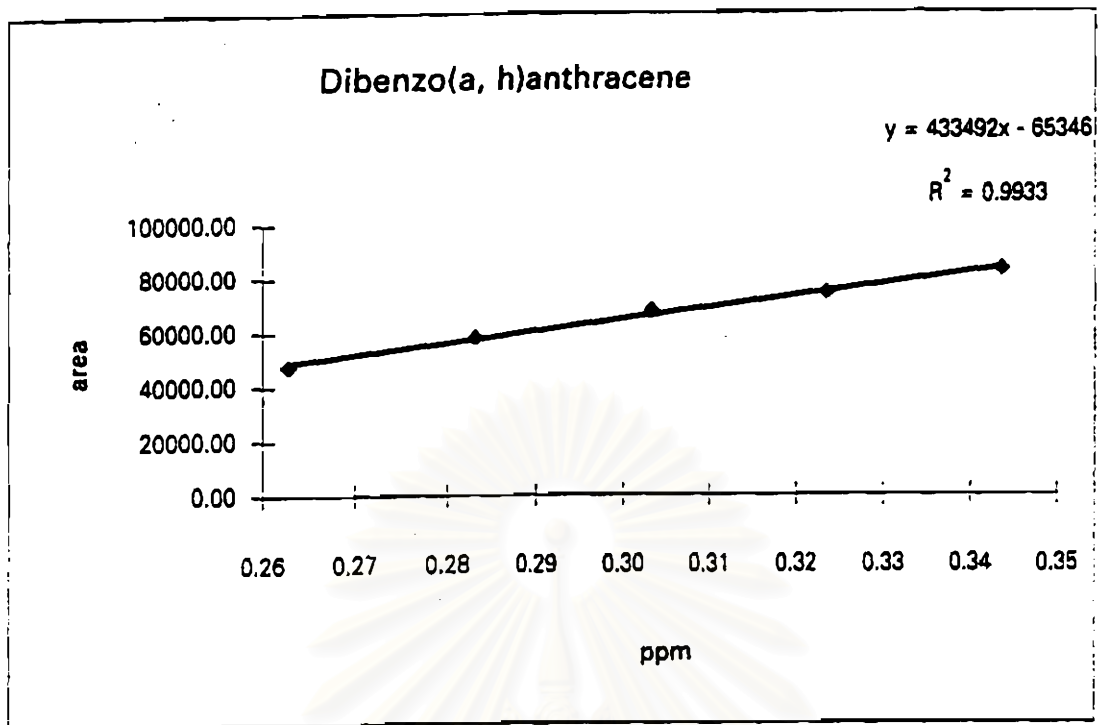


Figure A-15 Calibration curve of Dibenzo[a,k]anthracene

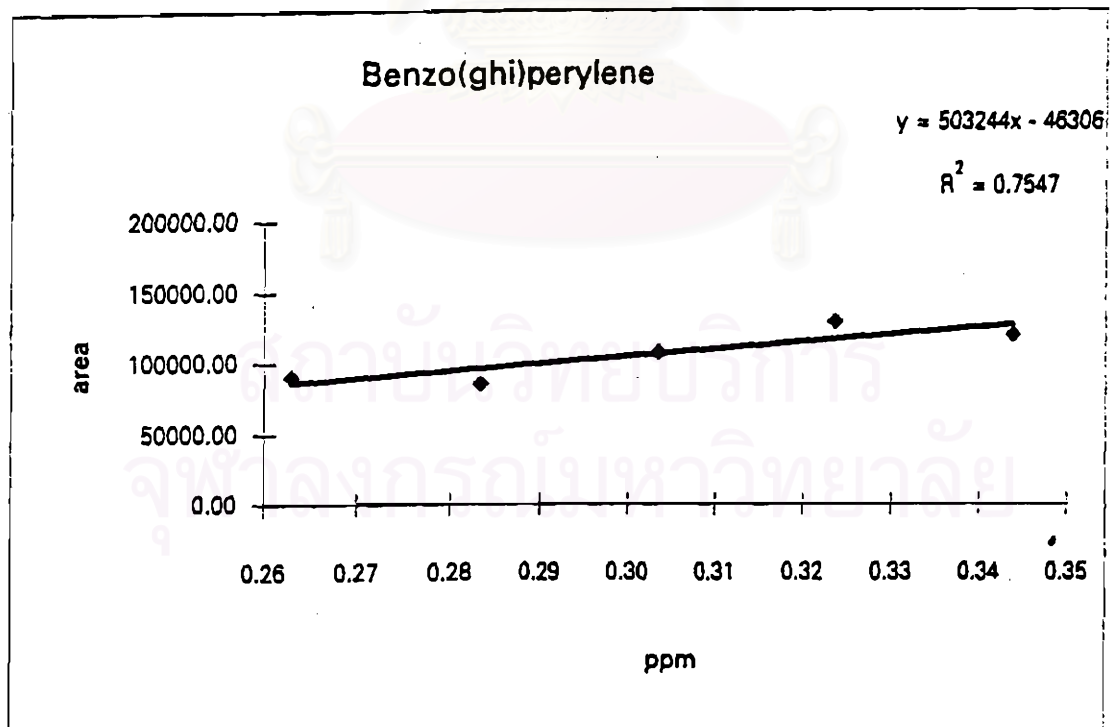
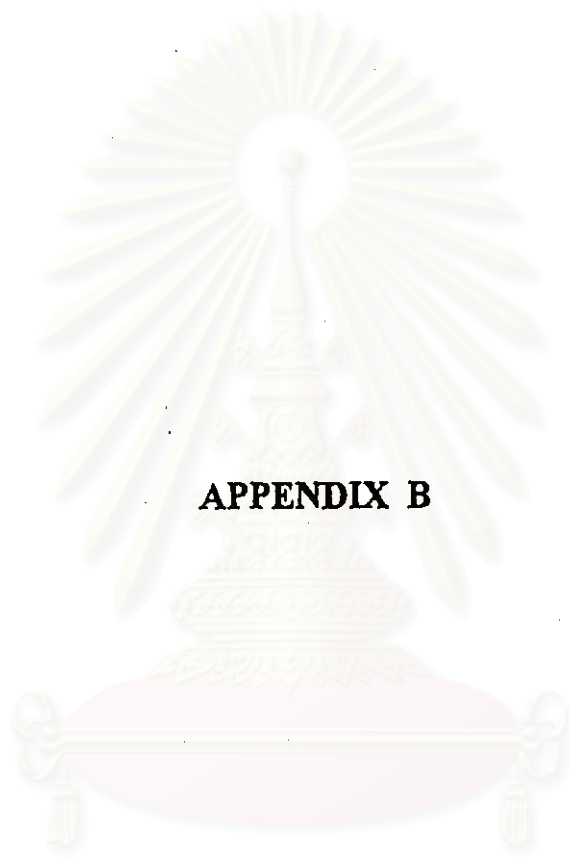


Figure A-16 Calibration curve of Benzo[ghi]perylene



APPENDIX B

สถาบันวิทยบริการ
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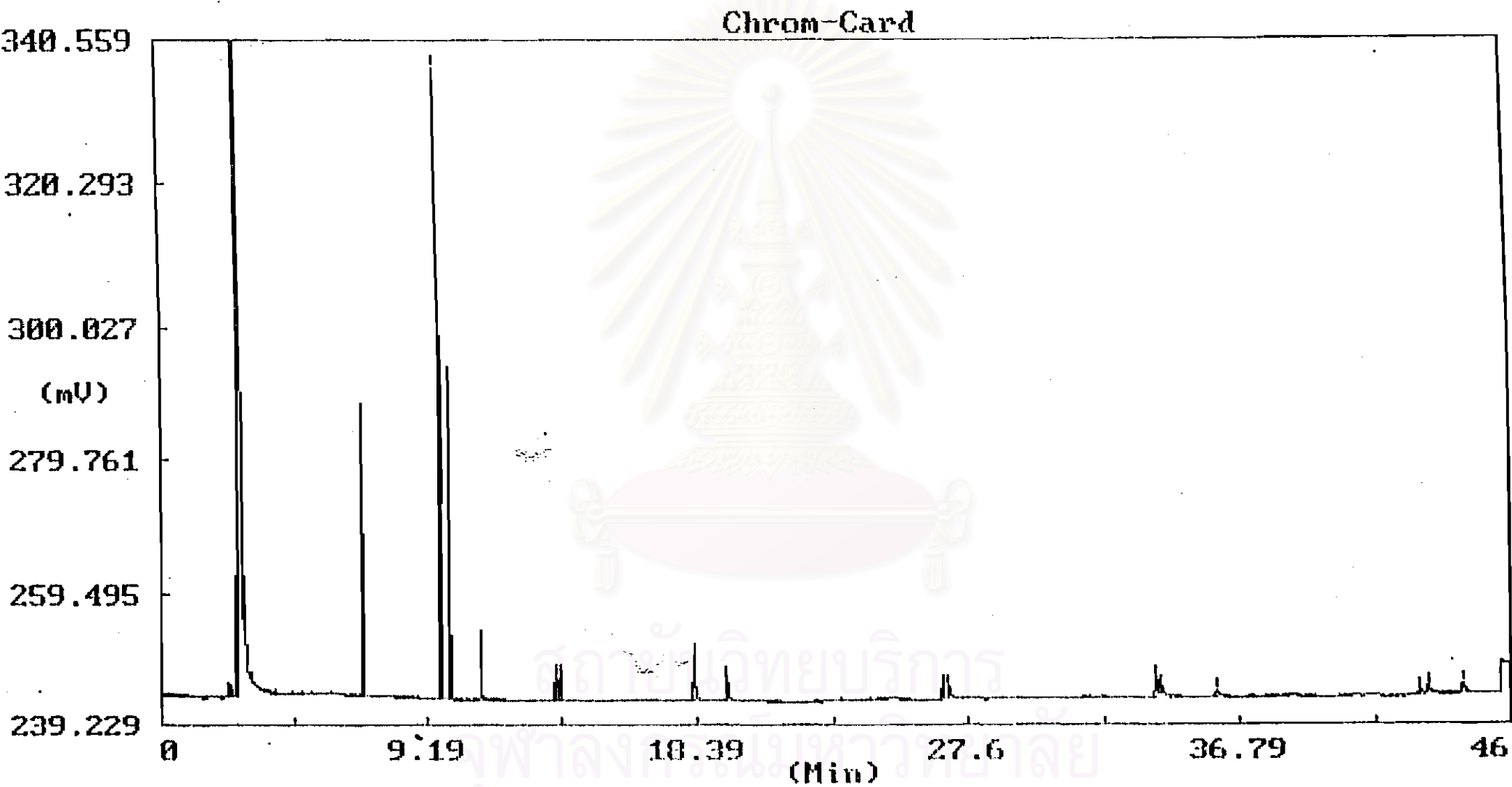


Figure B-1 The Chromatogram of Standard PAHs

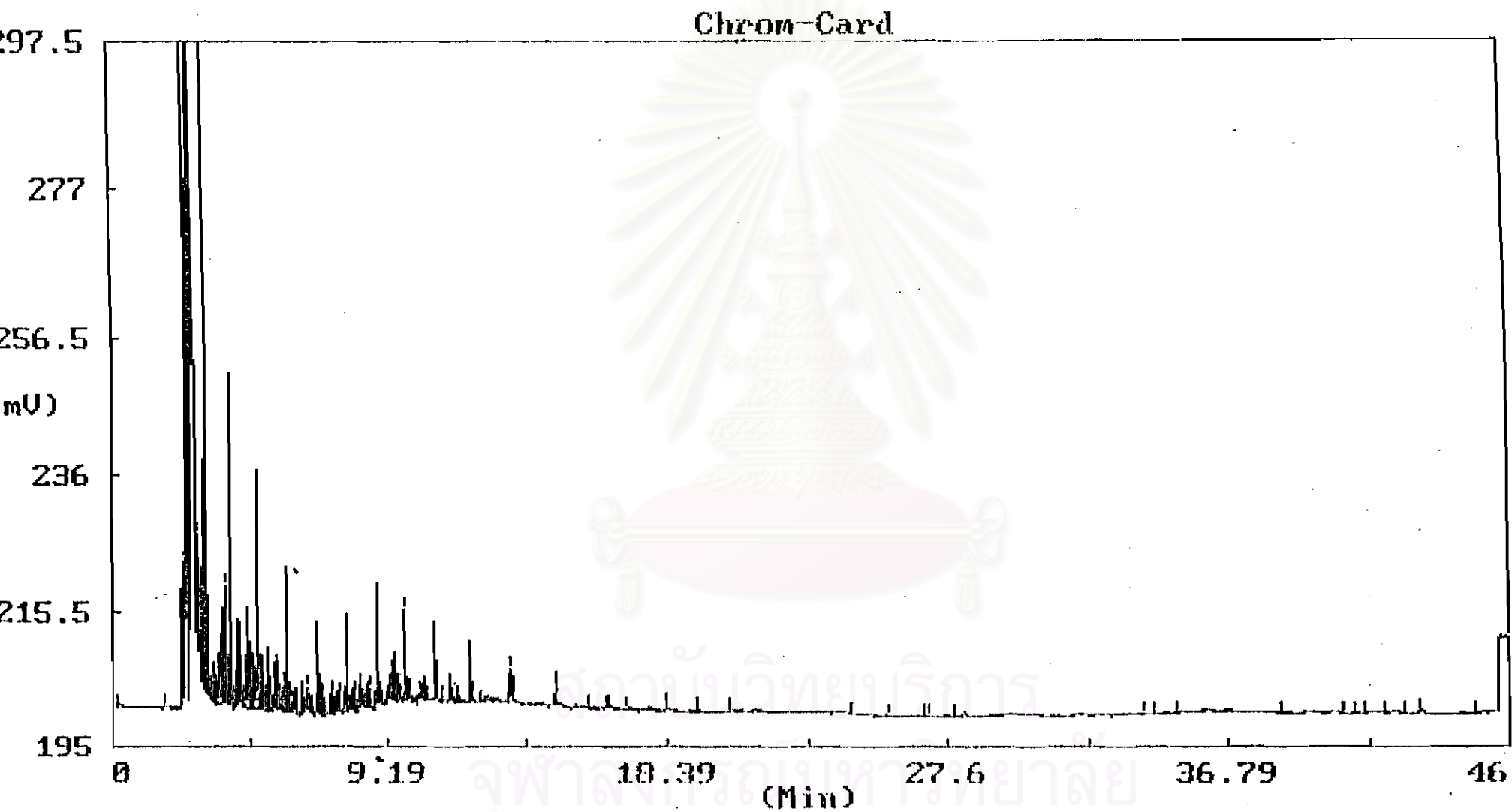


Figure B-2 The Chromatogram of exhaust emission of base diesel oil at 800 rpm of engine speed

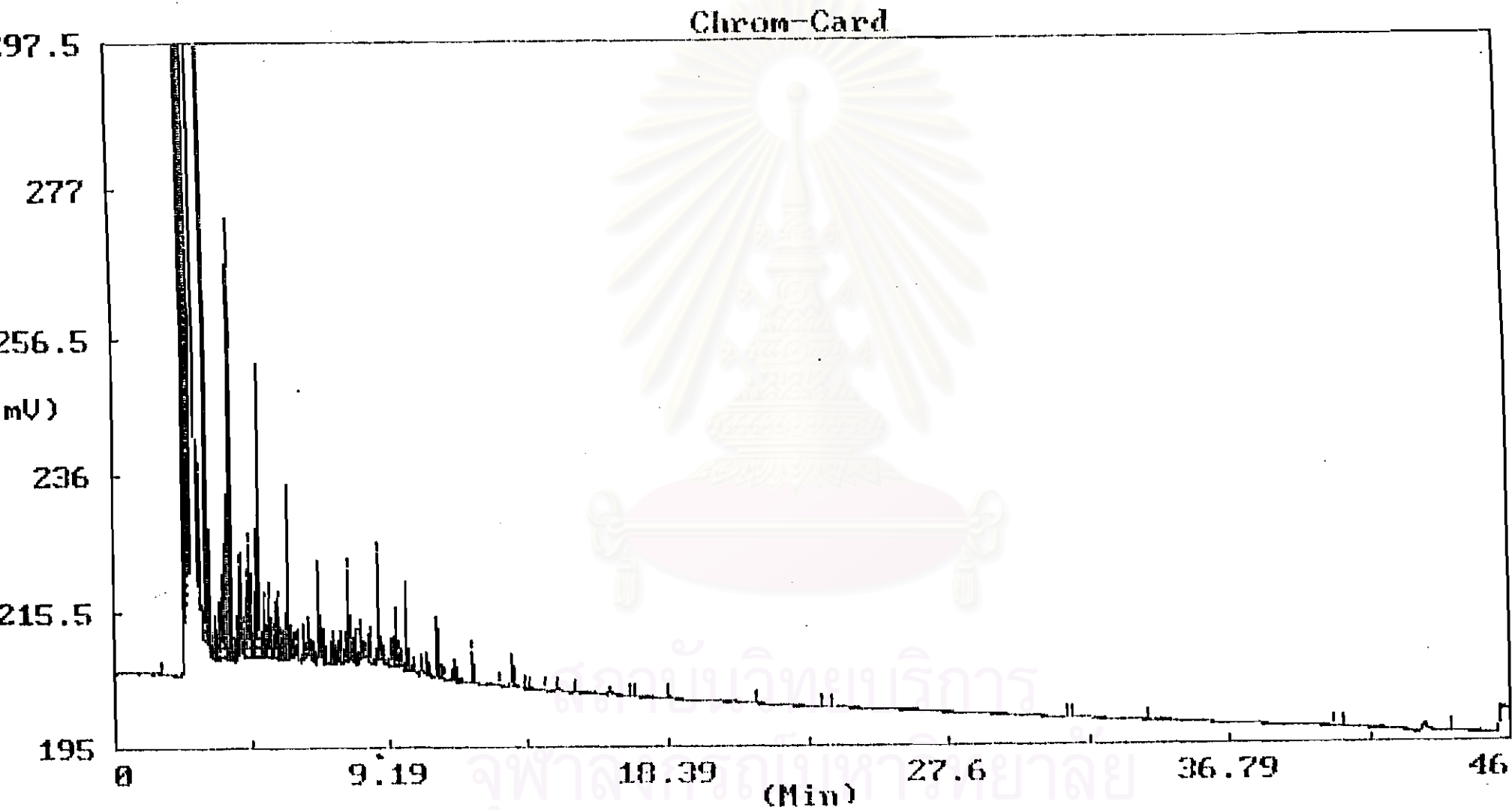


Figure B-3 The Chromatogram of exhaust emission of 2% fusel oil blended base diesel oil at 800 rpm of engine speed

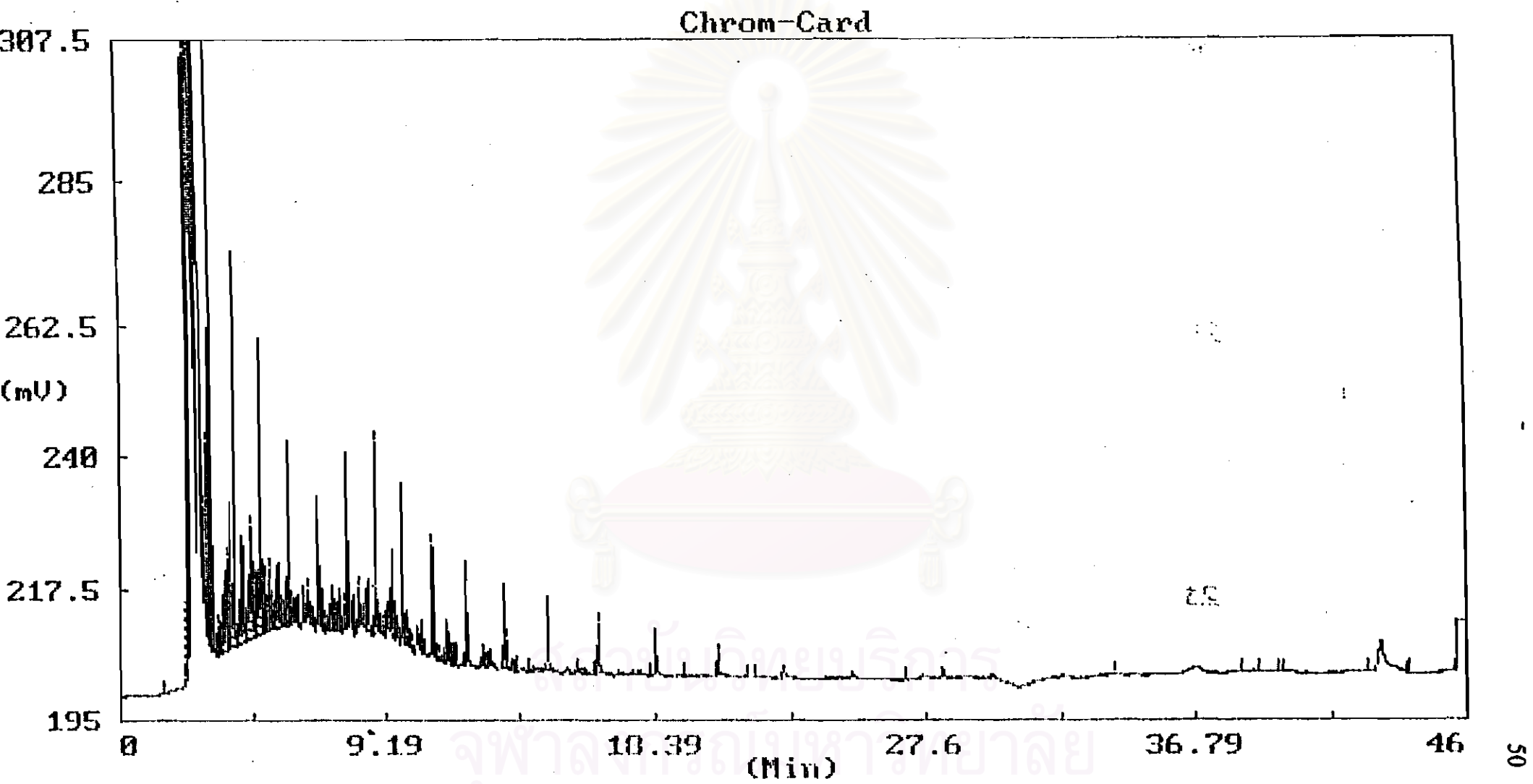


Figure B-4 The Chromatogram of exhaust emission of 4% fusel oil blended base diesel oil at 800 rpm of engine speed

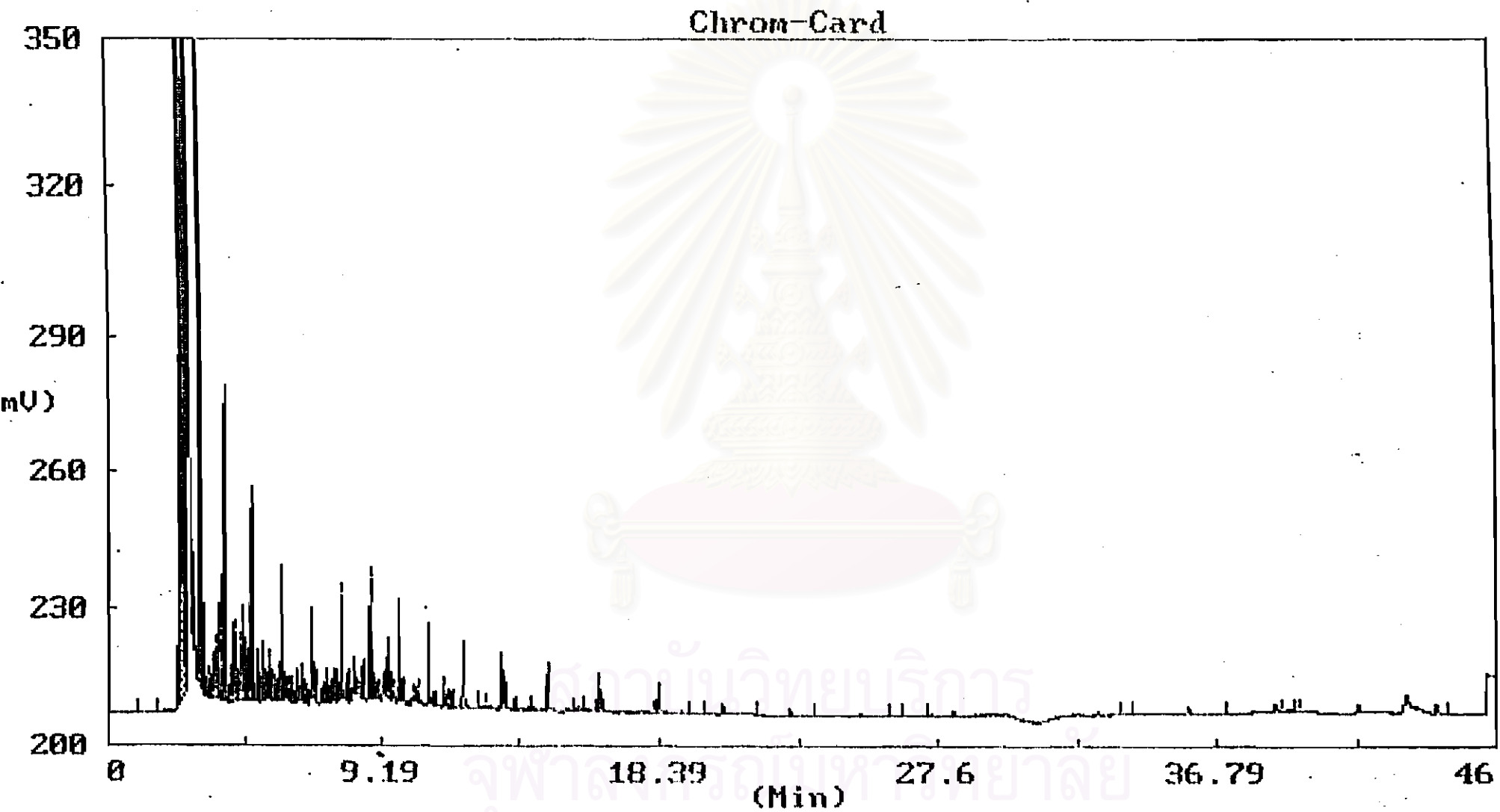


Figure B-5 The Chromatogram of exhaust emission of 6% fusel oil blended base diesel oil at 800 rpm of engine speed

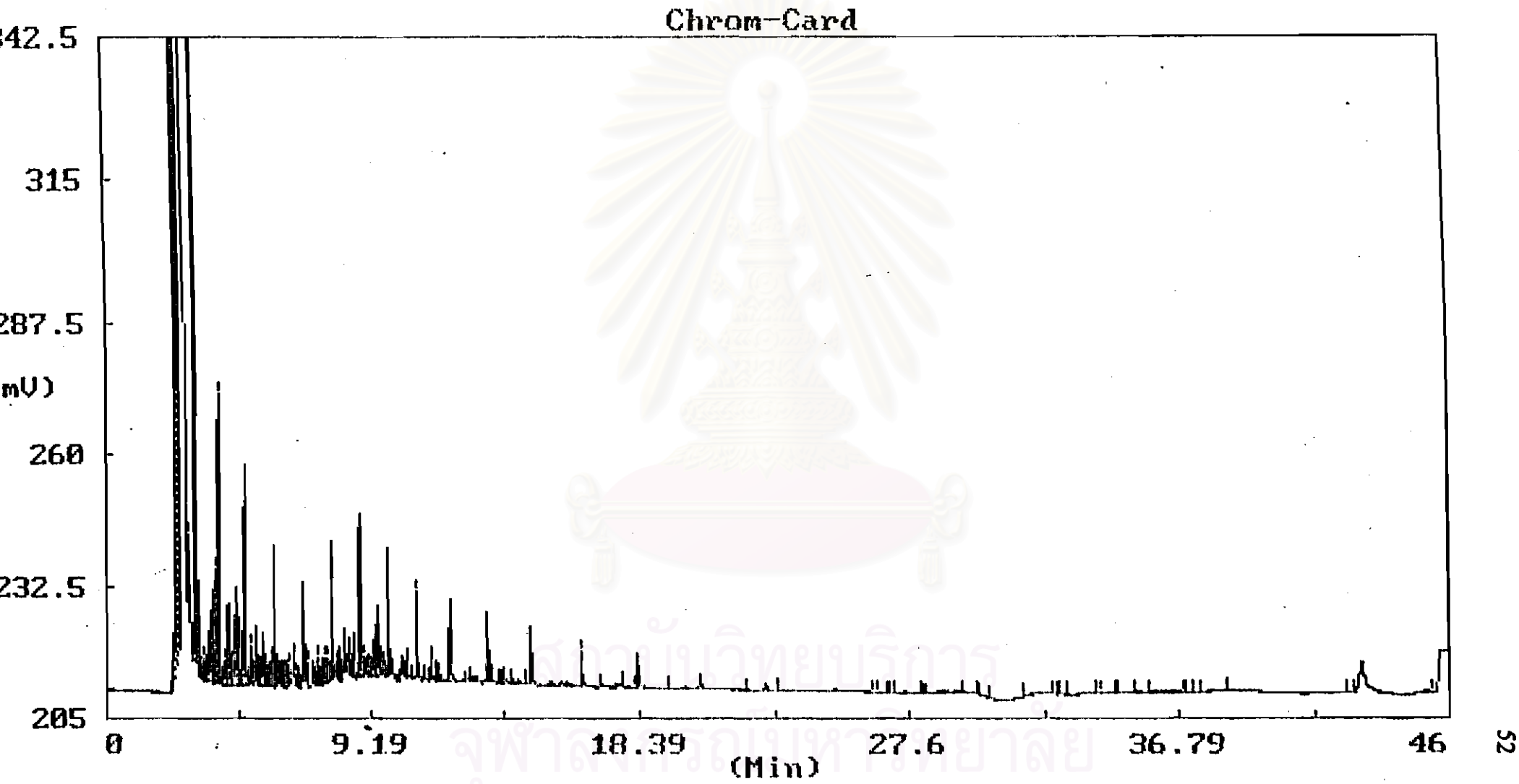


Figure B-6 The Chromatogram of exhaust emission of 8% fusel oil blended base diesel oil at 800 rpm of engine speed

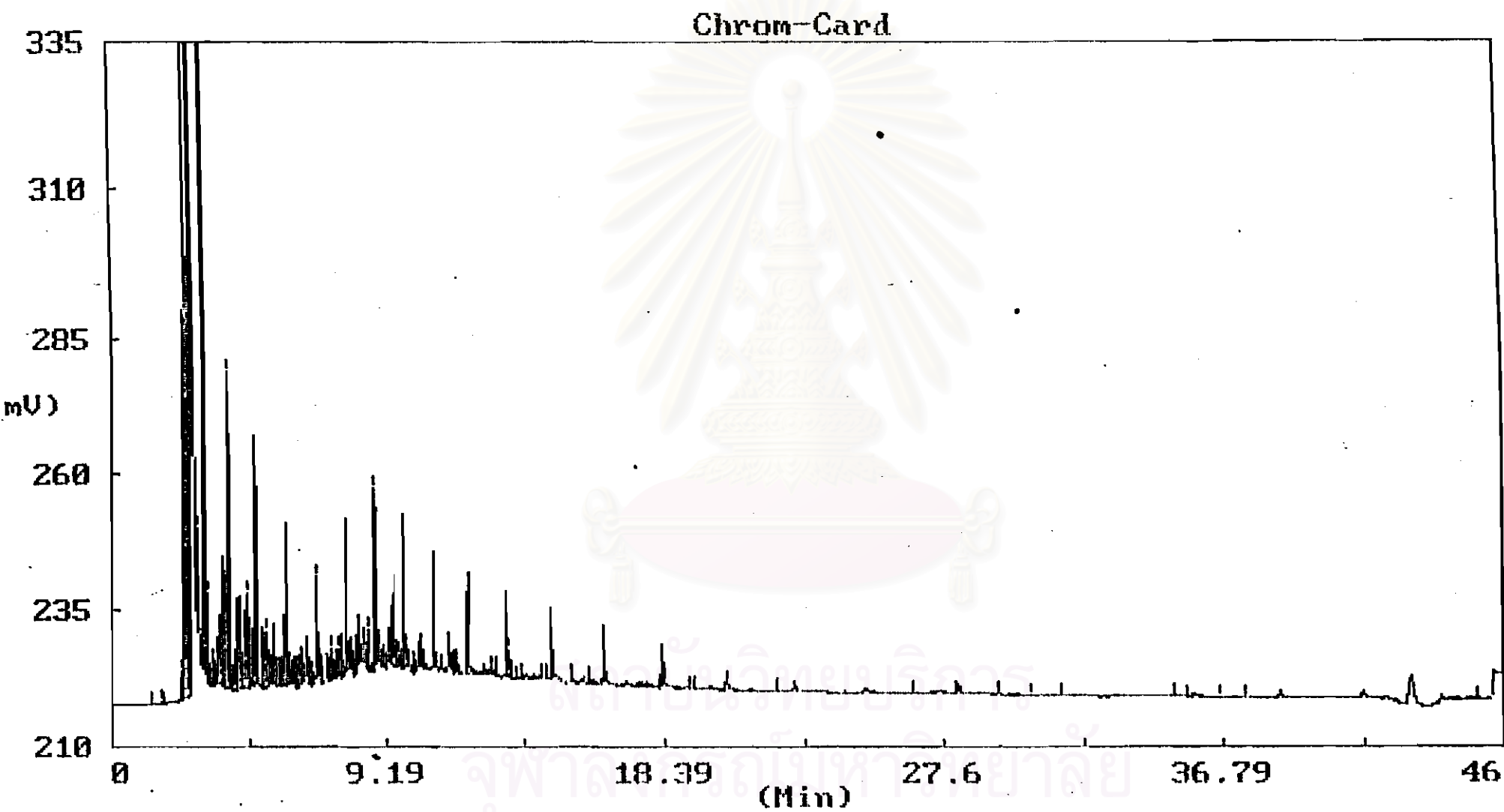


Figure B-7 The Chromatogram of exhaust emission of 10% fusel oil blended base diesel oil at 800 rpm of engine speed

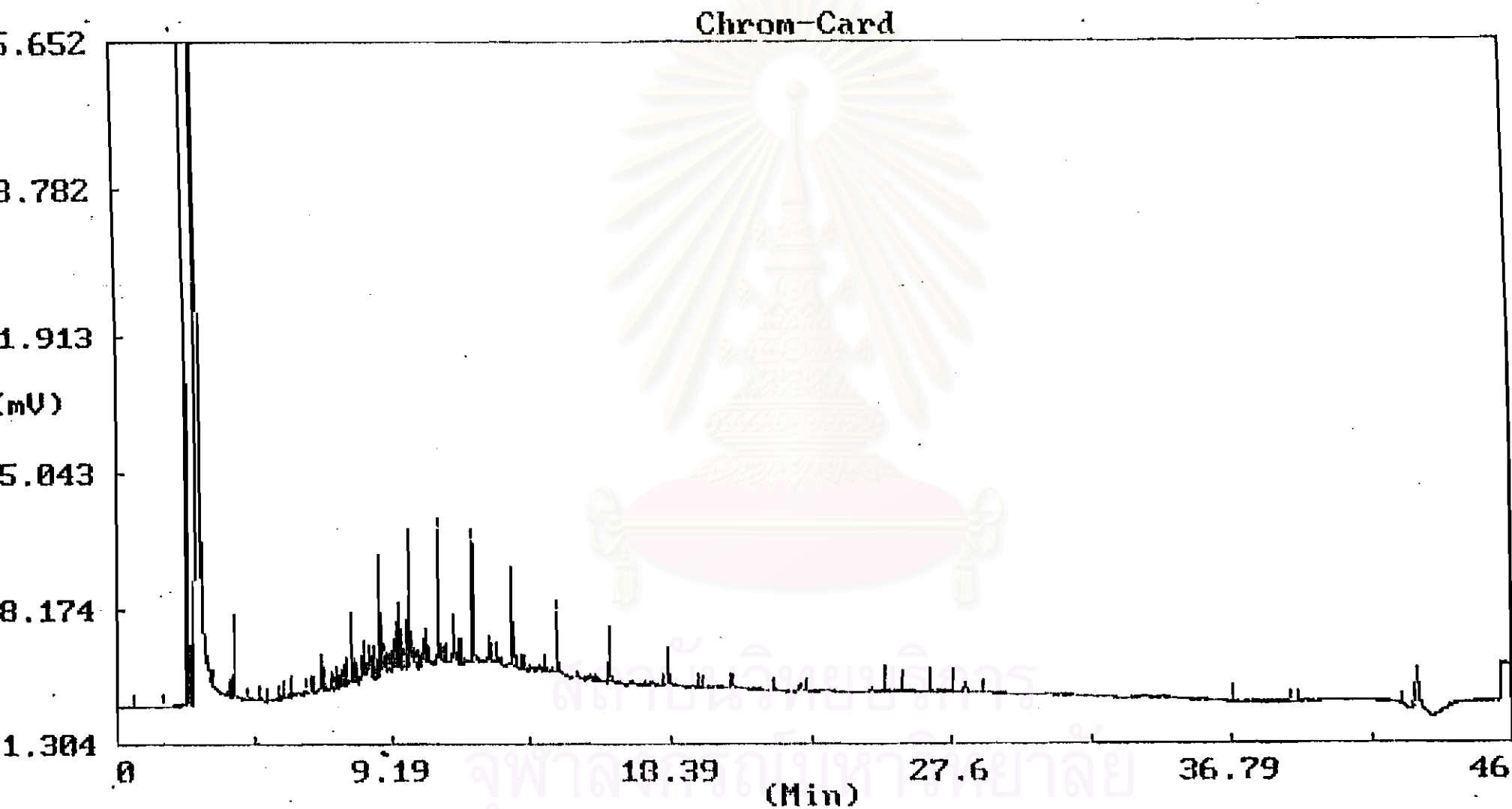


Figure B-8 The Chromatogram of exhaust emission of base diesel oil at 1600 rpm of engine speed

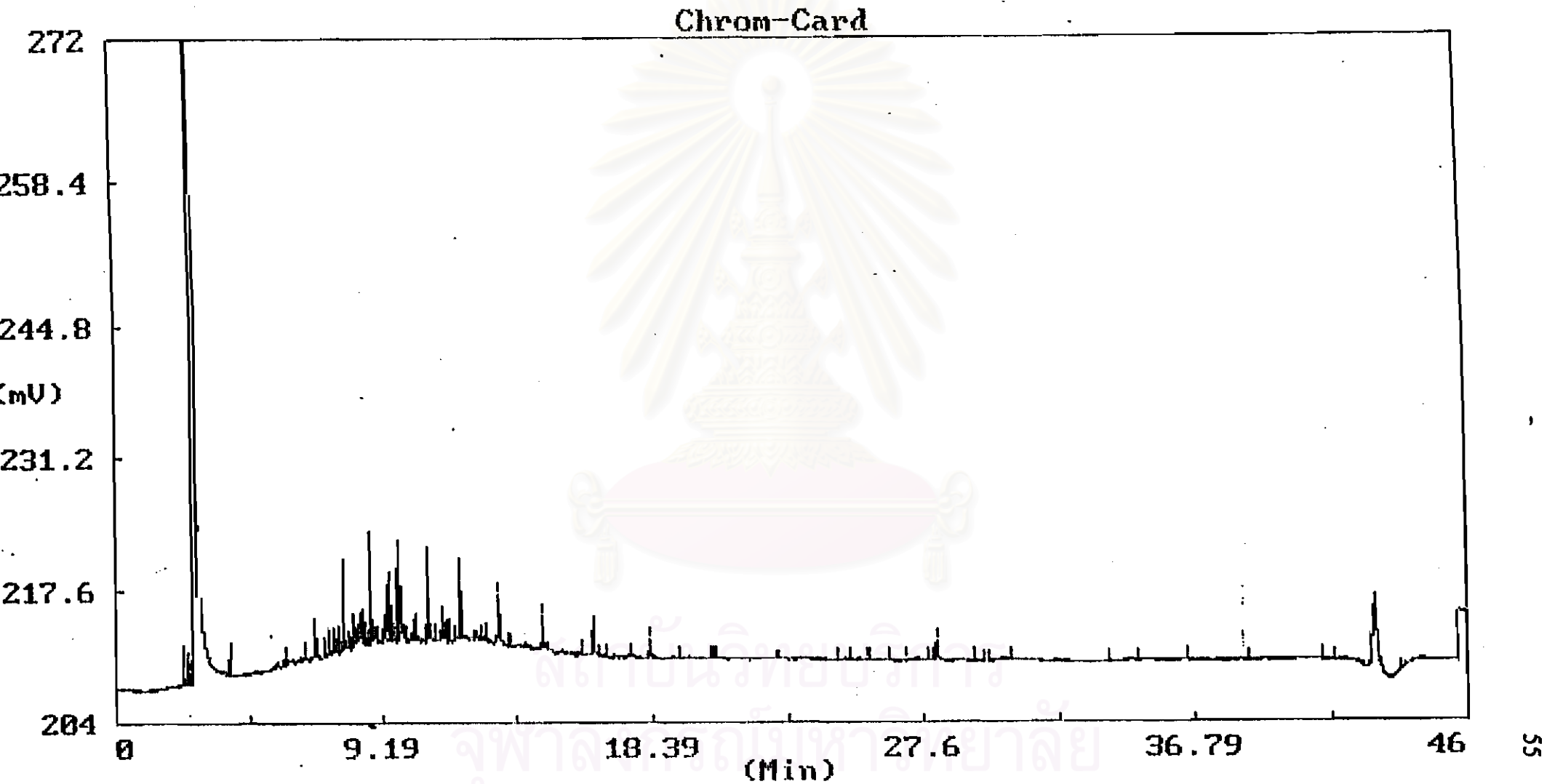


Figure B-9 The Chromatogram of exhaust emission of 2% fusel oil blended base diesel oil at 1600 rpm of engine speed

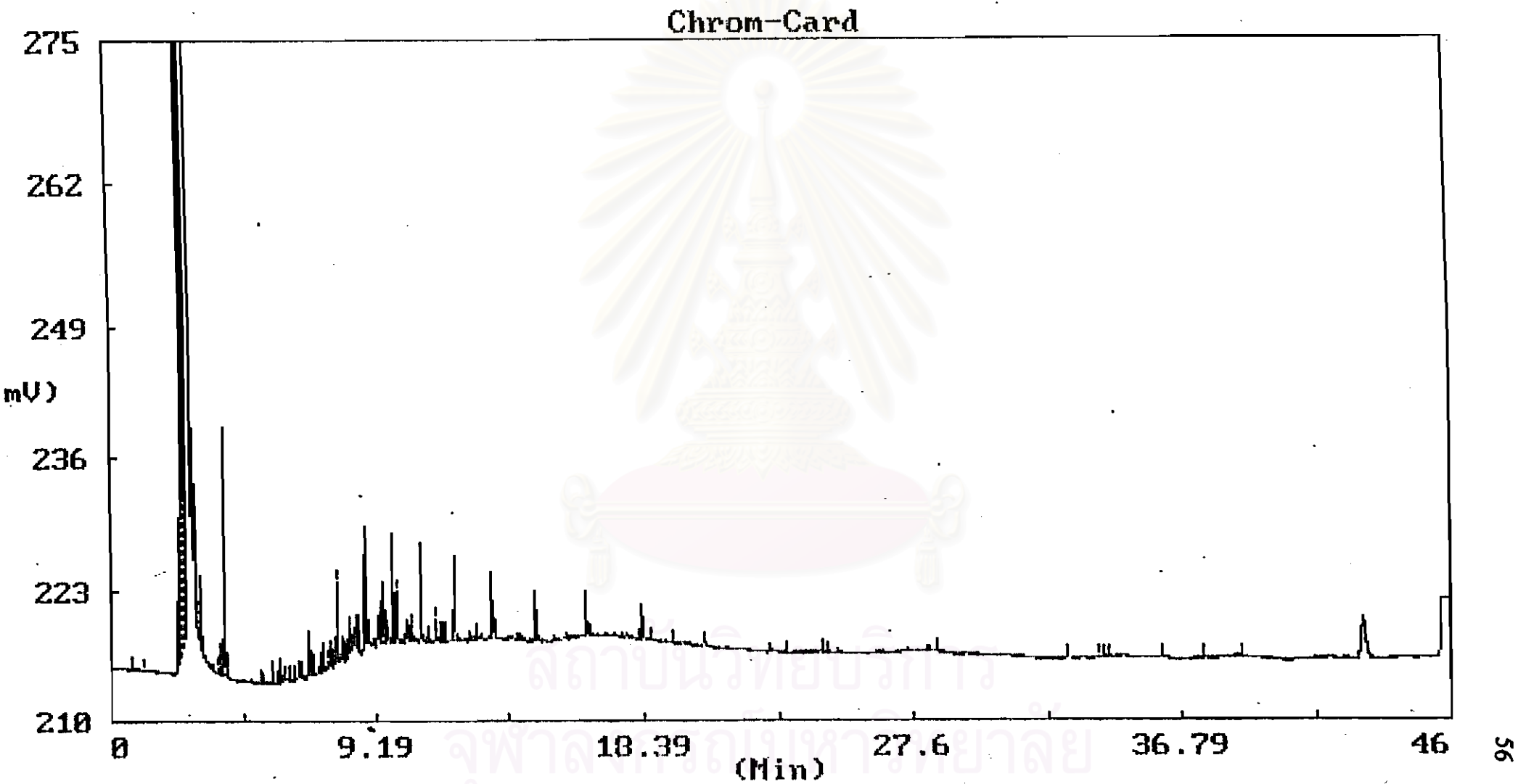


Figure B-10 The Chromatogram of exhaust emission of 4% fusel oil blended base diesel oil at 1600 rpm of engine speed

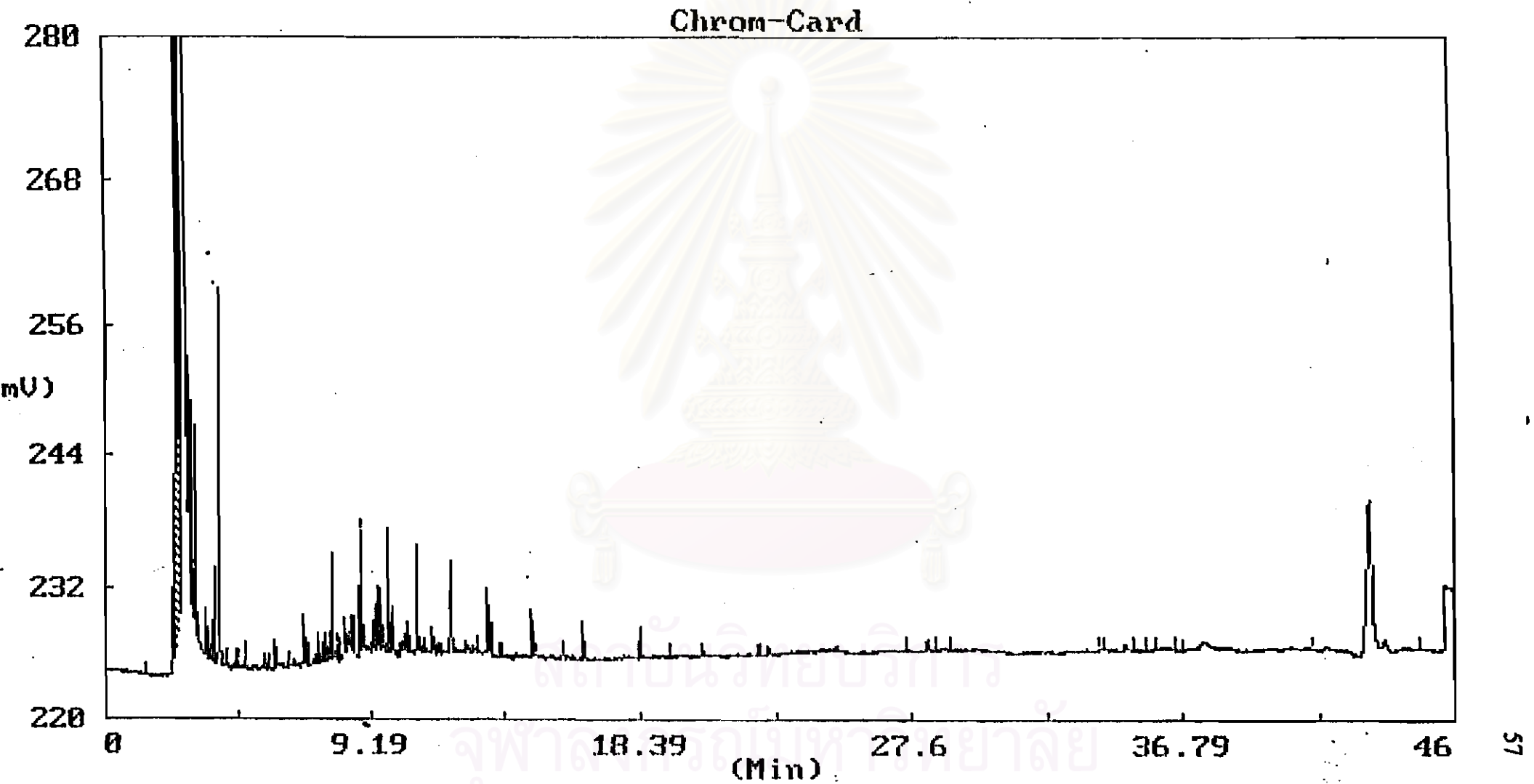


Figure B-11 The Chromatogram of exhaust emission of 6% fusel oil blended base diesel oil at 1600 rpm of engine speed

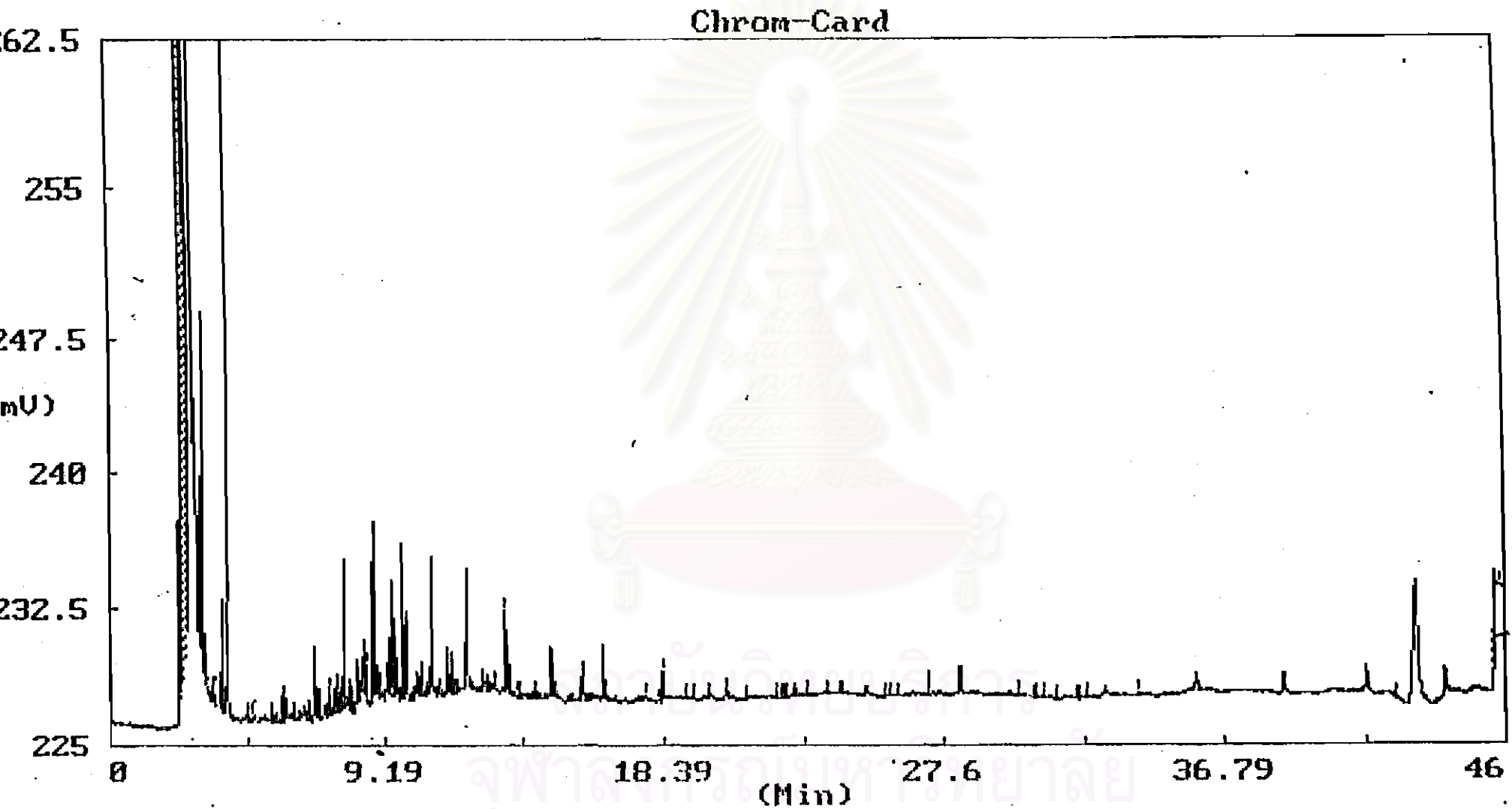


Figure B-12 The Chromatogram of exhaust emission of 8% fusel oil blended base diesel oil at 1600 rpm of engine speed

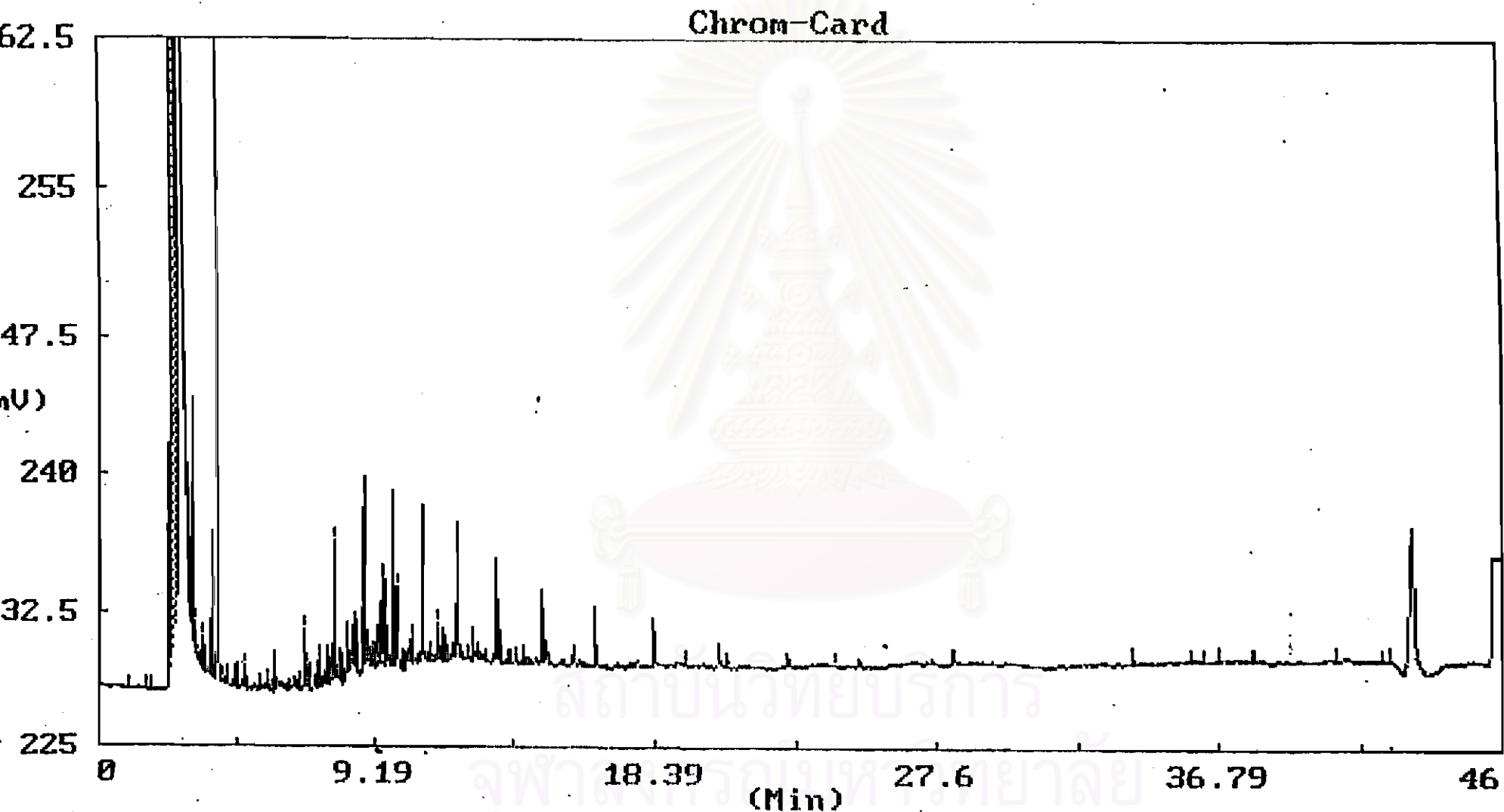


Figure B-13 The Chromatogram of exhaust emission of 10% fusel oil blended base diesel oil at 1600 rpm of engine speed

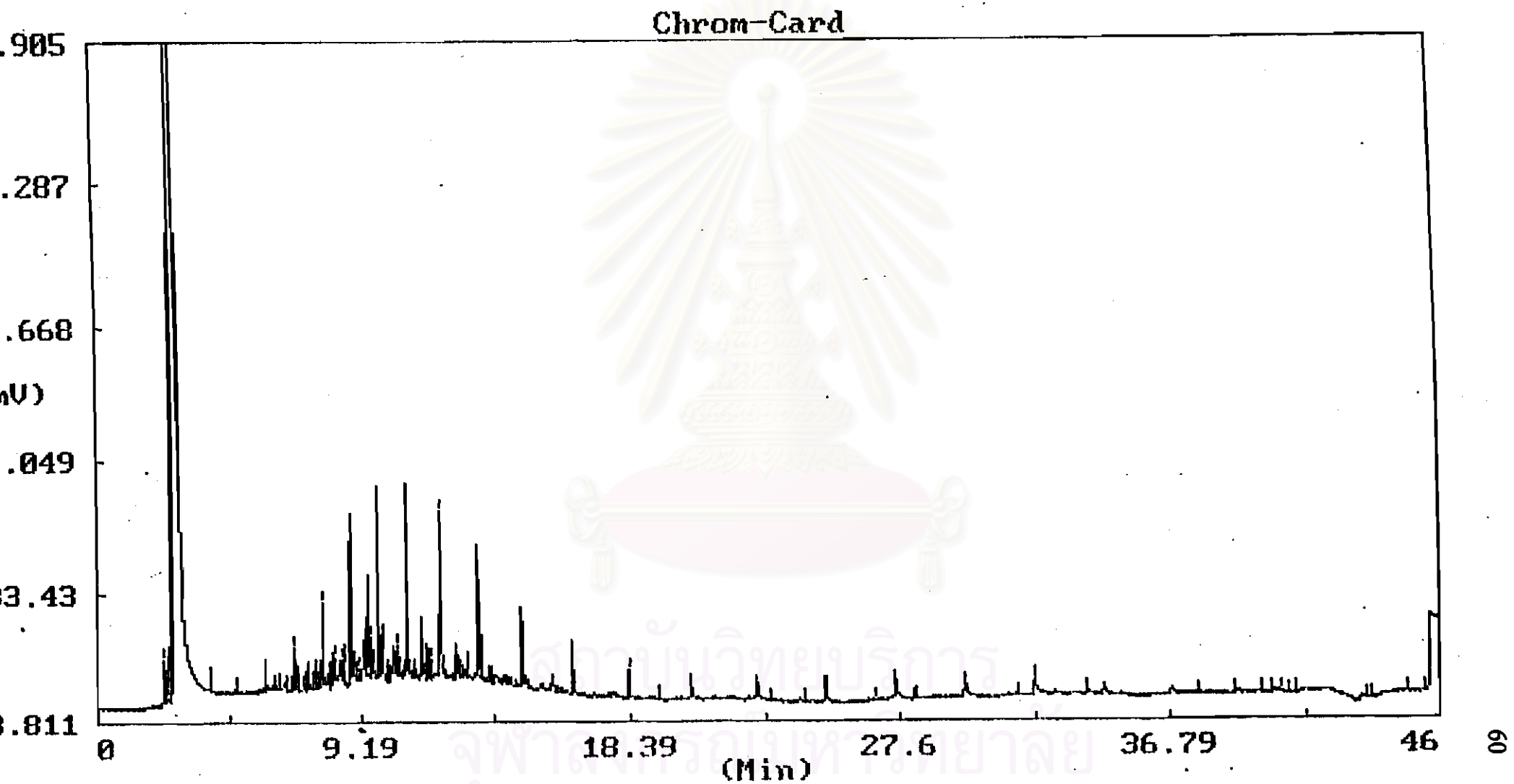


Figure B-14 The Chromatogram of exhaust emission of base diesel oil at 2400 rpm of engine speed

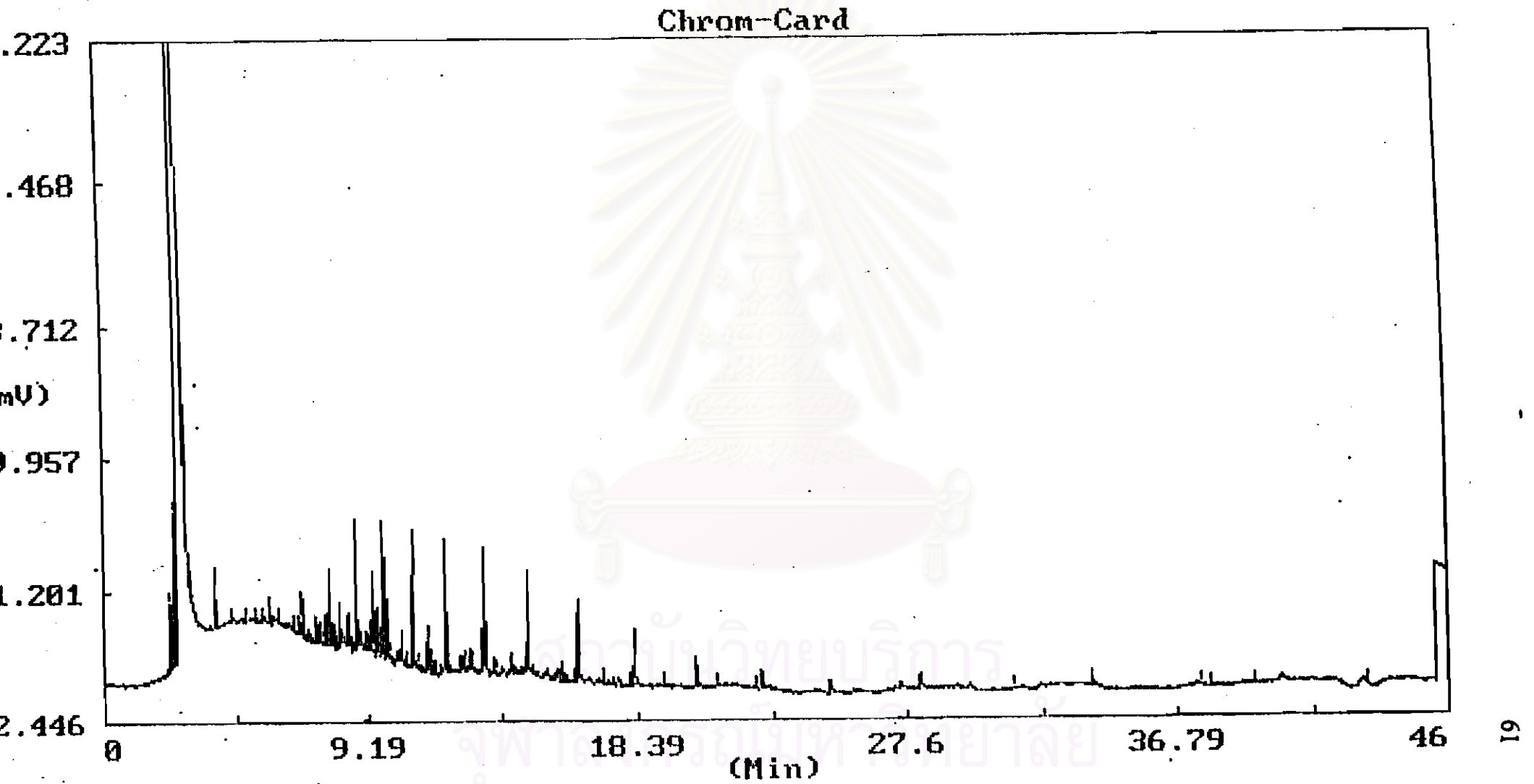


Figure B-15 The Chromatogram of exhaust emission of 0% fusel oil blended base diesel oil at 2400 rpm of engine speed.

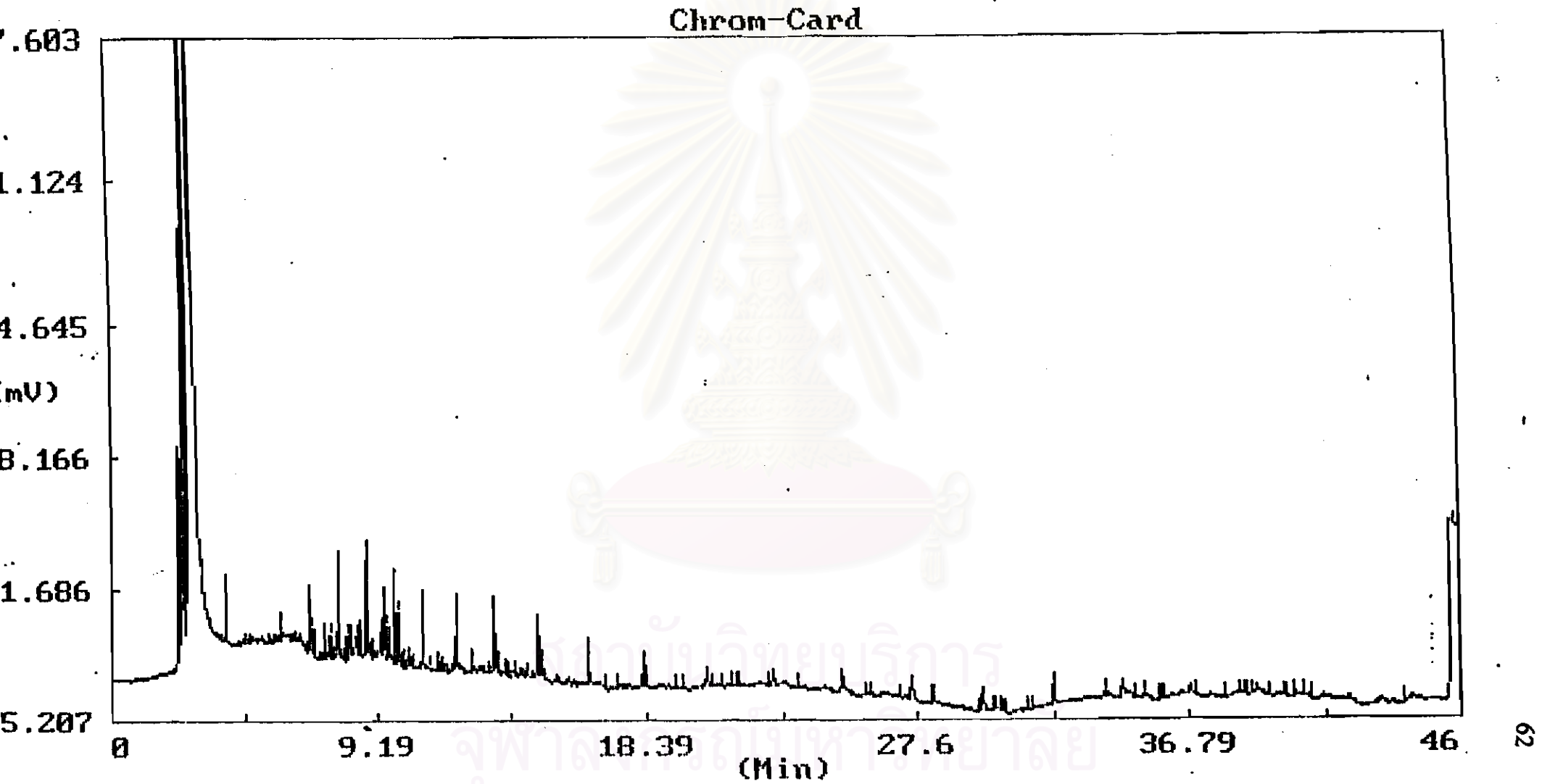


Figure B-16 The Chromatogram of exhaust emission of 4% fusel oil blended base diesel oil at 2400 rpm of engine speed

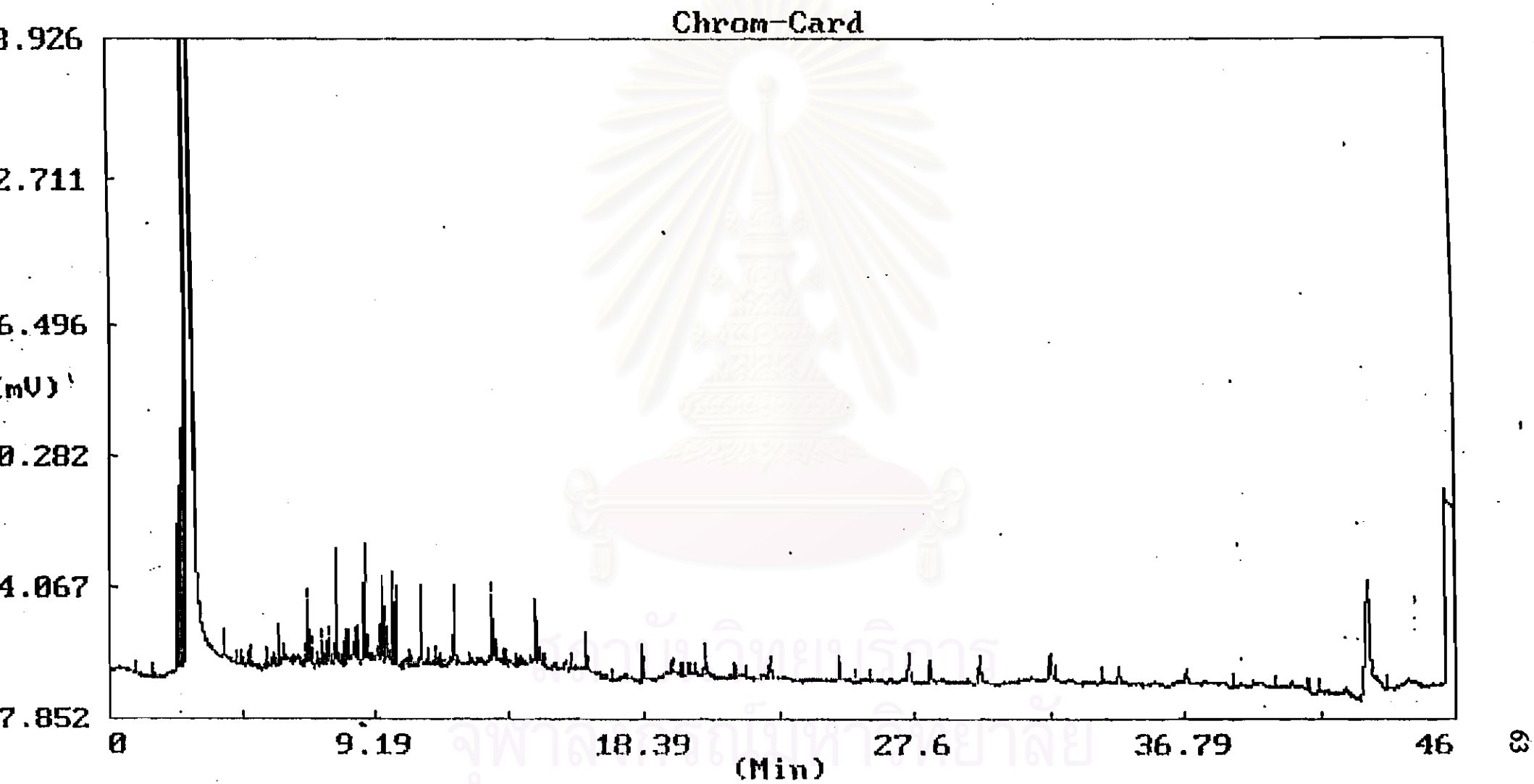


Figure B-17 The Chromatogram of exhaust emission of 6% fusel oil blended base diesel oil at 2400 rpm of engine speed

Chron-Card

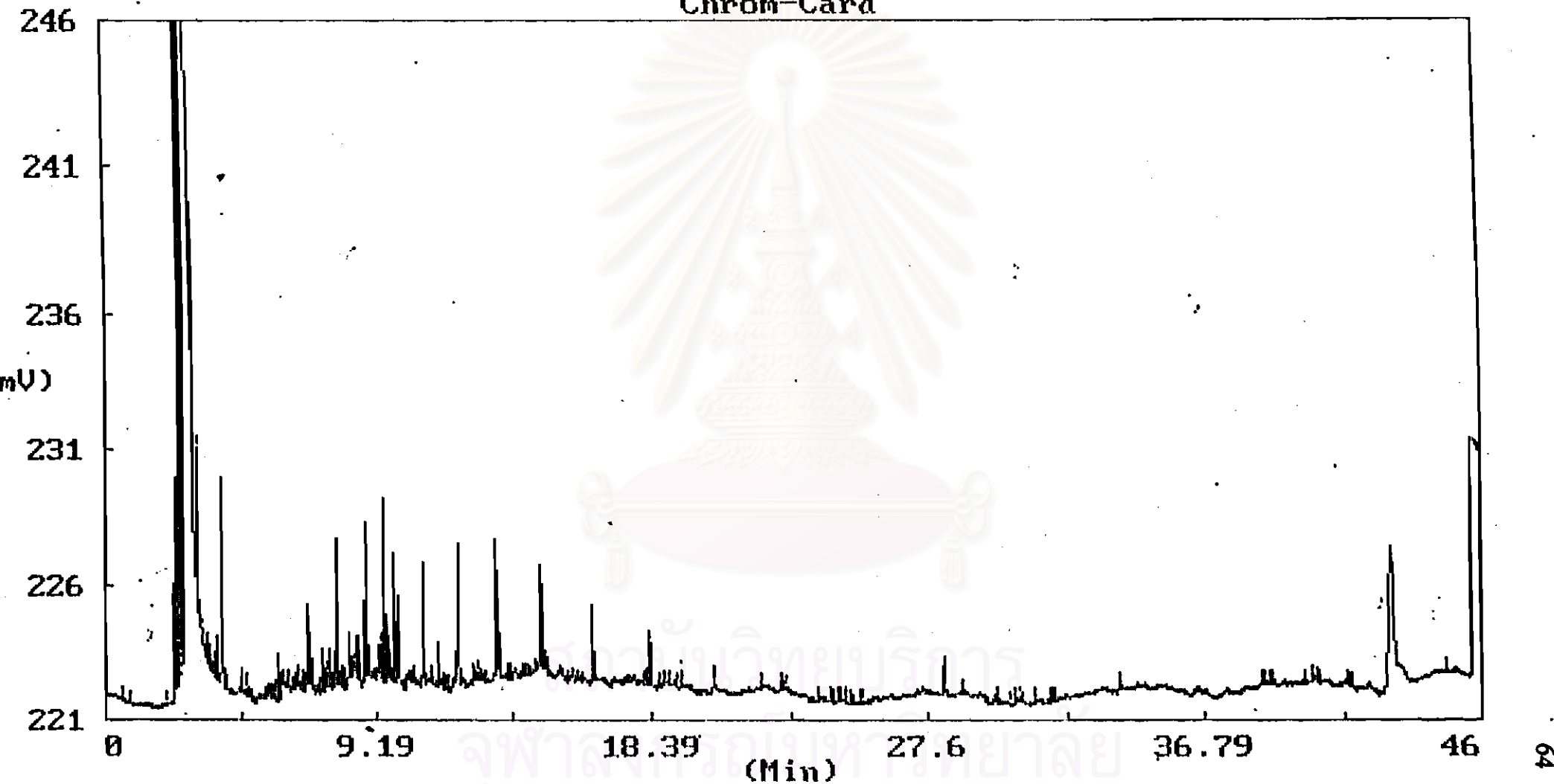


Figure B-18 The Chromatogram of exhaust emission of 8% fusel oil blended base diesel oil at 2400 rpm of engine speed

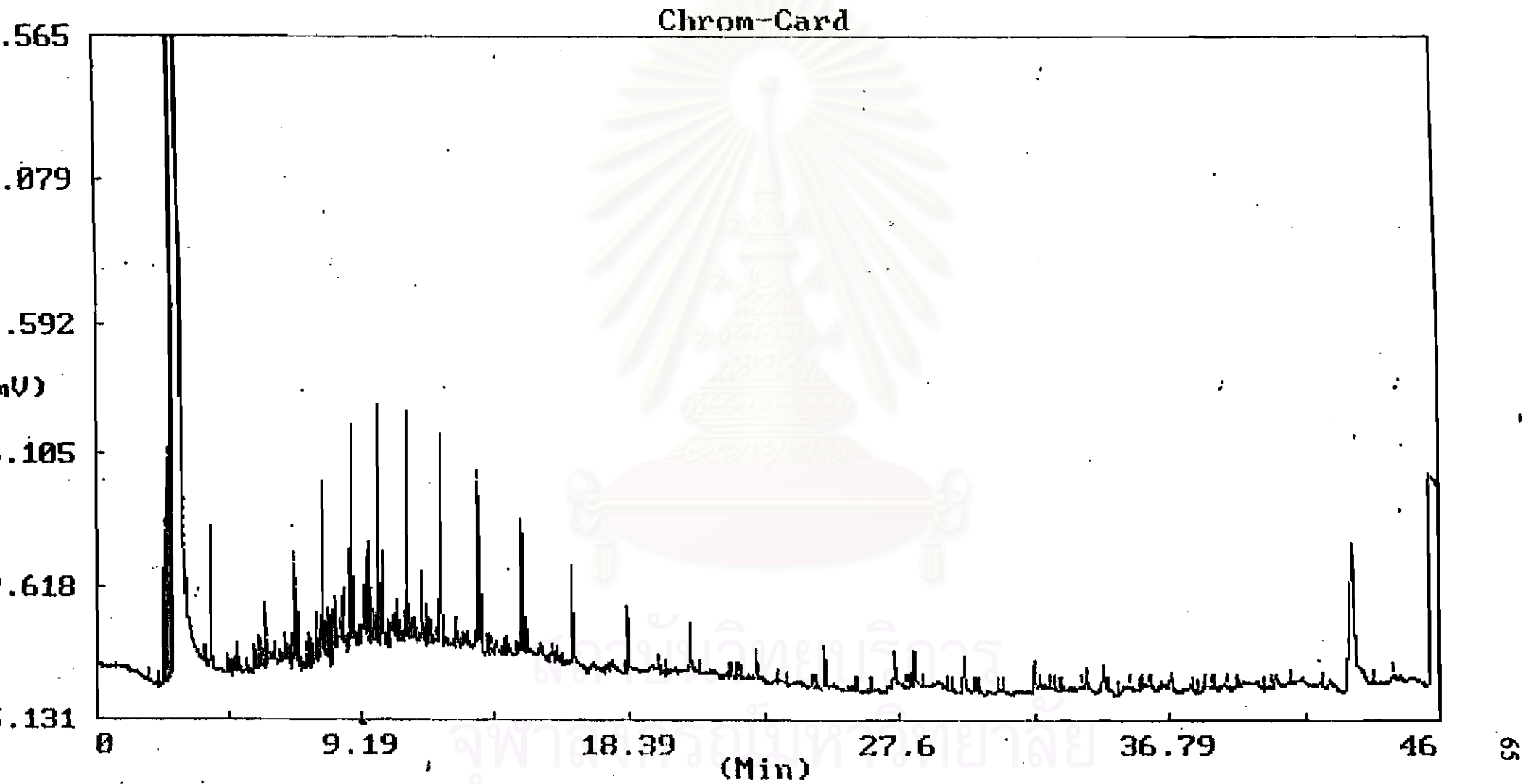
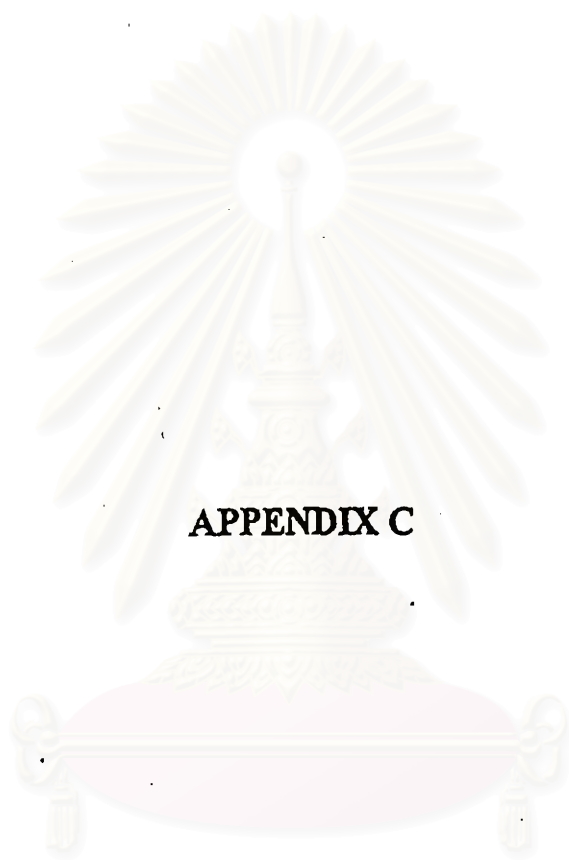


Figure B-19 The Chromatogram of exhaust emission of 10% fusel oil blended base diesel oil at 2400 rpm of engine speed



APPENDIX C

สถาบันวิทยบริการ
จุฬาลงกรณ์มหาวิทยาลัย

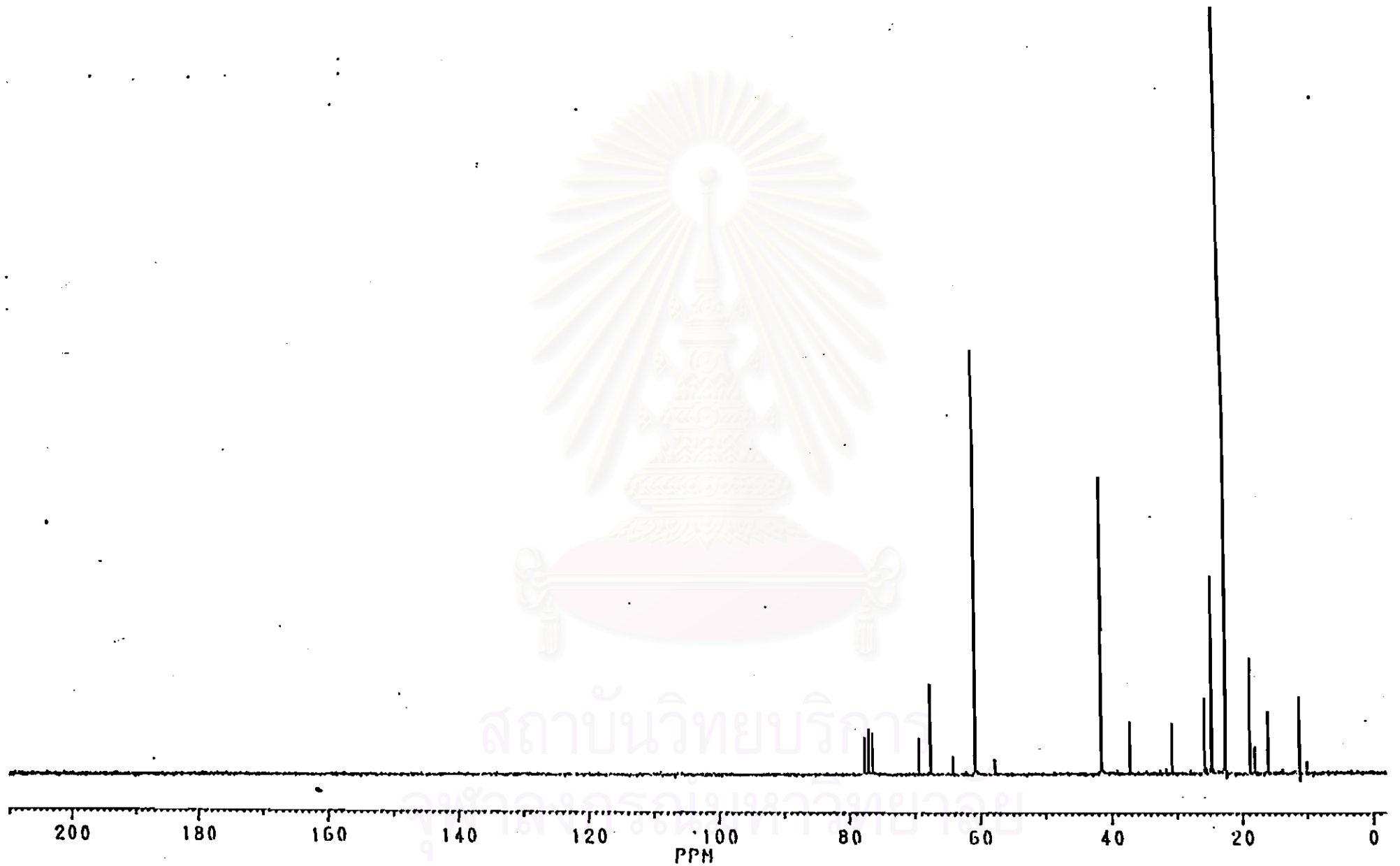


Figure C-1 The ^{13}C -NMR spectra of the fusel oil by normal atmospheric distillation

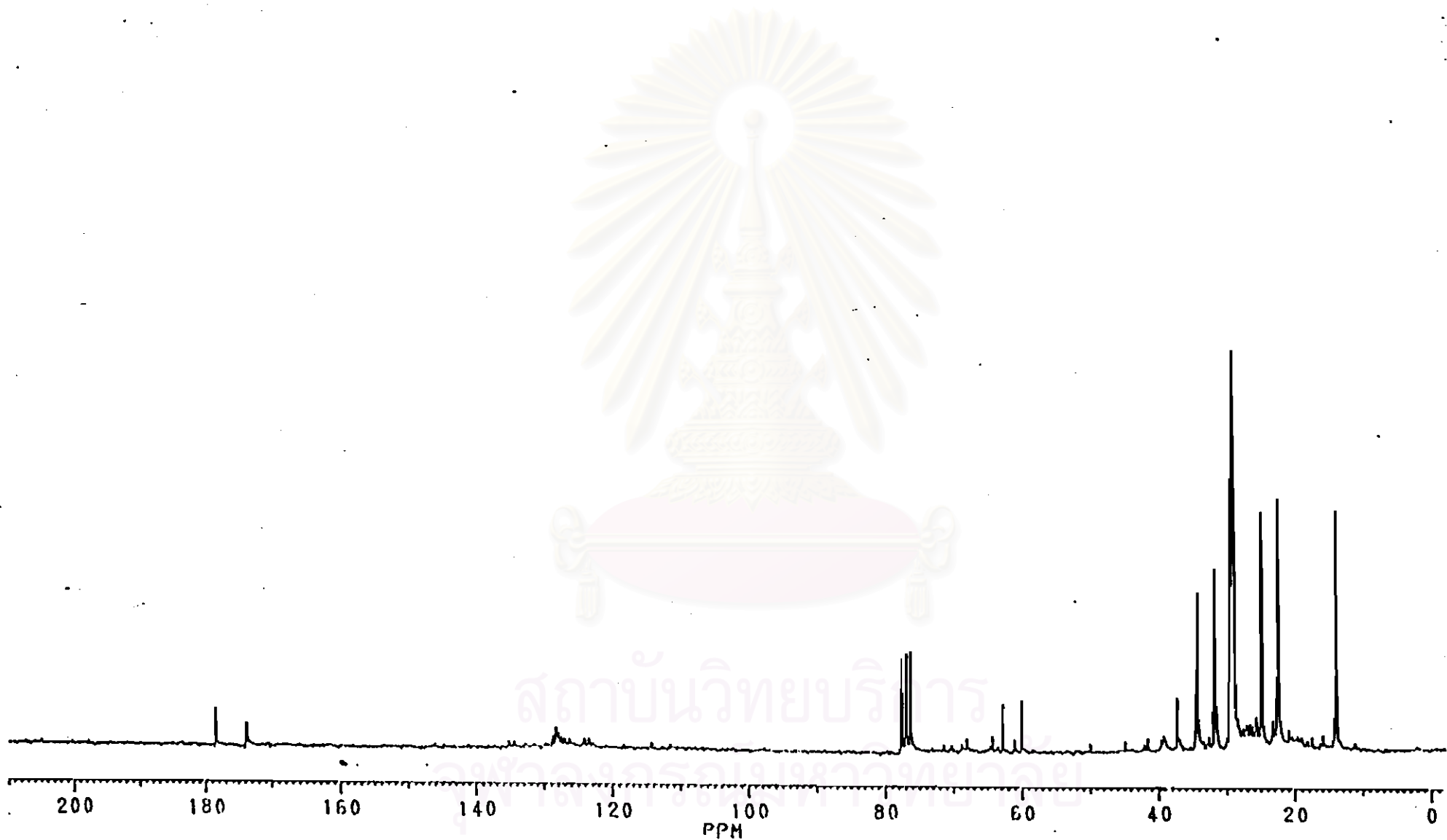


Figure C-2 The ¹³C-NMR spectra of the viscous residue by normal atmospheric distillation

Chromatogram Plot
Comment: 20 Jan 1999
Scan: 200 Seg: 1
Plotted: 200 to 800

C:\SATURN\DATA\K013

Date: 01/20/99 09:50:27

Group: 0 Retention: 3.33 RIC: 42434

Masses: 35-239

Range: 1 to 1800

100% = 50542592

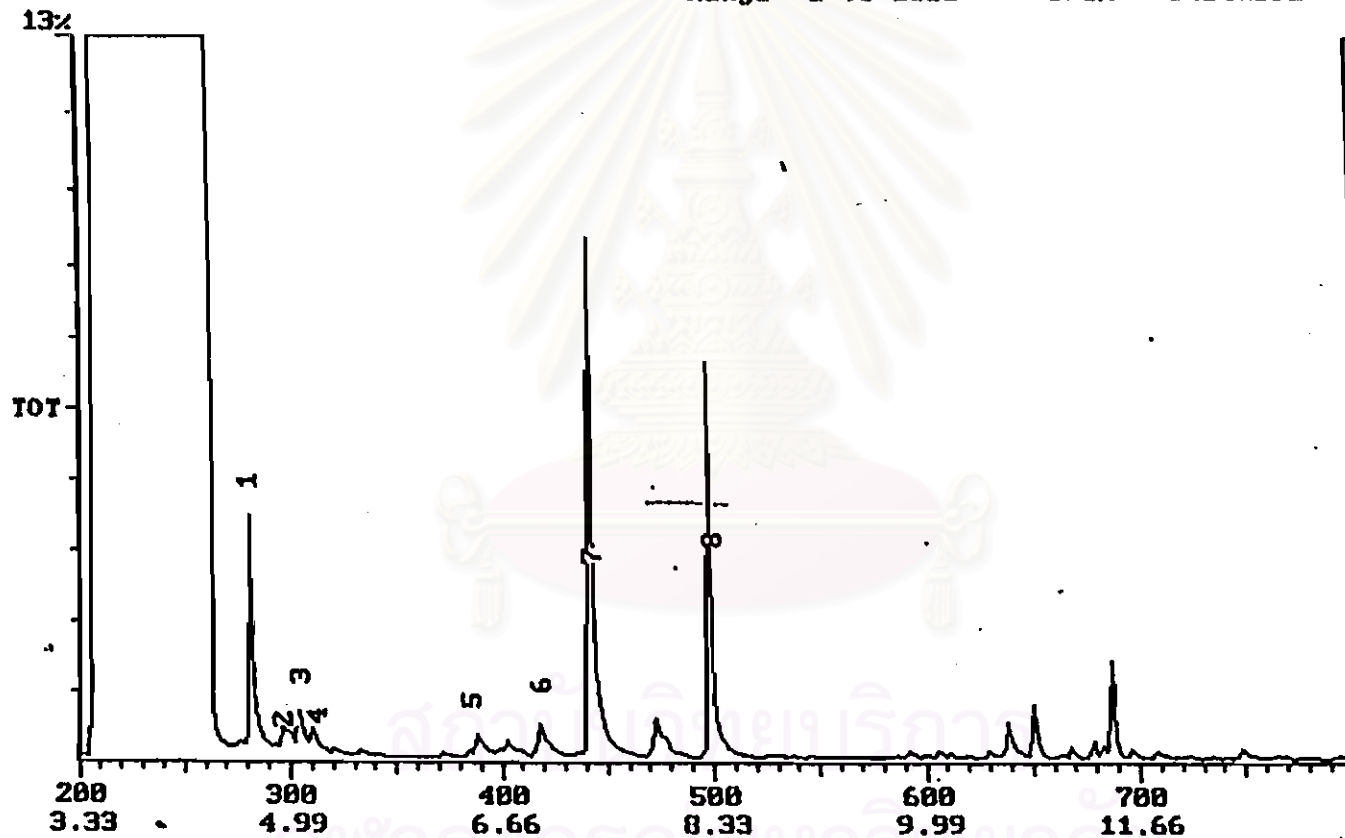
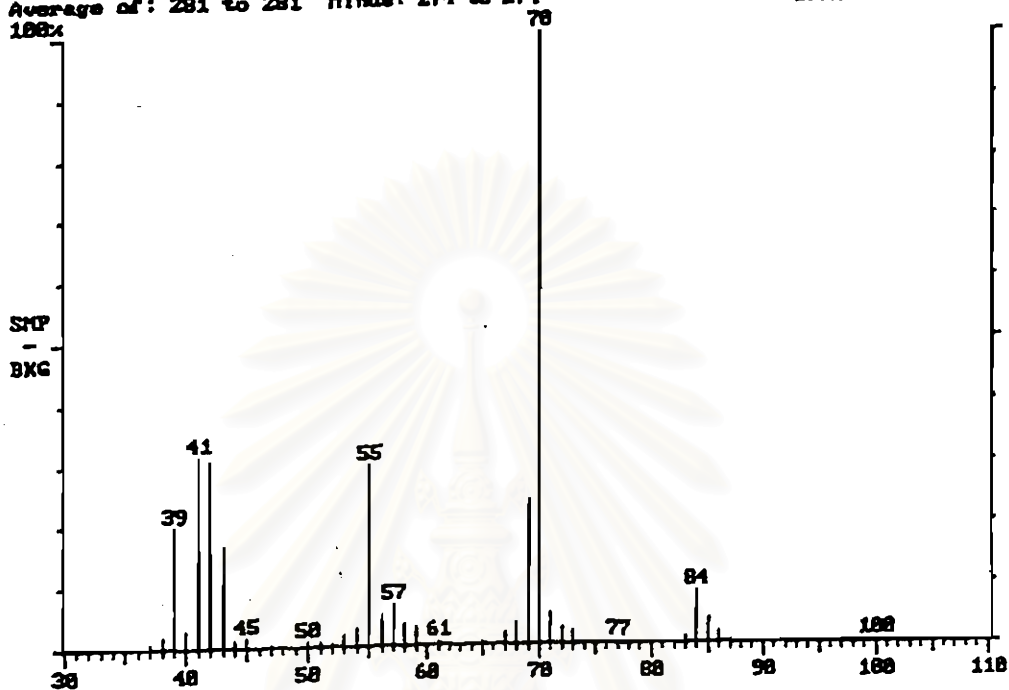
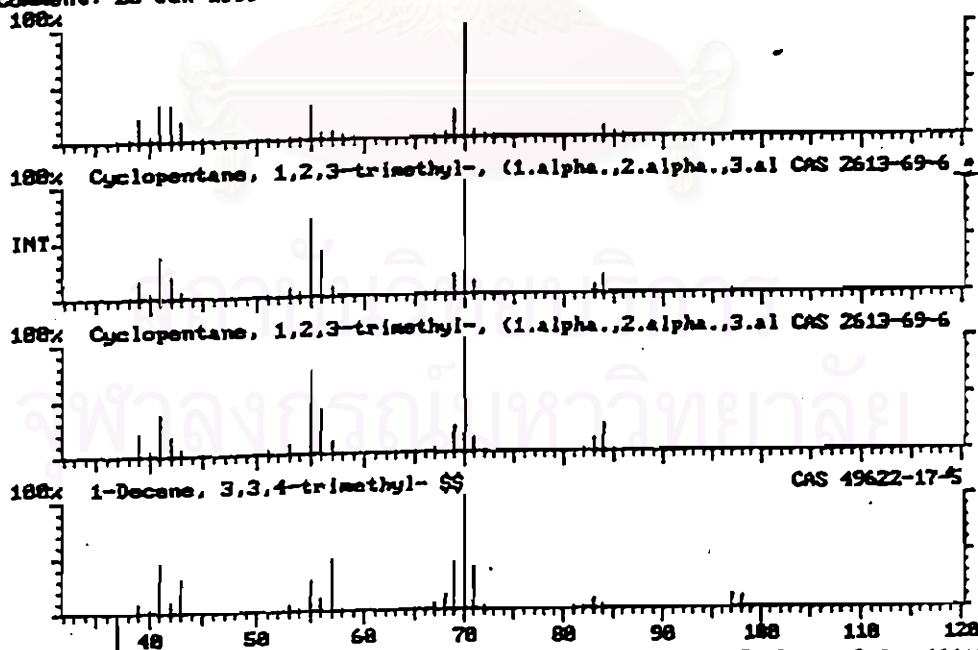


Figure C-3 The Chromatogram of distilled fusel oil

Background Subtract C:\SATURN\DATA\KA13 Date: 01/28/99 09:58:27
 Comment: 28 Jan 1999
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 100%



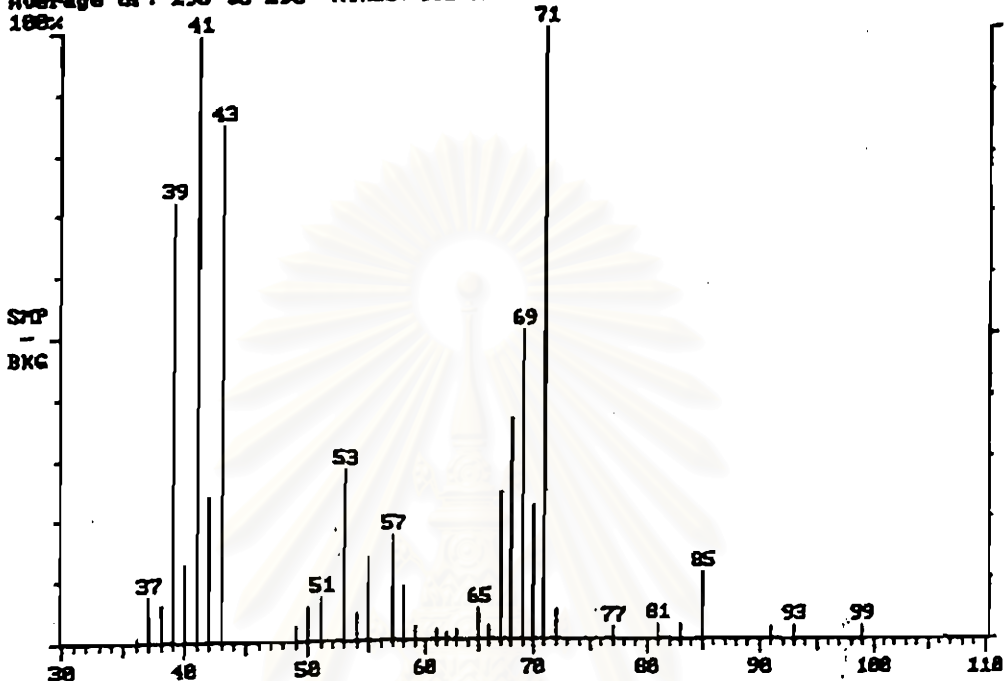
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 Comment: 28 Jan 1999



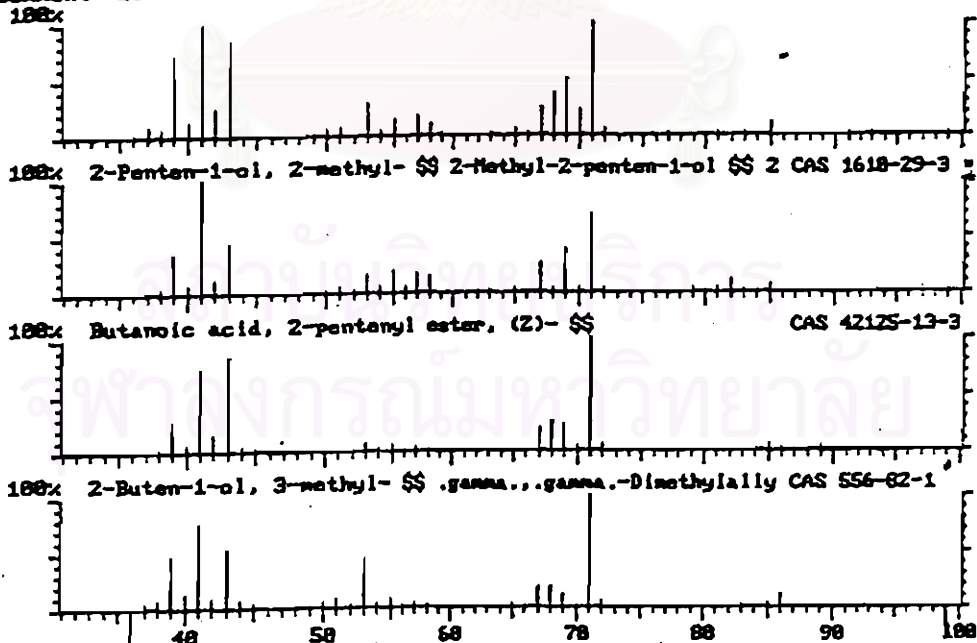
Formula C₈H₁₆ Rank 1 Index 114419
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Figure C-4 The Mass Spectra of 1,2,3 - trimethyl cyclopentane

Background Subtract C:\SATURN\DATA\K13 Date: 01/28/99 09:58:27
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Library Search C:\SATURN\DATA\K13 Acquired: 28 Jan 1999 Scan number 296
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Formula C₆H₁₂O Rank 1 Index 2654
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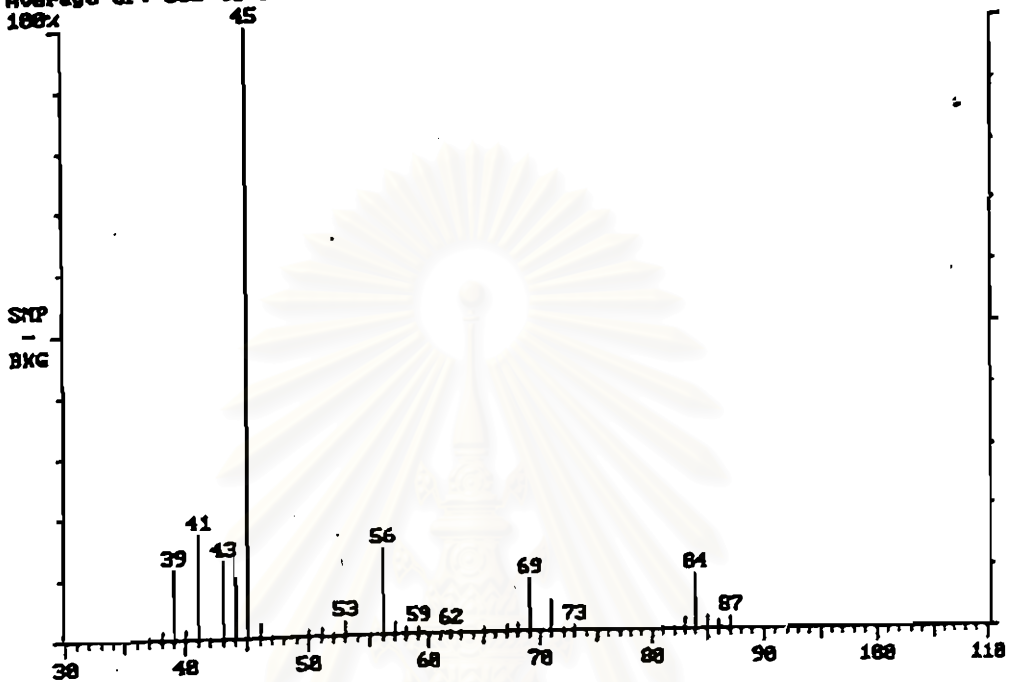
Figure C-5 The Mass Spectra of 2-methyl-2-penten-1-ol

Background Subtract
 Comment: 28 Jan 1999
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 100%

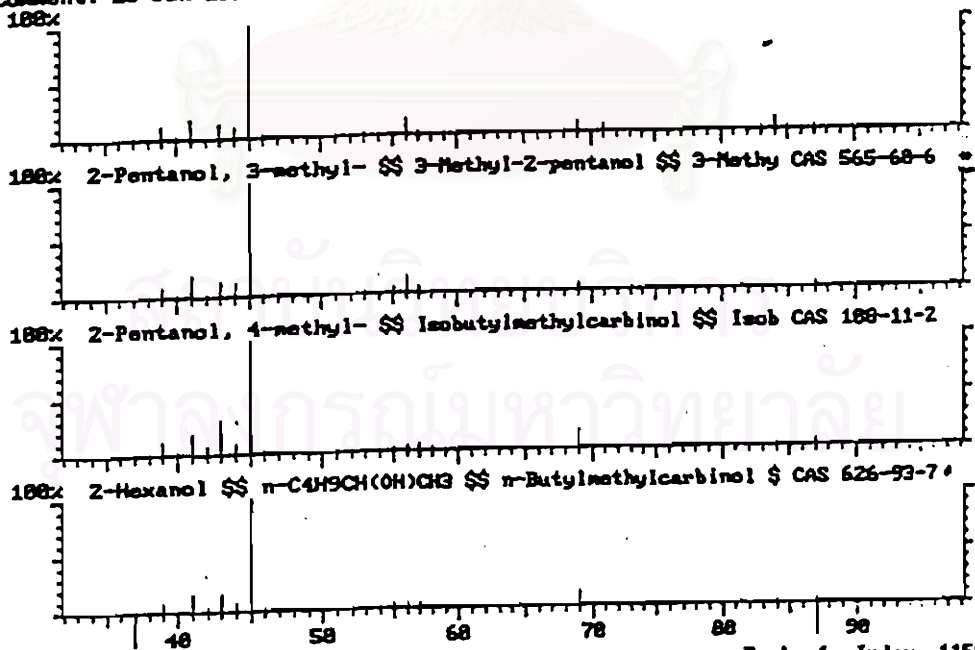
C:\SATURN\DATA\K13

Date: 01/28/99 09:58:27

100% = 125828



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 Comment: 28 Jan 1999

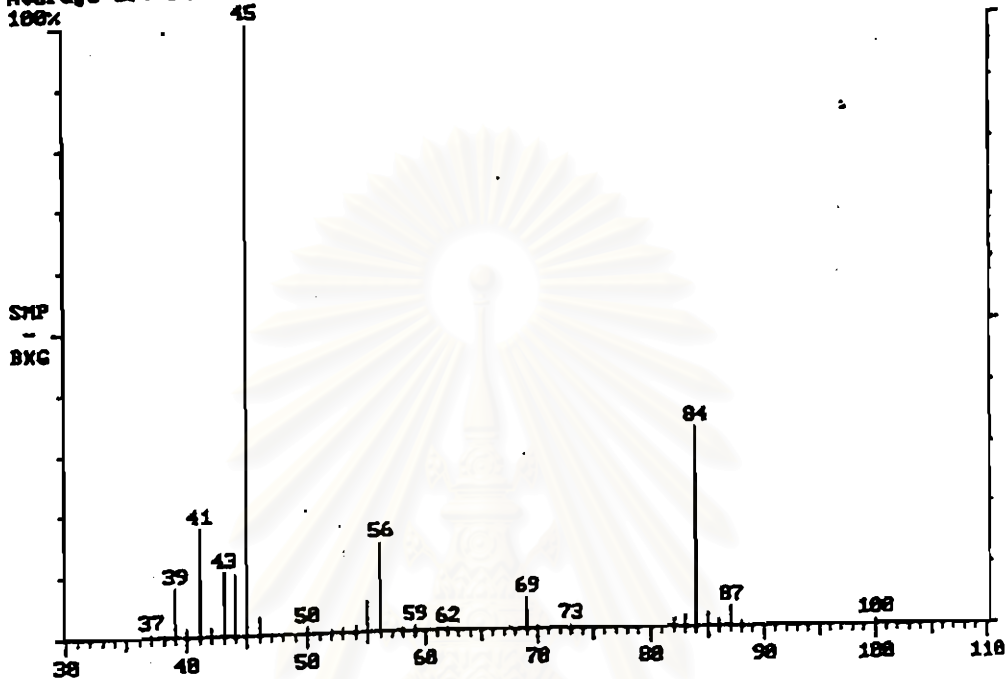


Formula C₆H₁₄O
 MolWeight:182

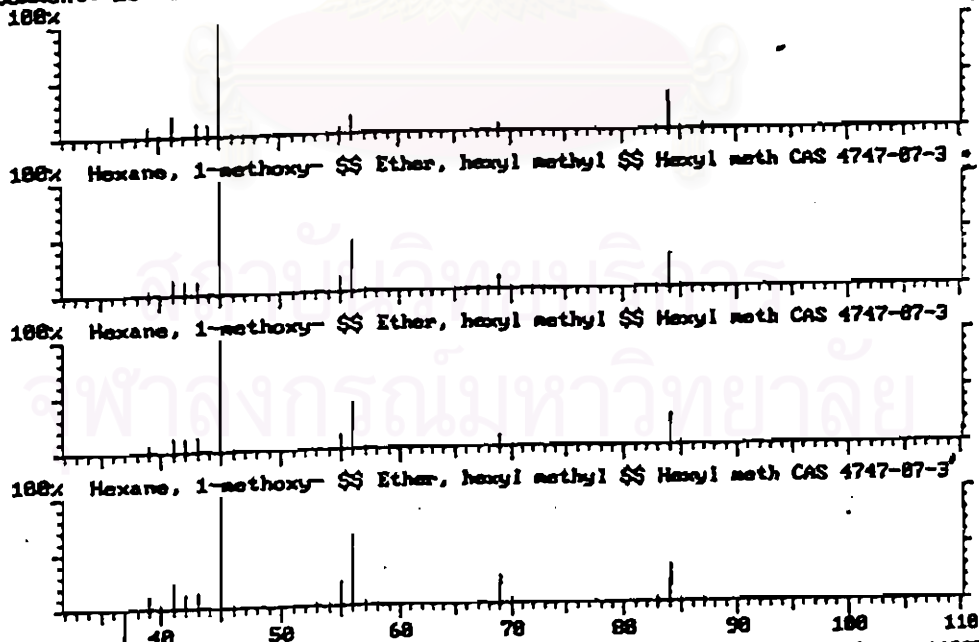
Search:Acq LocalNorm:On P:846 F:873 R:229 CAS: 565-68-6
 Rank 1 Index 11588

Figure C-6 The Mass Spectra of 3-methyl-2-pentanol

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 100%



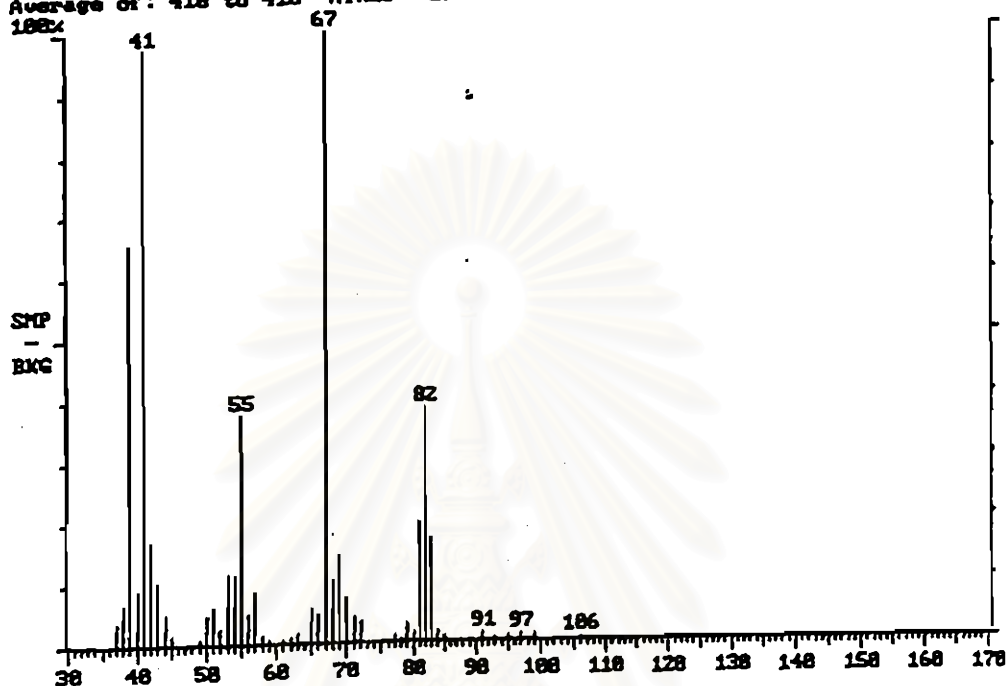
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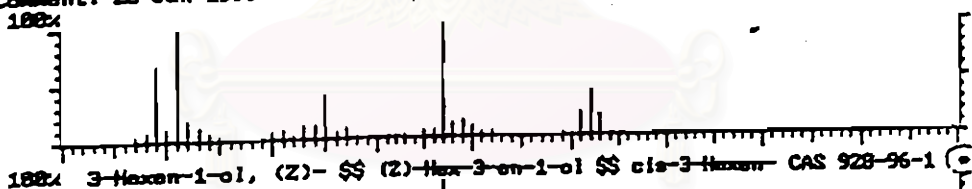
Formula C7.H16.O Rank 1 Index 118871
 MolWeight:116 Search:Acq LocalNorm:On P:849 F:853 R:100 CAS# 4747-87-3

Figure C-7 The Mass Spectra of Hexyl methyl ether

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 100x = 44264



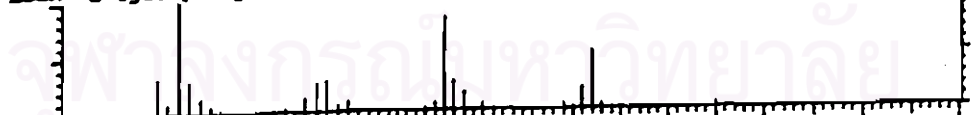
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 Comment: 28 Jan 1999



100x 3-Hexen-1-ol, (Z)- \$\$ (Z)-Hex-3-en-1-ol \$\$ cis-3-Hexen- CAS 928-96-1 (C)



100x 3-Cyclopentyl-1-propanol \$\$ Cyclopentanepropanol- \$\$ CAS 767-85-5

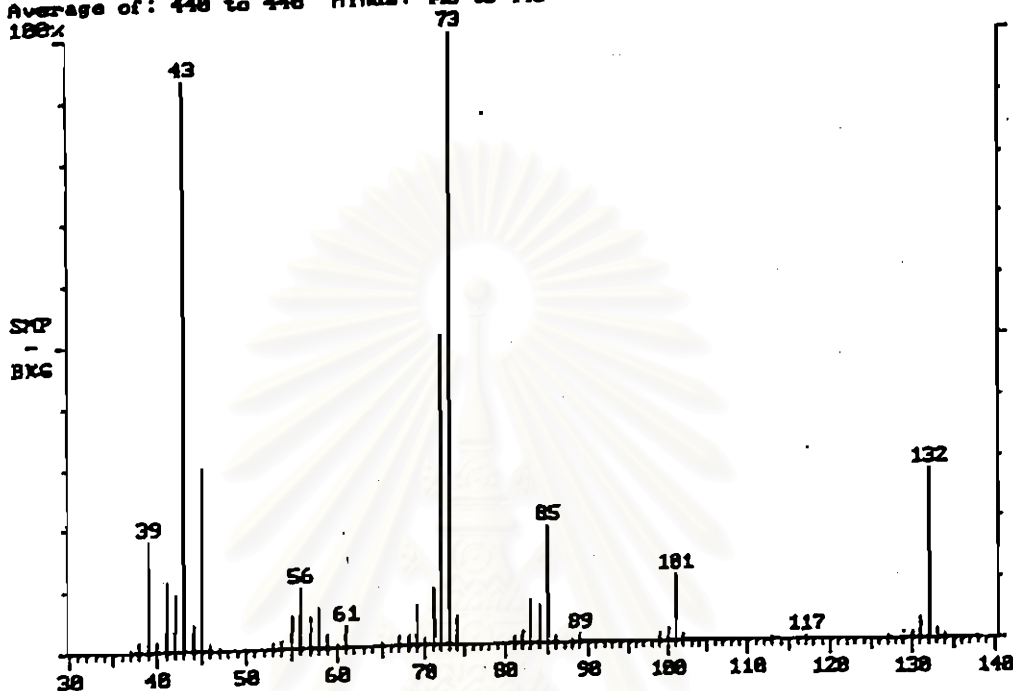


100x 3-Hexen-1-ol \$\$ 3-Hexen-1-ol (c.t.) \$\$ CAS 544-12-7^d

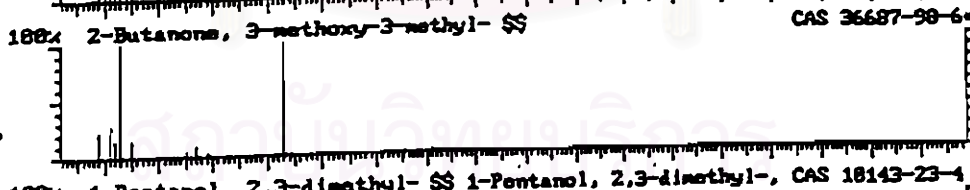
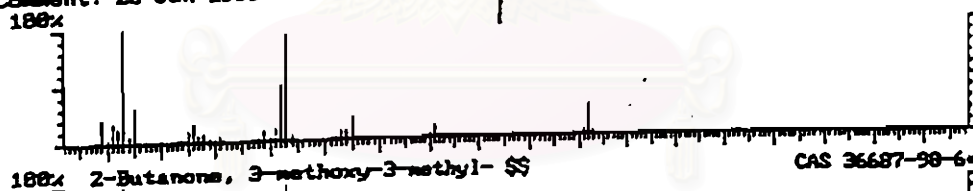
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 CAS 928-96-1

Figure C-8 The Mass Spectra of 3-hexen-1-ol

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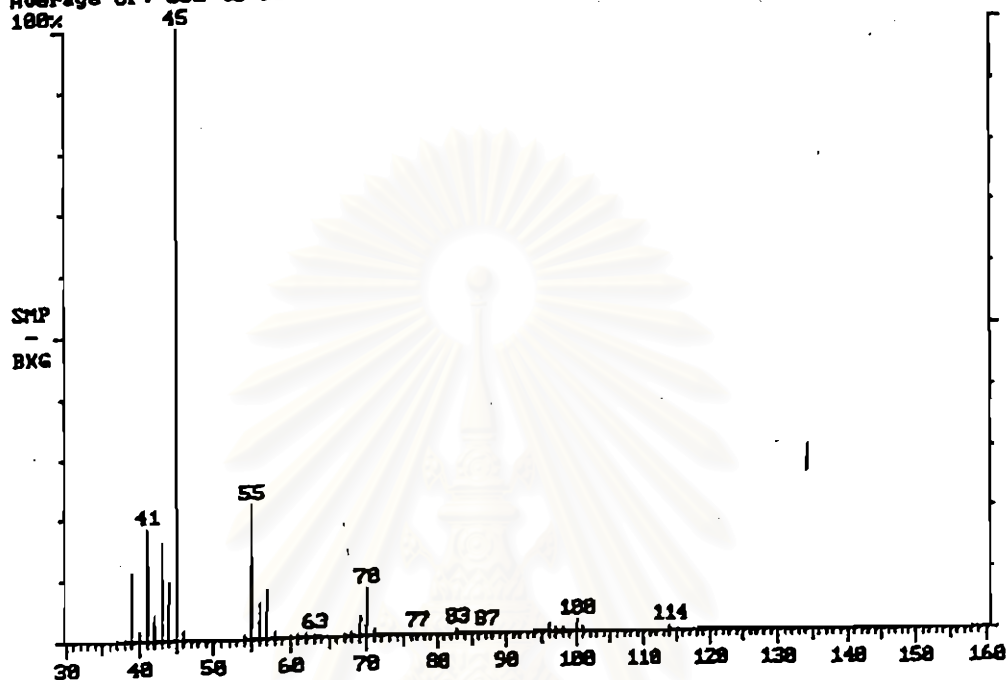
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 Comment: 28 Jan 1999



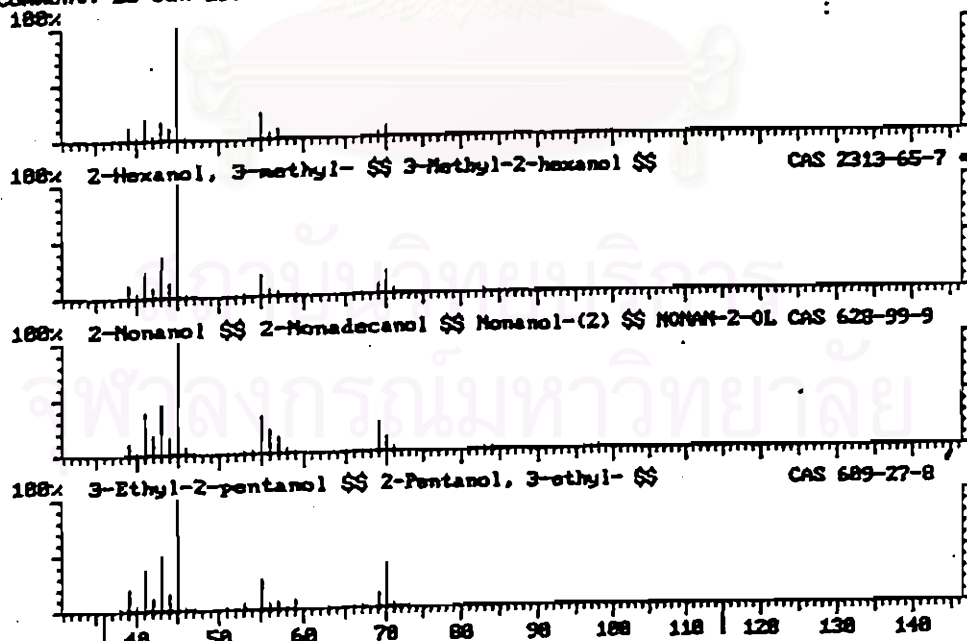
Formula C6.H12.O2 Rank 1 Index 25335
 MolWeight:116 Search:Acq LocalNorm:On P:538 F:115 R:531 CAS# 36687-98-6

Figure C-9 The Mass Spectra of 2,3-dimethyl-1-pentanol

Background Subtract C:\SATURN\DATA\KAI3 Date: 81/28/99 09:58:27
 Comment: 28 Jan 1999
 Average of: 582 to 582 Minus: 496 to 496 100% = 93191
 100%



Library Search C:\SATURN\DATA\KAI3 Acquired: 28 Jan 1999 Scan number 582
 Comment: 28 Jan 1999
 100%



Formula C7.H16.O Rank 1 Index 11546
 MolWeight:116 Search:Acq LocalNorm:On P:845 F:982 R:100 CAS 2313-65-7

Figure C-10 The Mass Spectra of 3-methyl-2-hexanol



APPENDIX D

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* * * * MULTIPLE REGRESSION * * * *

Listwise Deletion of Missing Data

Equation Number 1 Dependent Variable.. PAHS

Block Number 1. Method: Enter FUSEL RPM

Variable(s) Entered on Step Number

1.. RPM
2.. FUSEL

Multiple R	.80998
R Square	.65607
Adjusted R Square	.61021
Standard Error	.51758

Analysis of Variance

	DF	Sum of Squares	Mean Square
Regression	2	7.66513	3.83257
Residual	15	4.01832	.26789

F = 14.30660 Signif F = .0003

----- Variables in the Equation -----

Variable	B	SE B	Beta	T	Sig T
FUSEL	-.071190	.035716	-.301819	-1.993	.0648
RPM	-9.27083E-04	1.8677E-04	-.751647	-4.964	.0002
(Constant)	31.814286	.368877		86.246	.0000

End Block Number 1 All requested variables entered.

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VITA

Mr. Sirichai Buravannint was born on February 12, 1975 in Bangkok. He received his Bachelor of Science degree from the Department of Chemistry, Faculty of Science, Kasetsart University, in 1996. He began his studies in the Multidisciplinary program of Petrochemistry and Polymer Science, Graduate School, Chulalongkorn University, in 1996 and completed the program in 1999.



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