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APPENDICES

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APPENDIX A

A. Substitution of cinnamoyl groups on AS calculation

From $^1\text{H-NMR}$ of **G-AS**, integration of methyl protons linked with silicon (Si-CH_3) = 314 and integration of methoxy protons (OCH_3) = 10.6.

amount of methyl groups linked with silicon = $314/3 = 104.7$ groups

amount of methoxy groups = $10.6/3 = 3.5$ groups

amount of dimethyl groups linked with silicon ($\text{CH}_3\text{-Si-CH}_3$) = $104.7 - 3.5 = 101.2$ groups

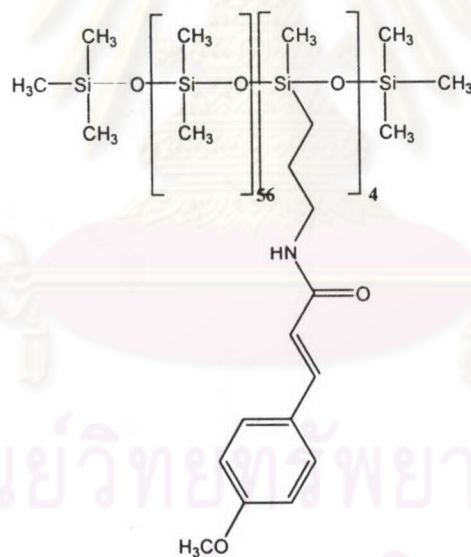
units of methoxy : units of dimethyl groups linked with silicon = $3.5 : 50.6$ units

M.W. of **AS** ~ 4,500; consists of silicon units ~ 60 units

\therefore **AS** consists of dimethyl units = $(50.6 \times 60)/54 = 56$ units

amino propyl = $(3.5 \times 60)/54 = 4$ units

G-AS product has dimethyl units = 56 units and cinnamoyl units = 4 units



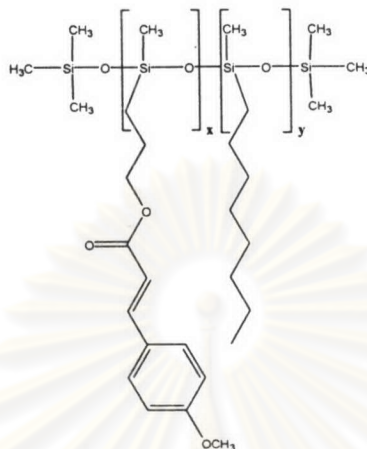
G-AS

\therefore M.W. of **G-AS** = $4,500 + (4 \times 160) = 5,140$

B. Substitution of cinnamoyl groups on MHS calculation

From $^1\text{H-NMR}$ of **G-MHS**, integration of methyl protons linked with silicon (Si-CH_3) = 1.3 and integration of methoxy protons (OCH_3) = 0.1.

MHS has M.W. = 2280.5 and Si-H unit = 35 units



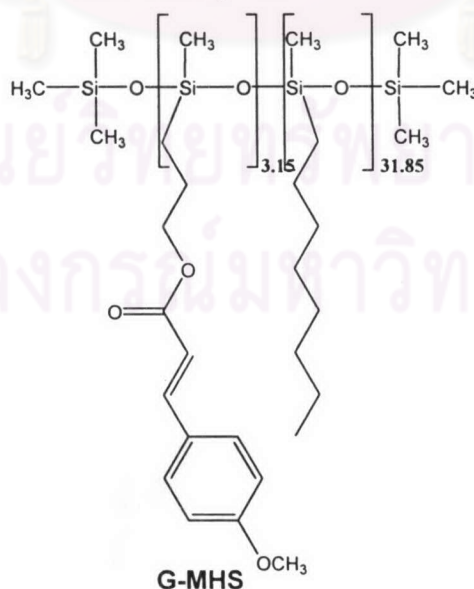
$$\text{a) } \frac{\text{amounts of methoxy protons}}{\text{amounts of methyl protons linked with silicon}} = \frac{3x}{(18+3y+3x)} = \frac{0.1}{1.3}$$

$$\text{b) } x+y+2 = 37; x+y = 35$$

$$\frac{3x}{3(6+y+x)} = \frac{0.1}{1.3}$$

$$\frac{3x}{3(6+35)} = \frac{0.1}{1.3}$$

$$\therefore x = 3.15, y = 35 - 3.15 = 31.85$$



$$\text{M.W. of G-MHS} = 6534.4$$

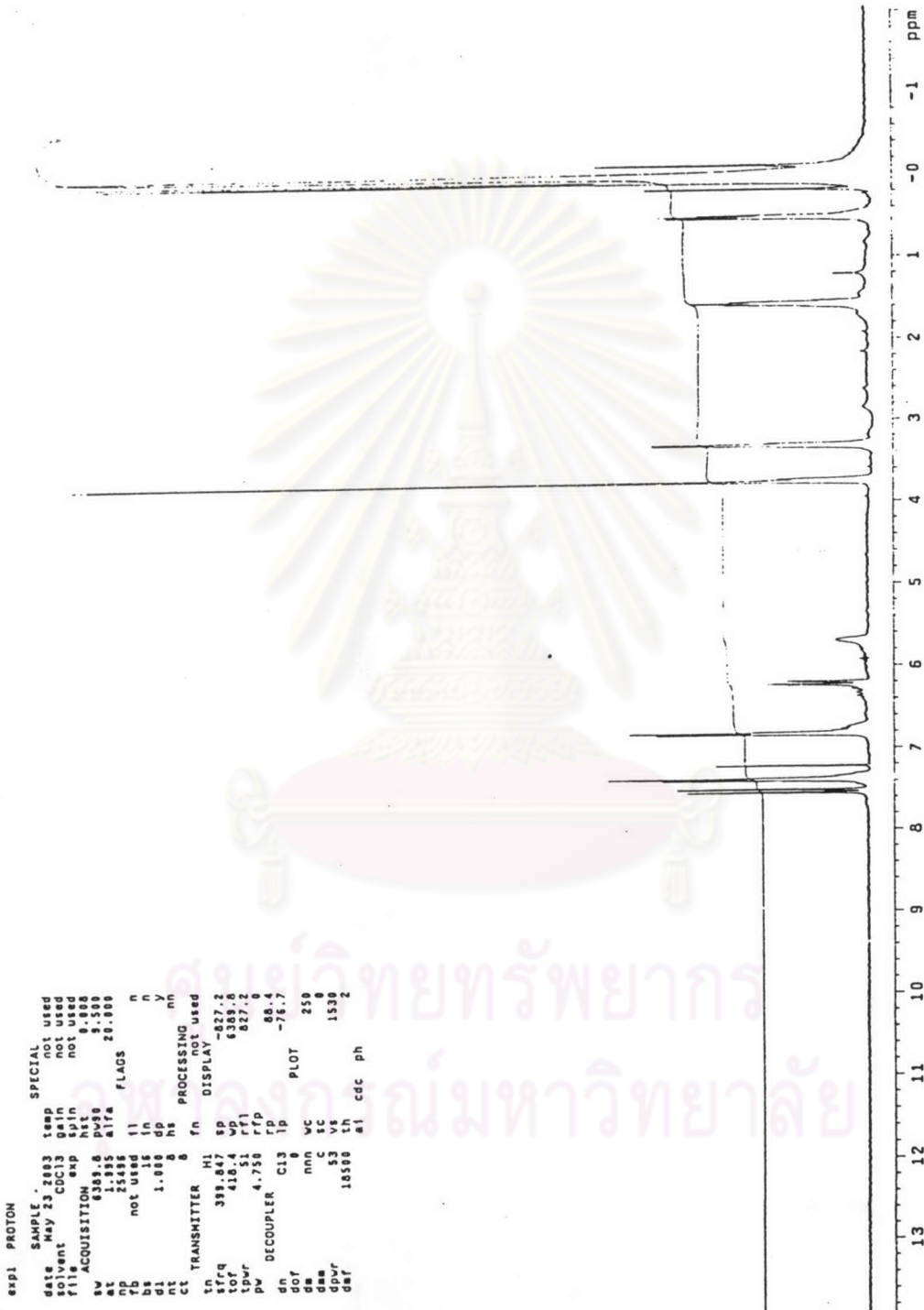


Figure B.1 ¹H-NMR spectrum of [3-(p-methoxycinnamido)propyl](methyl)-dimethylsiloxane copolymer; G-AS

Date Collected on: mercury400-mercury400
 Archive directory: /home/mruser/vmr/sys/data
 Sample directory: 1888_1813-04-23
 File: CARBON

Pulse Sequence: szpul

Solvent: CDCl₃
 Temp. 19.9 C / 293.1 K
 Relax. delay 1.000 sec
 Pulse 45.0 degrees
 Acq. time 1.139 sec
 Width 25125.6 Hz
 5000 repetitions
 OBSERVE C13, 100.641062 MHz
 DECOUPLE H1, 399.846414 MHz
 Continuously on
 VOLTAGE modulated
 DATA PROCESSING
 Line broadening 1.0 Hz
 FI size 65536
 Total time 3 hr, 10 min

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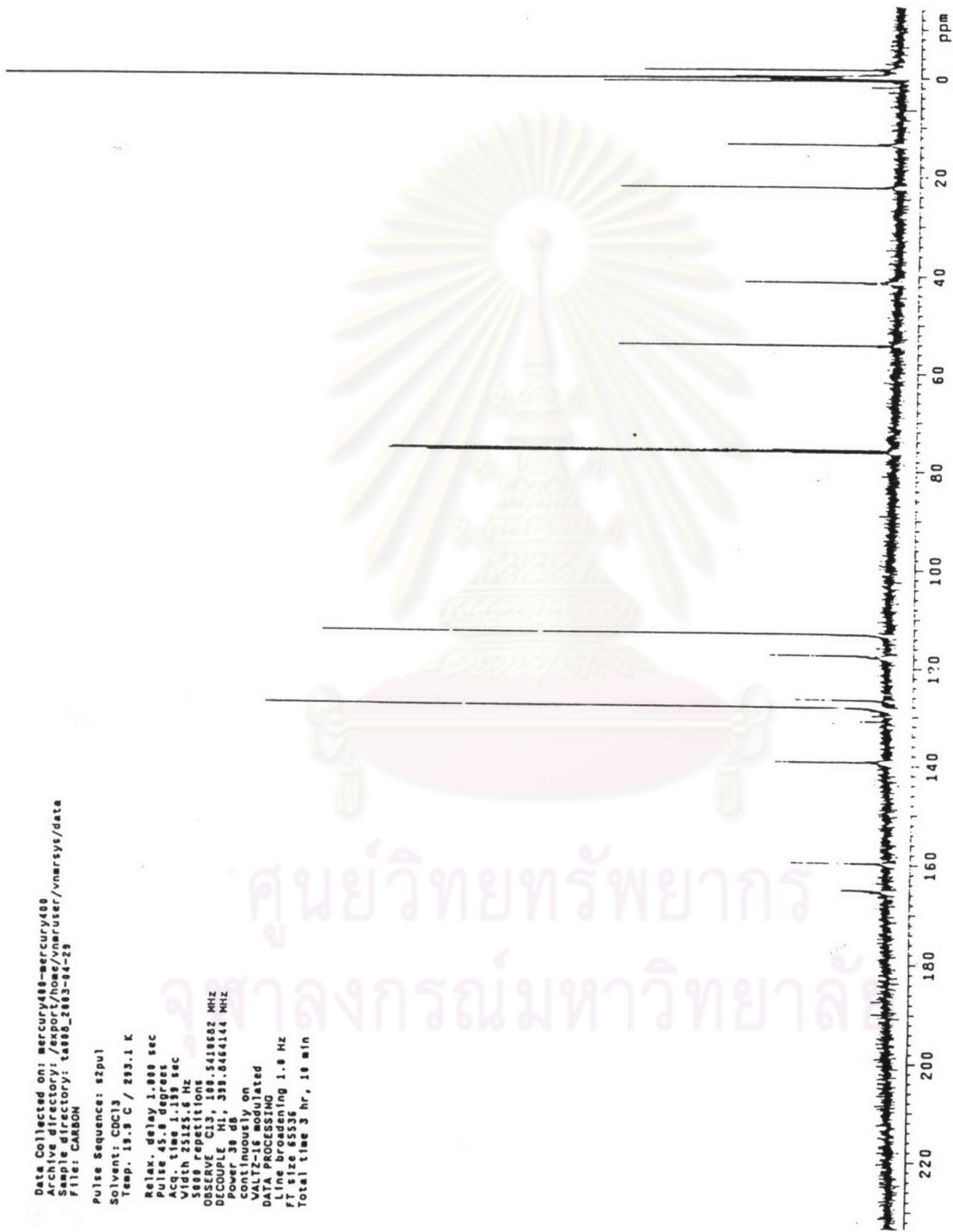


Figure B.2 ¹³C-NMR spectrum of [3-(*p*-methoxycinnamido)propyl](methyl)-dimethylsiloxane copolymer; G-AS

Data Collected on: mercury400-mercury400
 Archive directory: /export/home/vnmruser/vnmr4/mercury/data
 Sample directory: 16088_2803-04-28
 File: gHSQC_01

Pulse Sequence: gHSQC

Solvent: CDCl3

Relax. delay 1.000 sec
 Acq. time 0.150 sec
 Width 6418.3 Hz
 2D Width 17894.6 Hz
 4 repetitions
 2 x 28 increments
 DECOUPLE C13, 189.546667 MHz
 Power 53 db
 on during acquisition
 off during delay

DATA PROCESSING
 F1 DATA PROCESSING 7.769 sec
 F2 DATA PROCESSING 9.822 sec
 Gauss: apodization 9.822 sec
 FT size 2848 x 4896
 Total time 36 min

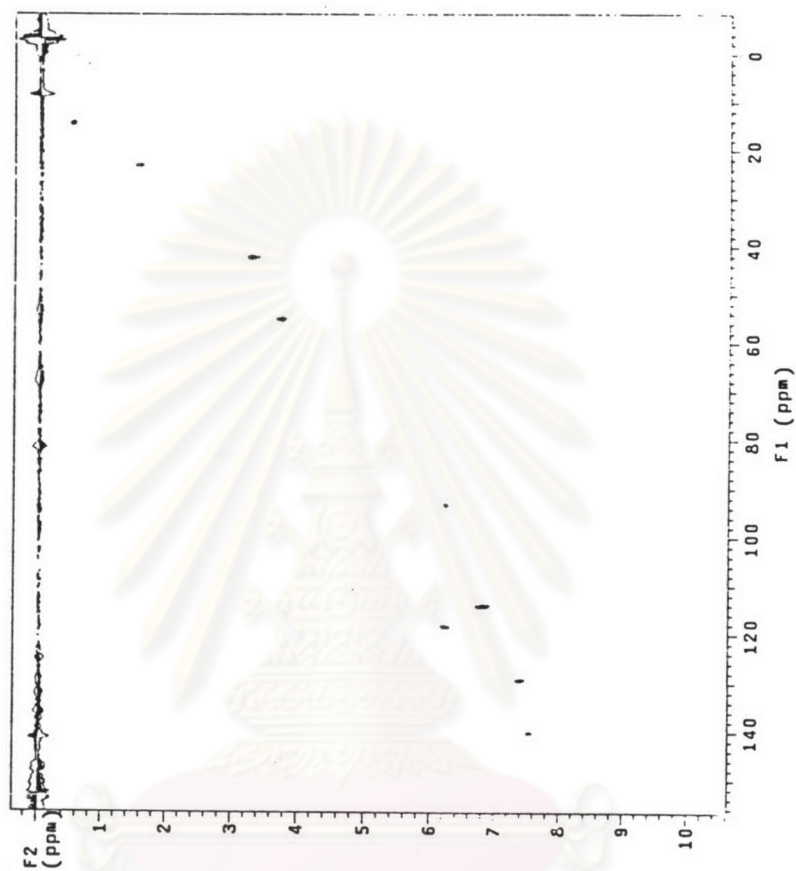


Figure B.3 gHSQC NMR spectrum of [3-(*p*-methoxycinnamido)propyl](methyl)-dimethylsiloxane copolymer; G-AS

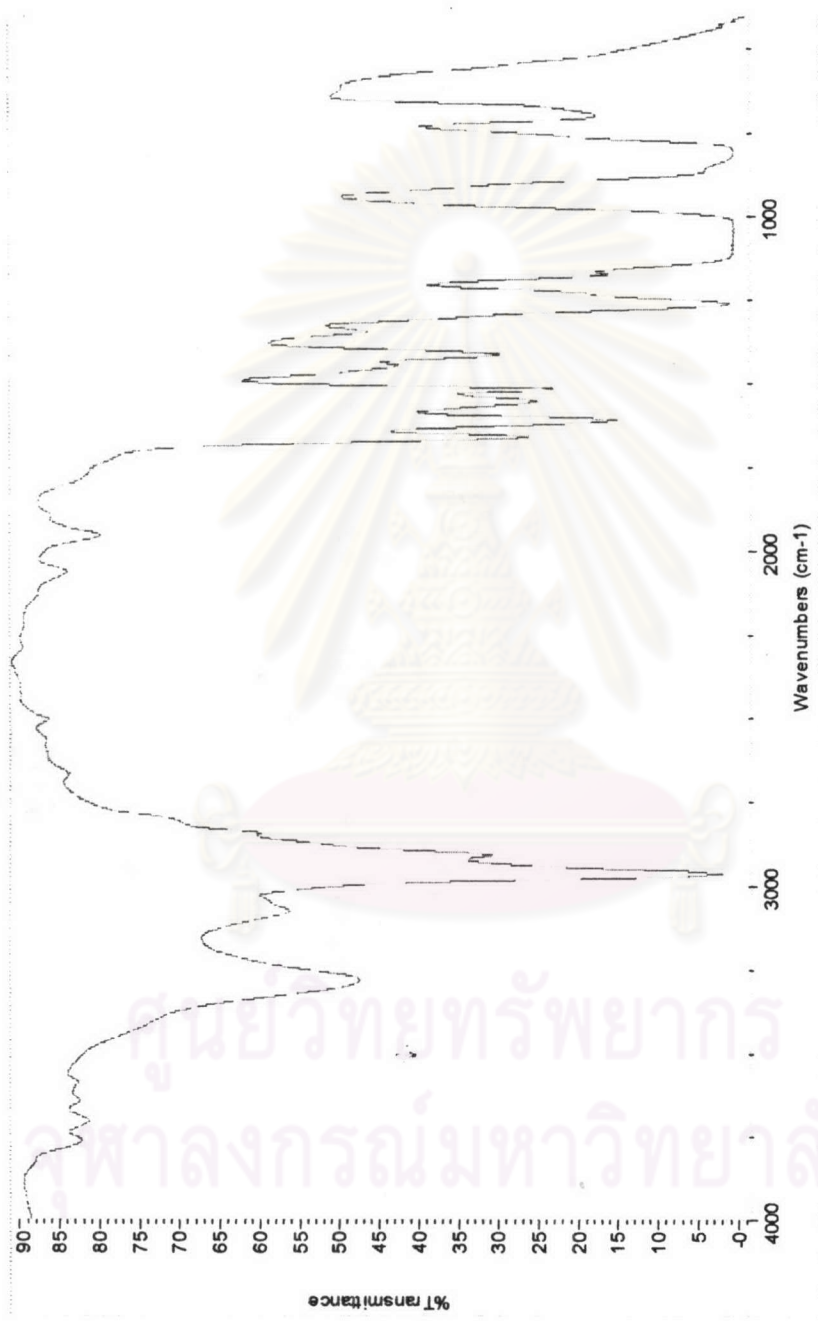


Figure B.4 IR spectrum of [3-(*p*-methoxycinnamido)propyl]-dimethylsiloxane copolymer; G-AS



Figure B.5 GPC chromatogram of polystyrene standard

Vial	5	Sample Type	Broad Unknown
Injection	1	Date Acquired	7/22/03 1:06:12 PM
Injection Volume	100.00 ul	Acq Method Set	MethR_THF_30C_4
Channel	SATIN	Processing Method	ProcR_THF_30C_4
Run Time	22.0 Minutes	Date Processed	7/22/03 2:01:35 PM

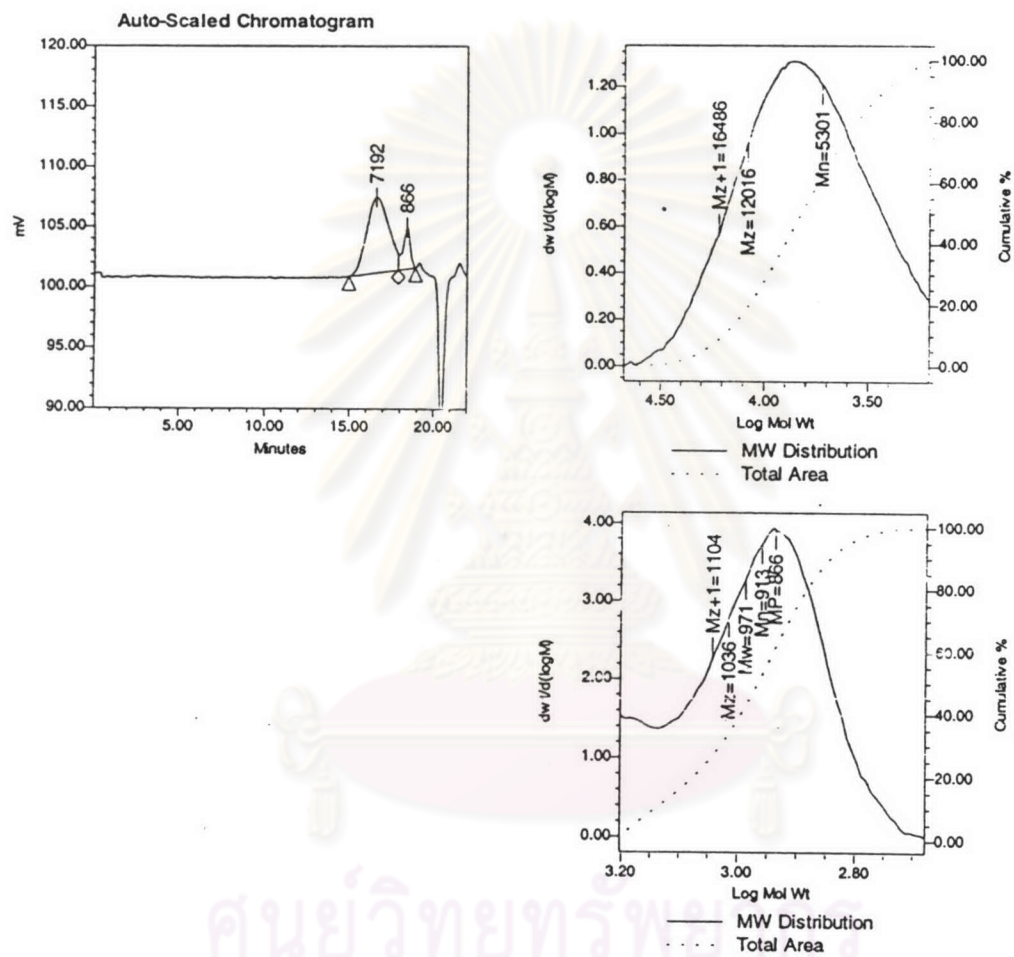


Figure B.6 GPC chromatogram of [3-(*p*-methoxycinnamido)propyl](methyl)-dimethylsiloxane copolymer; G-AS

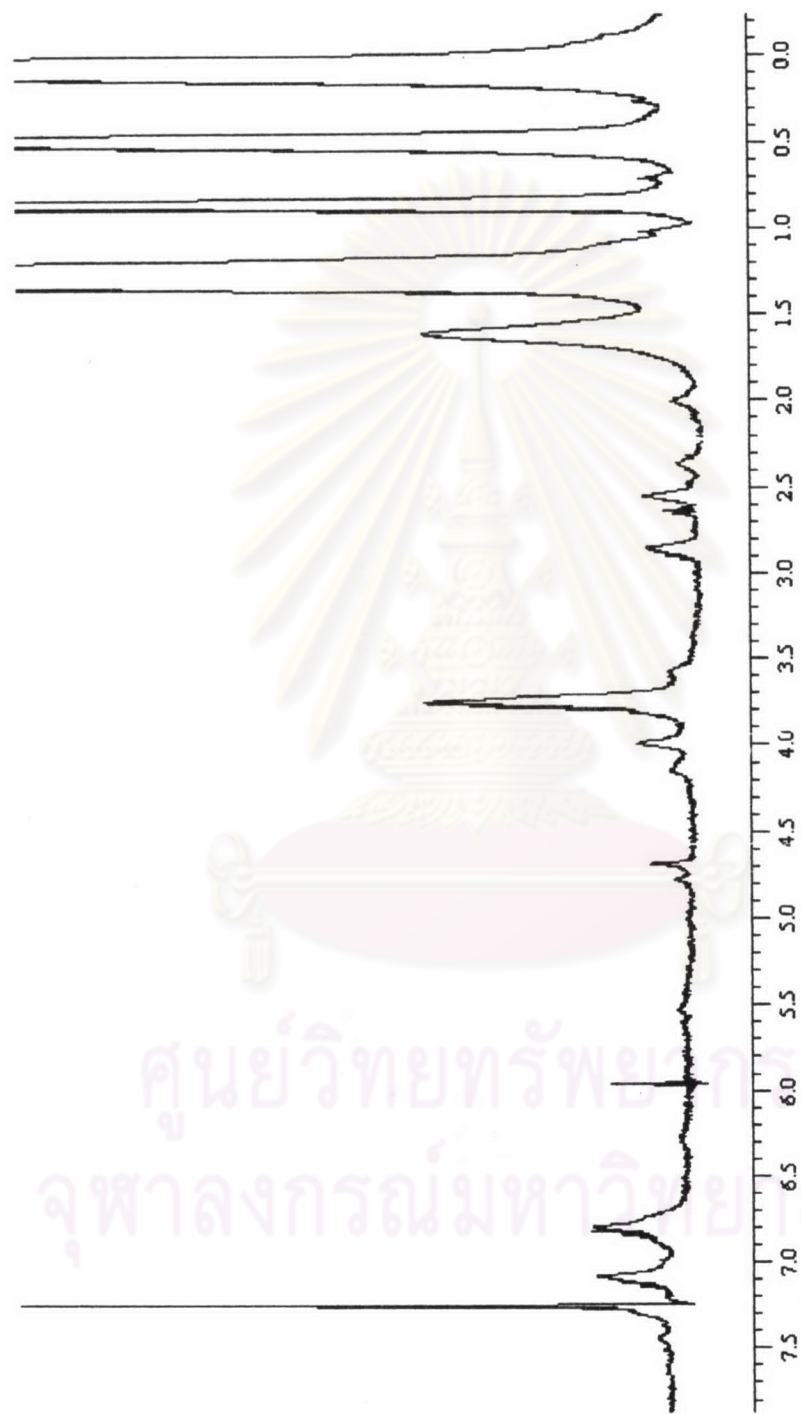


Figure B.7 $^1\text{H-NMR}$ spectrum of poly[(methyl)(octyl)(propyl)-4-methoxycinnamatesiloxane]; G-MHS

Data Collected on: mercury400-mercury400
 Archive directory: /export/home/vmruser/vmruser/data
 Sample directory: sw02_2803-86-17
 File: CARBON

Pulse sequence: szpu1

Solvent: CDCl₃
 Temp: 28.3 C / 293.4 K

Relax. delay 1.000 sec

Pulse 45.0 degrees

Acq. time 1.199 sec

Width 25125.6 Hz

Observed C13, 5489317 MHz

DECOUPLE H1, 399.8464144 MHz

Power 38 db

continuously on

WALTZ-16 modulated

DATA PROCESSING

FT low resolution 1.0 Hz

PT low resolution 0.5559

Total time 9 min



Figure B.8 ¹³C-NMR spectrum of poly[(methyl)(octyl)(propyl)-4-methoxycinnamatesiloxane]; G-MHS

SILAXANE-29SI

30-JUL-2003 09:37:26.02

 * CHULALONGKORN UNIVERSITY *
 * JNM-A500 *

SF1LE : (.D) SILAXANE-29SI
 COMNT : S:LAXANE-29SI

EXMOD : SINGL
 IRMOD : BCM
 POINT : 16384
 FREQU : 39682.54 Hz
 SCANS : 400
 DUMMY : 4
 ACQTM : 0.4129 sec
 PD : 10.0000 sec
 RGAIN : 23
 PW1 : 15.00 usec
 OBNUC : 29SI
 OBFRQ : 99.25 MHz
 OBSET : 117621.00 Hz

IRNUC : 1H
 IRFHZ : 500.00 MHz
 IRSET : 162410.00 Hz
 IRATN : 120
 IRRPW : 55.0 usec
 IRBP1 : 30
 IRBP2 : 6
 IRBNS : 0

ADBIT : 16
 CTEMP : 23.2 C
 CSPED : 12 Hz
 SLVNT : CDCL3
 RESOL : 2.42 Hz
 BF : 2.42 Hz
 REFVL : 0.00 ppm
 XE : 25833.37 Hz
 XS : -1070.54 Hz

OPERATOR :

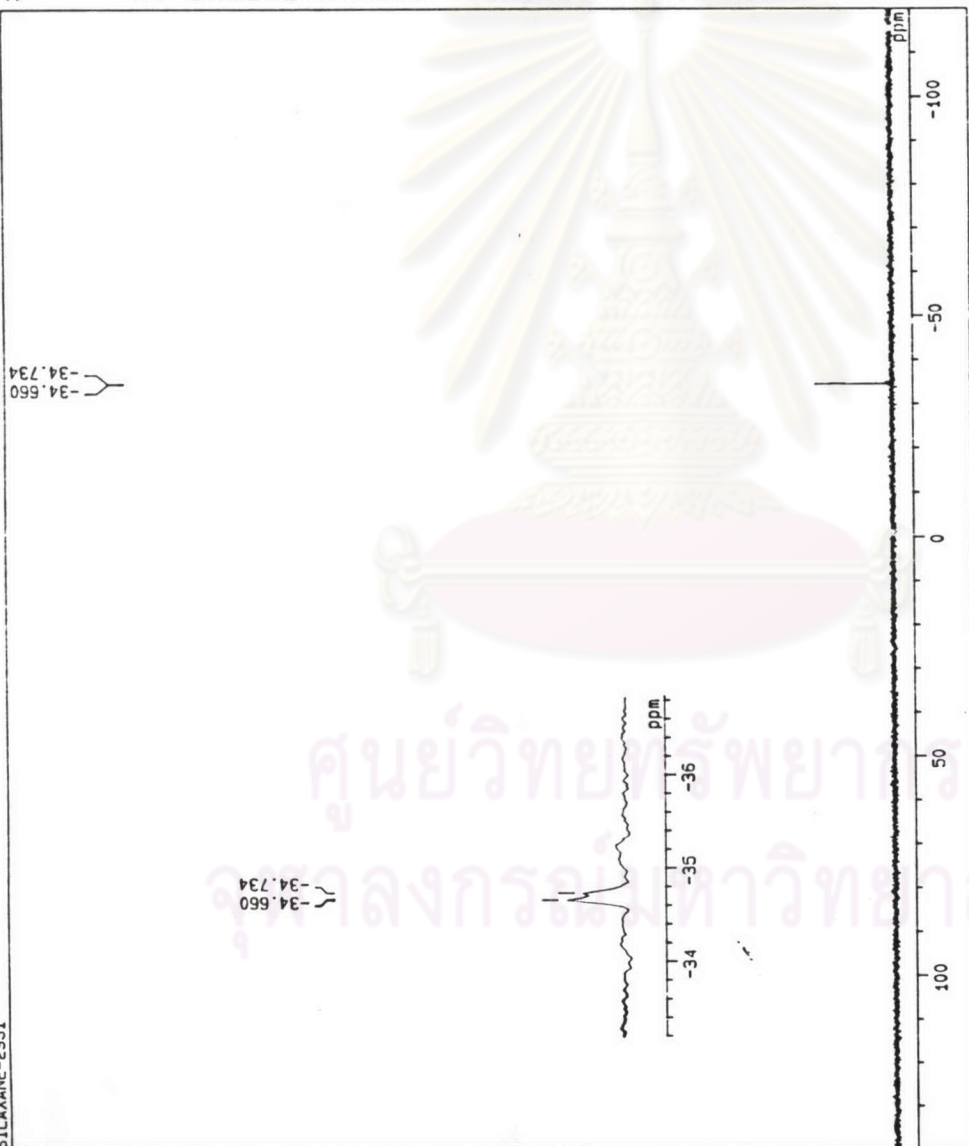


Figure B.9 ^{29}Si -NMR spectrum of Poly (methylhydrogensiloxane); MHS

-22.961

30-JUL-2003 09:43:07.25

 * CHULALONGKORN UNIVERSITY *
 * JNM-A500

SF1LE : (.D)GRAFTED-10
 COM1T : GRAFTED_PRODUCT_10X

EXHOD : SINGL
 IRMOD : BCH
 POINT : 16384
 FREQU : 39682.54 Hz
 SCANS : 800
 DUMMY : 4
 ACQTH : 0.4129 sec
 PD : 10.0000 sec
 RGATN : 23
 PW1 : 15.00 usec
 OBNUC : 29SI
 OBFRO : 99.25 MHz
 OBSET : 117621.00 Hz

IRNUC : 1H
 IRFRO : 500.00 MHz
 IRSET : 162410.00 Hz
 IRATN : 120
 TRBPW : 55.0 usec
 TRBP1 : 30
 TRBP2 : 6
 TRRNS : 0

ADBIT : 16
 CTEMP : 22.8 C
 CSPED : 14 Hz
 SLYNT : CDCL3
 RESOL : 2.42 Hz
 BF : 2.42 Hz
 REFVL : 0.00 ppm
 XE : 25833.37 Hz
 XS : -1070.54 Hz

OPERATOR :

100 50 0 -50 -100 ppm

Figure B.10 $^{29}\text{Si-NMR}$ spectrum of poly[(r-methyl)(octyl)(propyl)-4-methoxycinnamatesiloxane]; G-MHS

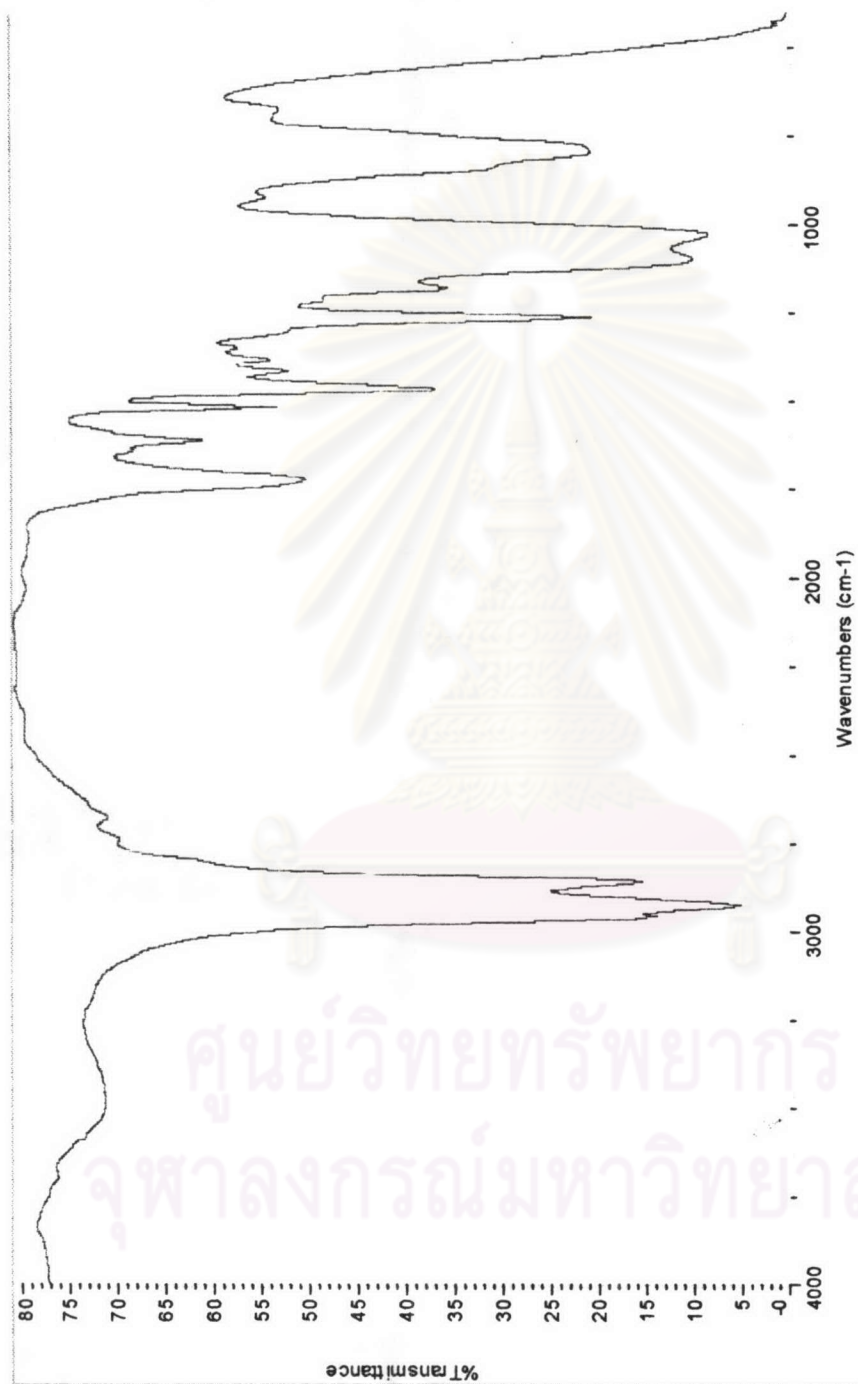


Figure B.11 IR spectrum of poly[(methyl)(octyl)(propyl)-4-methoxycinnamatesiloxane]; G-MHS

Vial	3	Sample Type	Broad Unknown
Injection	1	Date Acquired	7/22/03 12:14:48 PM
Injection Volume	100.00 μ l	Acq Method Set	MethR_THF_30C_4
Channel	SATIN	Processing Method	ProcR_THF_30C_4
Run Time	22.0 Minutes	Date Processed	7/22/03 2:00:52 PM

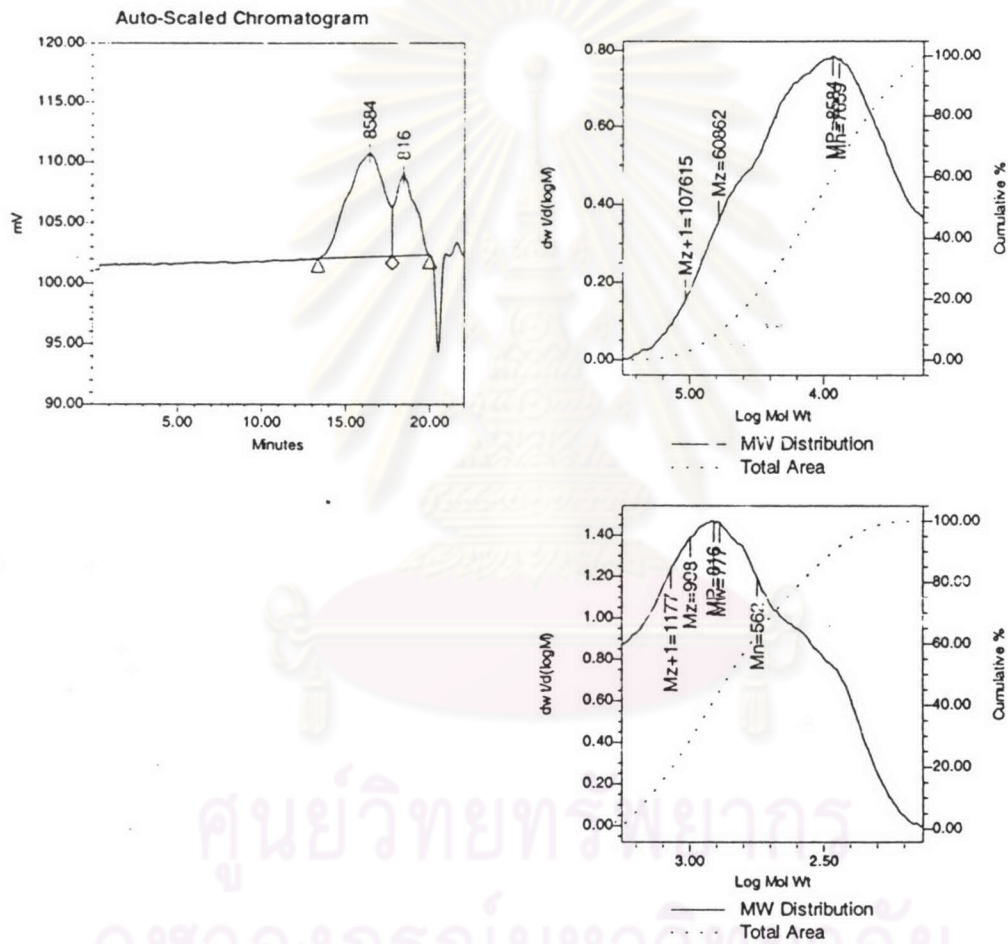


Figure B.12 GPC chromatogram of poly[(methyl)(octyl)(propyl)-4-methoxycinnamatesiloxane];

G-MHS

VITA

Ms. Nantawan Hongchinnagorn was born on August 24, 1979 in Bangkok. She received a Bachelor's Degree of Science in Chemistry from Chulalongkorn University in 2001. After that, she has started her graduate study in Organic Chemistry, Faculty of Science, Chulalongkorn University. She was awarded a teaching assistant scholarship by the Faculty of Science on 2002-2003, during her Master's degree studies. Moreover, she was supported by a research grant for her research from the Graduate School, Chulalongkorn University. She lives at 400 Sukhumvit 71 Road Wattana Bangkok 10110, Tel. 0-2381-2420, 0-1831-9795, Fax. 0-2392-2371.



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