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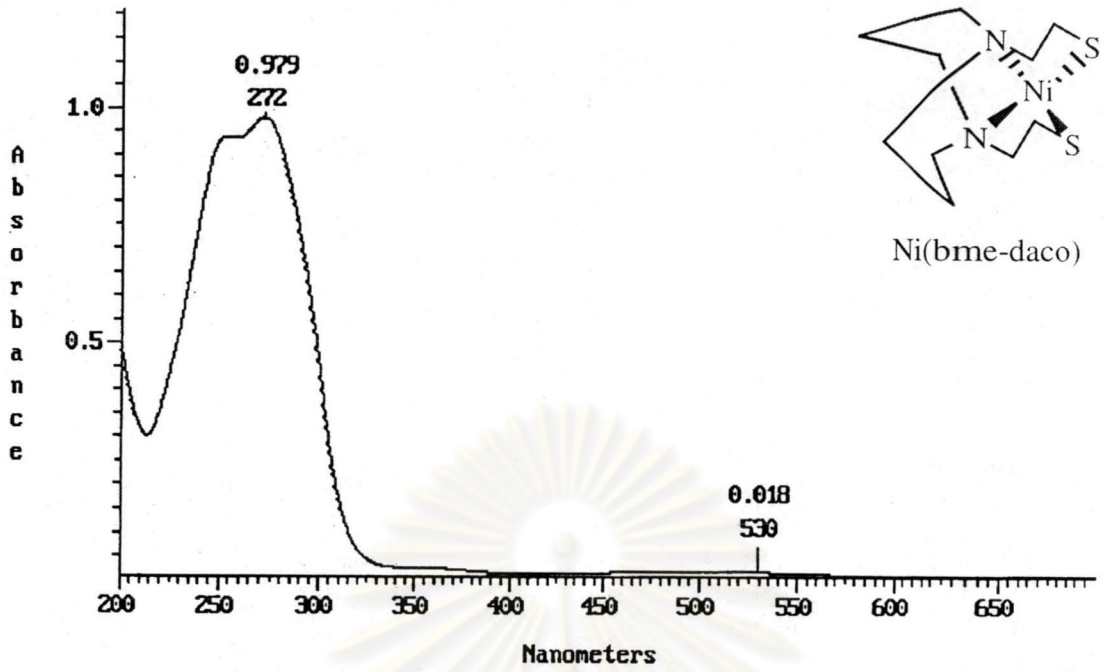
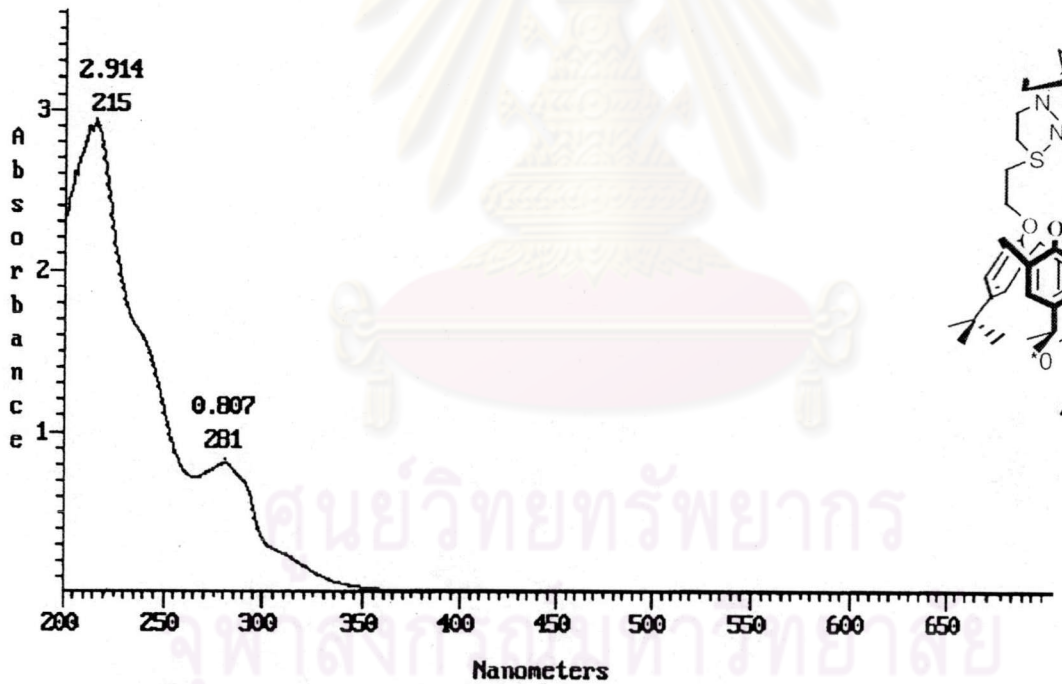
APPENDICES

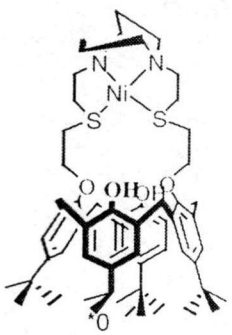
APPENDIX A



Ni(bme-daco)

Figure A.1 UV spectrum of Ni(bme-daco)





4

Figure A.2 UV spectrum of Ni(bme-daco)diethylcalix[4]arene (**4**)

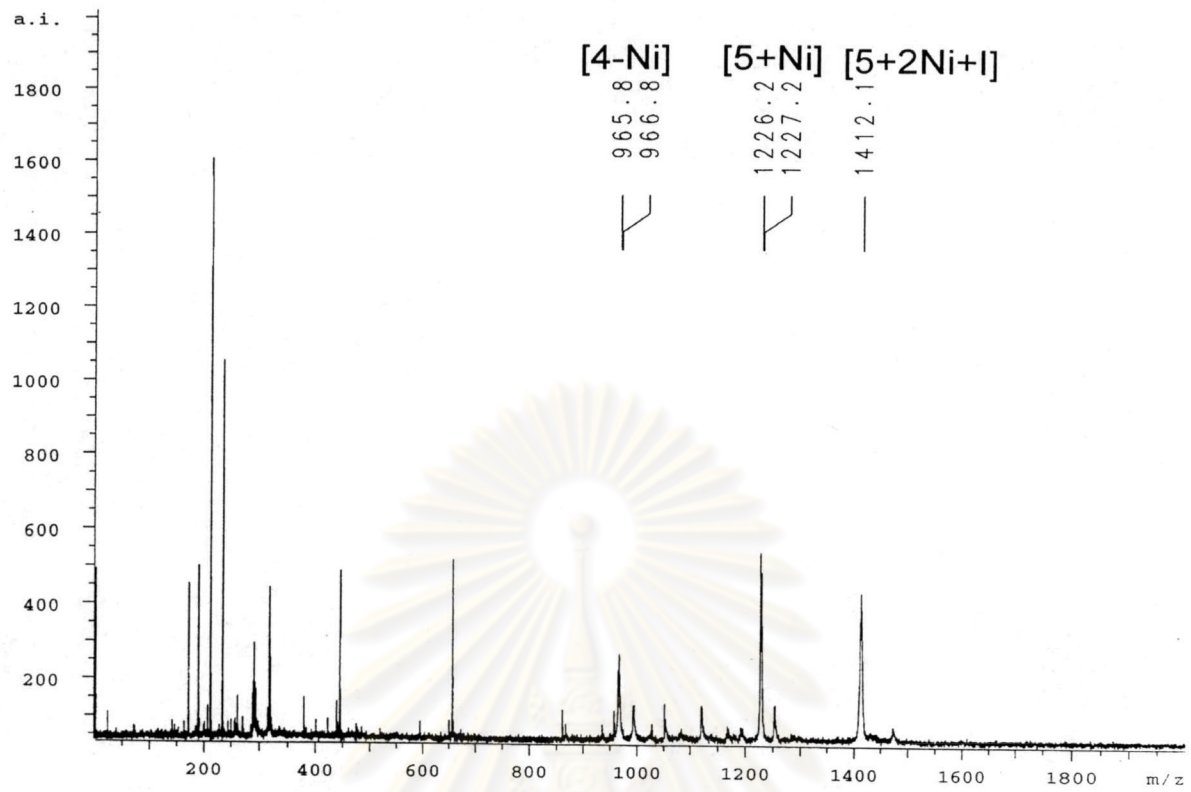


Figure A.3 Mass Spectrum (MALDI-TOF) of 25,27-*N,N'*-Ni(mercaptoethyl)-1,5-diaza cyclooctaneethyl-*p-tert*-butylcalix[4]arene (**4**)

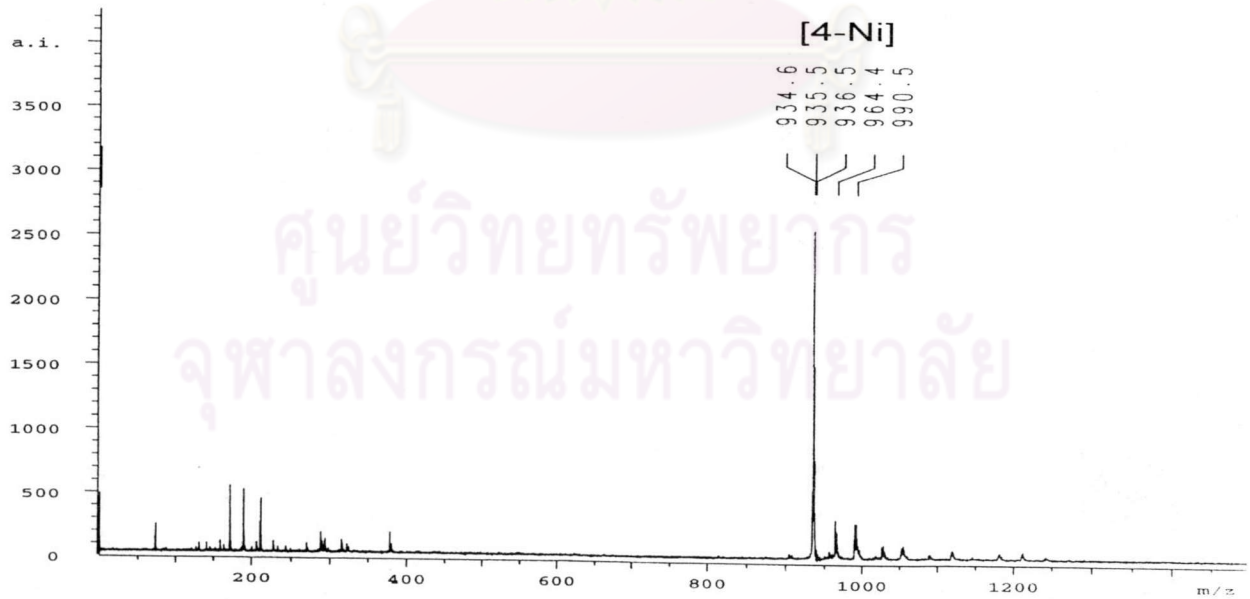
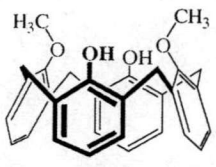


Figure A.4 Mass Spectrum (MALDI-TOF) of 25,27-*N,N'*-bisNi(mercaptoethyl)-1,5-diaza cyclo octaneethyl-*p-tert*-butylcalix[4]arene (**5**)



1a

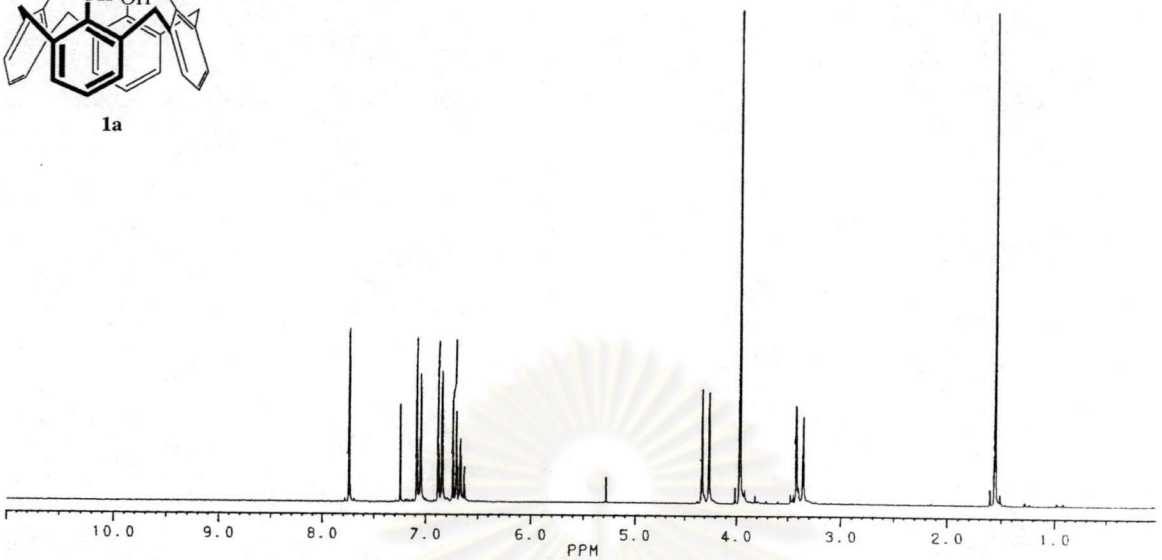
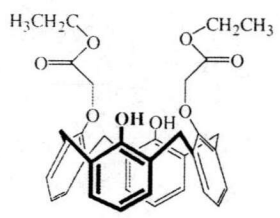


Figure A.5 ^{1}H-NMR spectrum of 26, 28-dimethoxycalix[4]arene (**1a**) in $CDCl_3$ with 200 MHz



1b

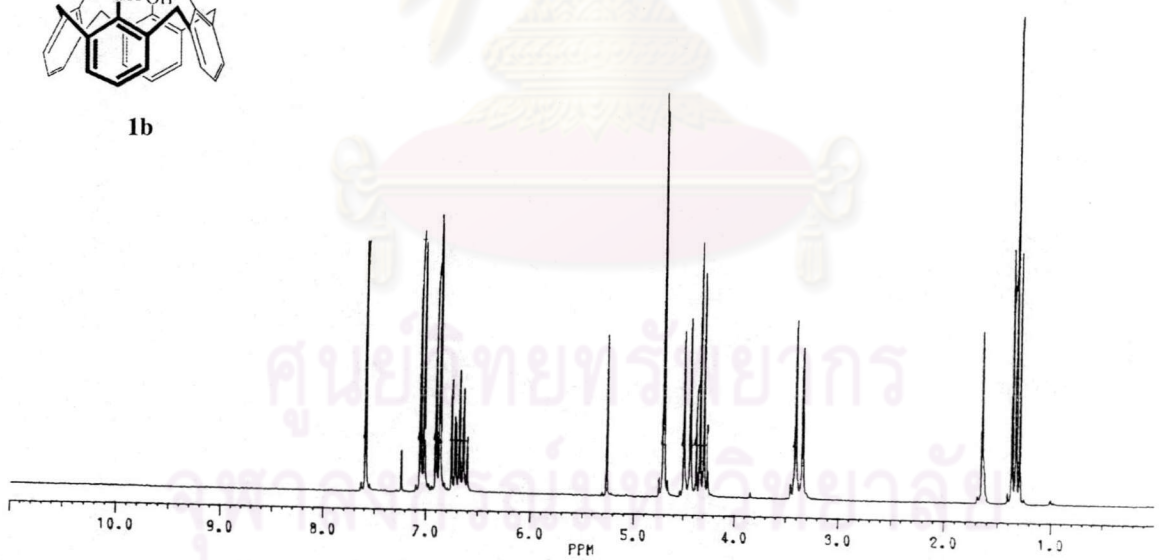


Figure A.6 ^{1}H-NMR spectrum of 26,28-dimethylethylestercalix[4]arene (**1b**) in $CDCl_3$ with 200 MHz

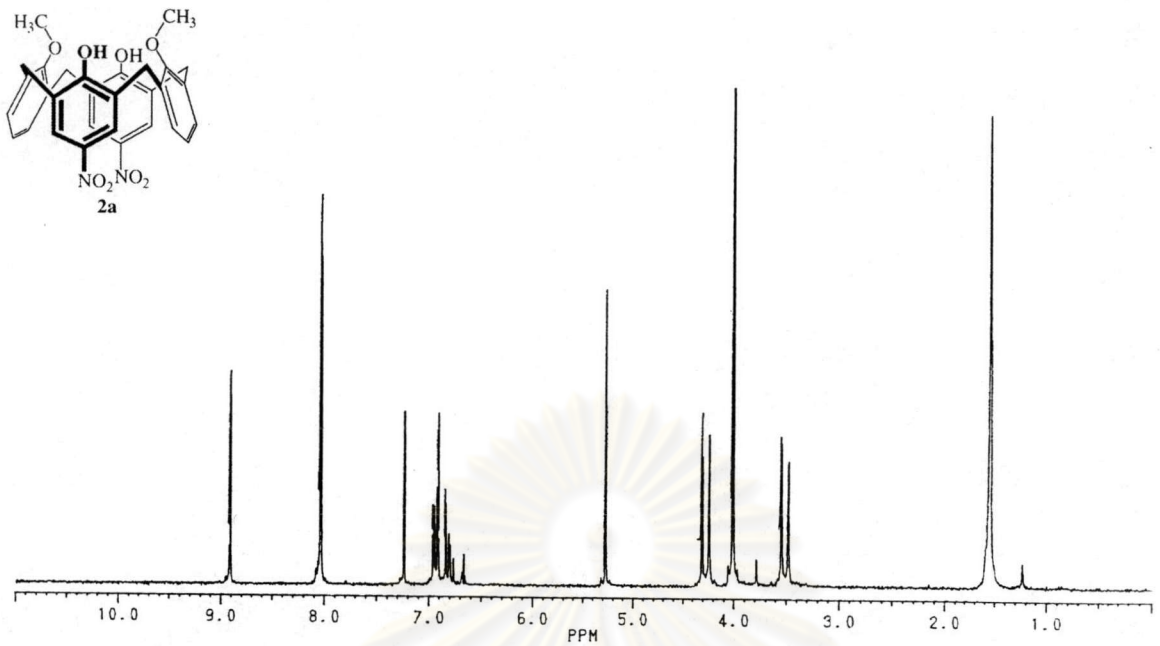


Figure A.7 1H-NMR spectrum of 5,7-dinitro-26,28-dimethoxycalix[4]arene (**2a**) in $CDCl_3$ with 200 MHz

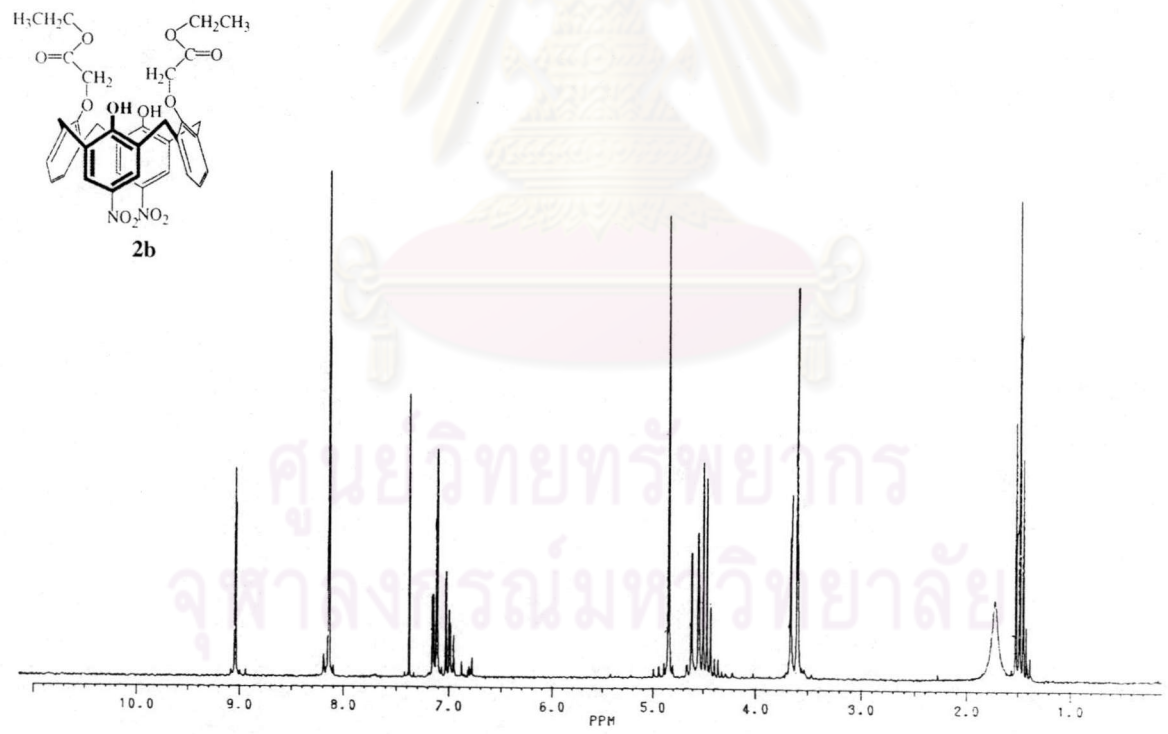
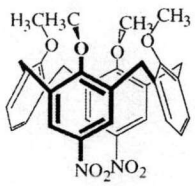


Figure A.8 ^{1}H-NMR spectrum of 5,7-dinitro-26,28-dimethylethylestercalix[4]arene (**2b**) in $CDCl_3$ with 200 MHz



3a

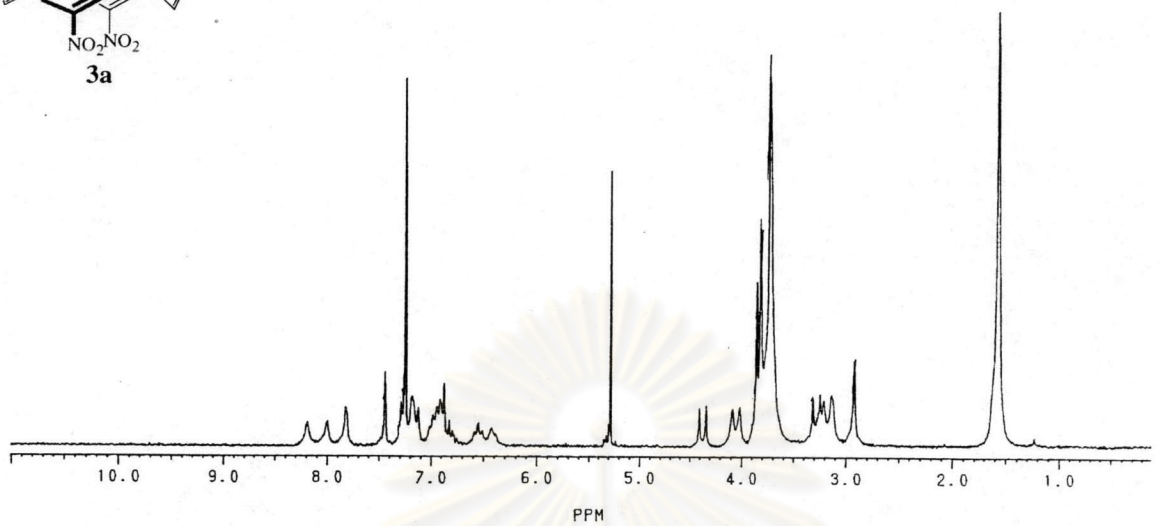
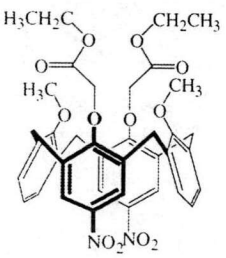


Figure A.9 ^{1}H-NMR spectrum of 5,7-dinitro-25,26,27,28-tetramethoxycalix[4]arene (**3a**) in $CDCl_3$ with 200 MHz



3b

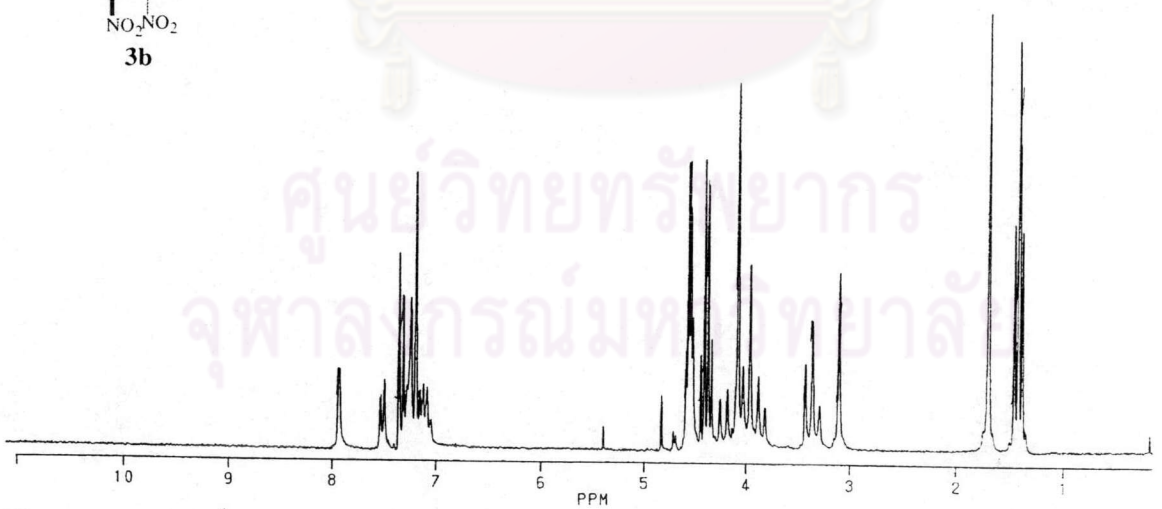
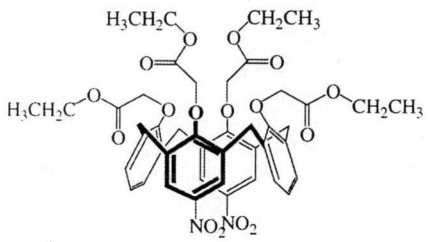


Figure A.10 ^{1}H-NMR spectrum of 5,7-dinitro-25,26,27,28-dimethoxydimethylethyl estercalix[4]arene (**3b**) in $CDCl_3$ with 200 MHz



3c

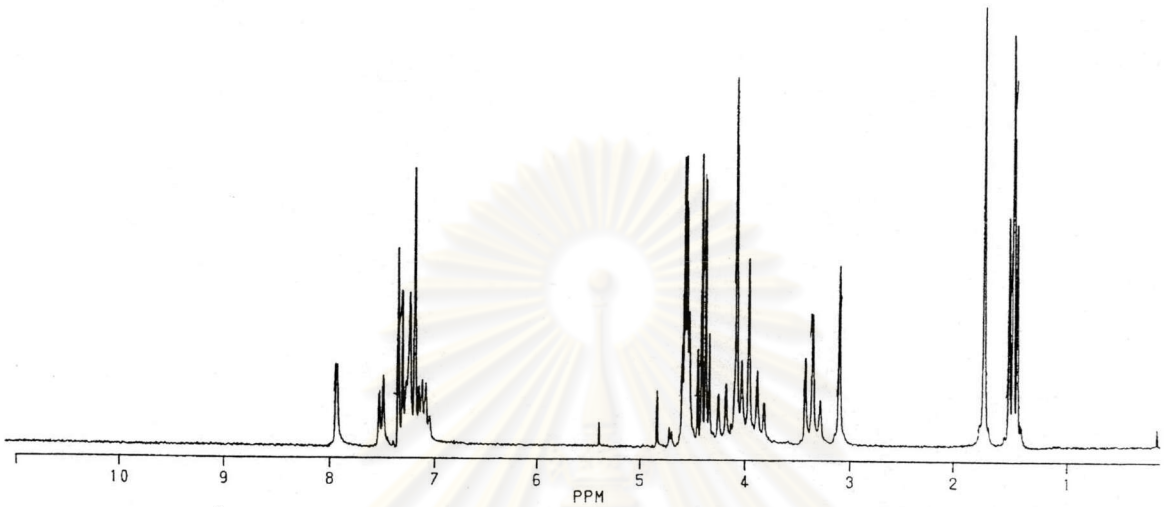
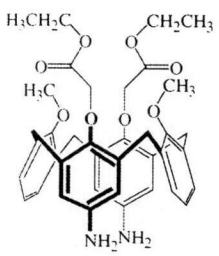


Figure A.11 ^{1}H-NMR spectrum of 5,7-dinitro-25,26,27,28-dimethoxydimethylethyl estercalix[4]arene (**3b**) in $CDCl_3$ with 200 MHz



4b

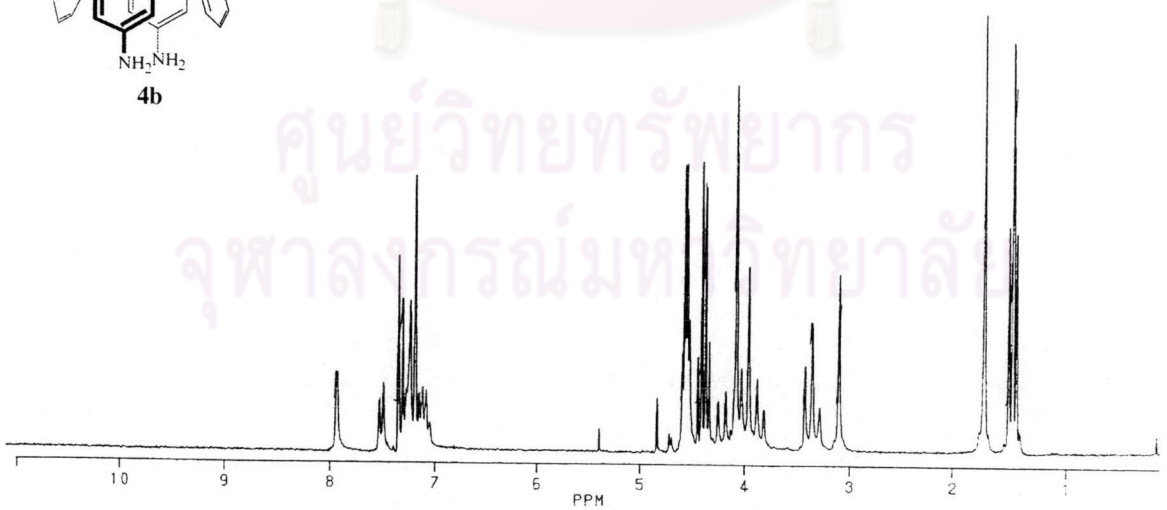
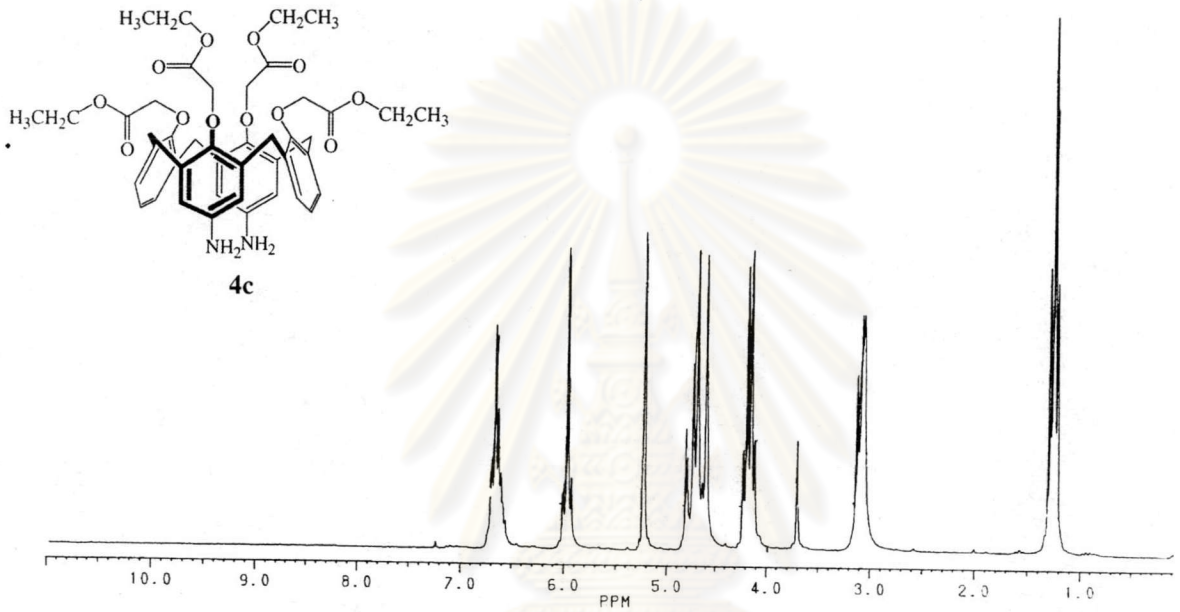


Figure A.12 ^{1}H-NMR spectrum of 5,7-dinitro-25,26,27,28-dimethoxydimethylethyl estercalix[4]arene (**3b**) in $CDCl_3$ with 200 MHz



4c

Figure A.13 ^{1}H-NMR spectrum of 5,7-diamino-25,26,27,28-tetramethylethylestercalix[4]arene (**4c**) in $CDCl_3$ with 200 MHz

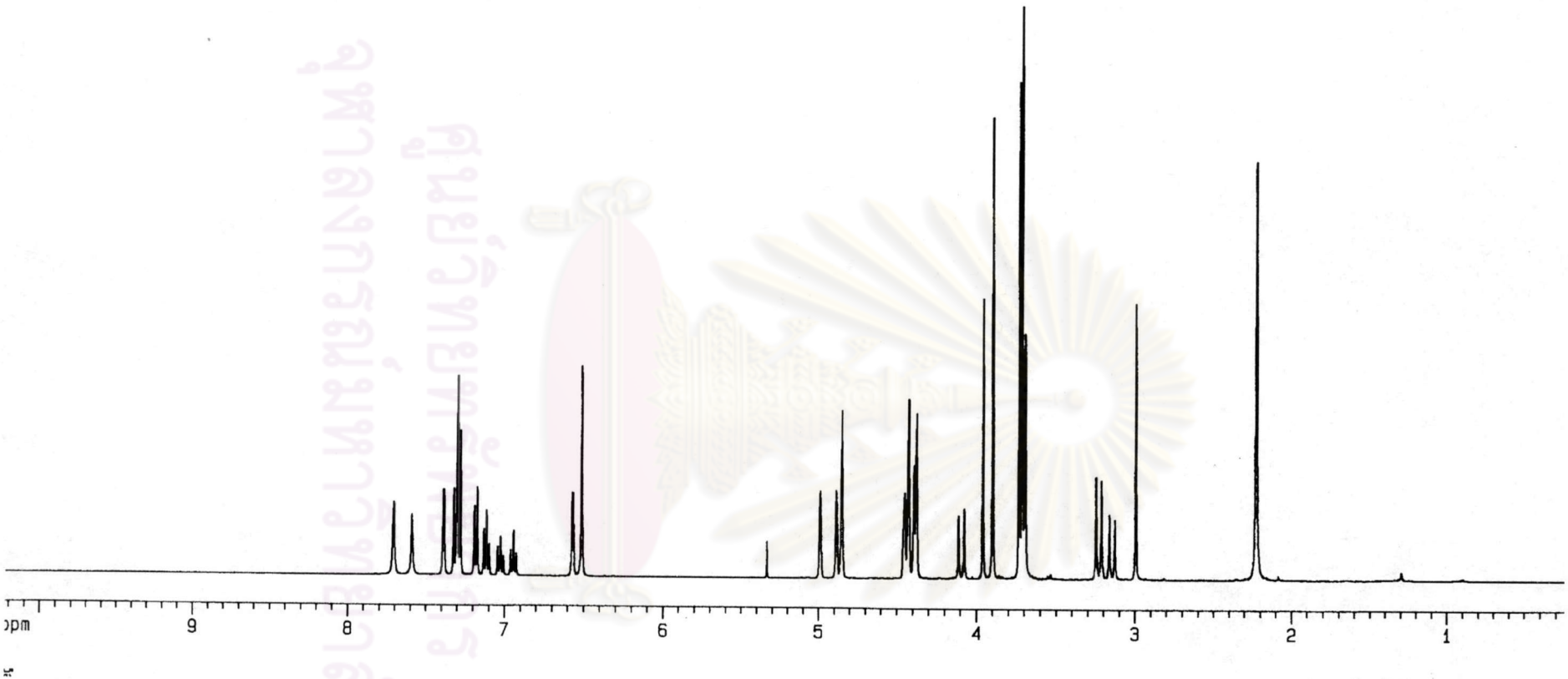


Figure A.14 ^{1}H-NMR of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

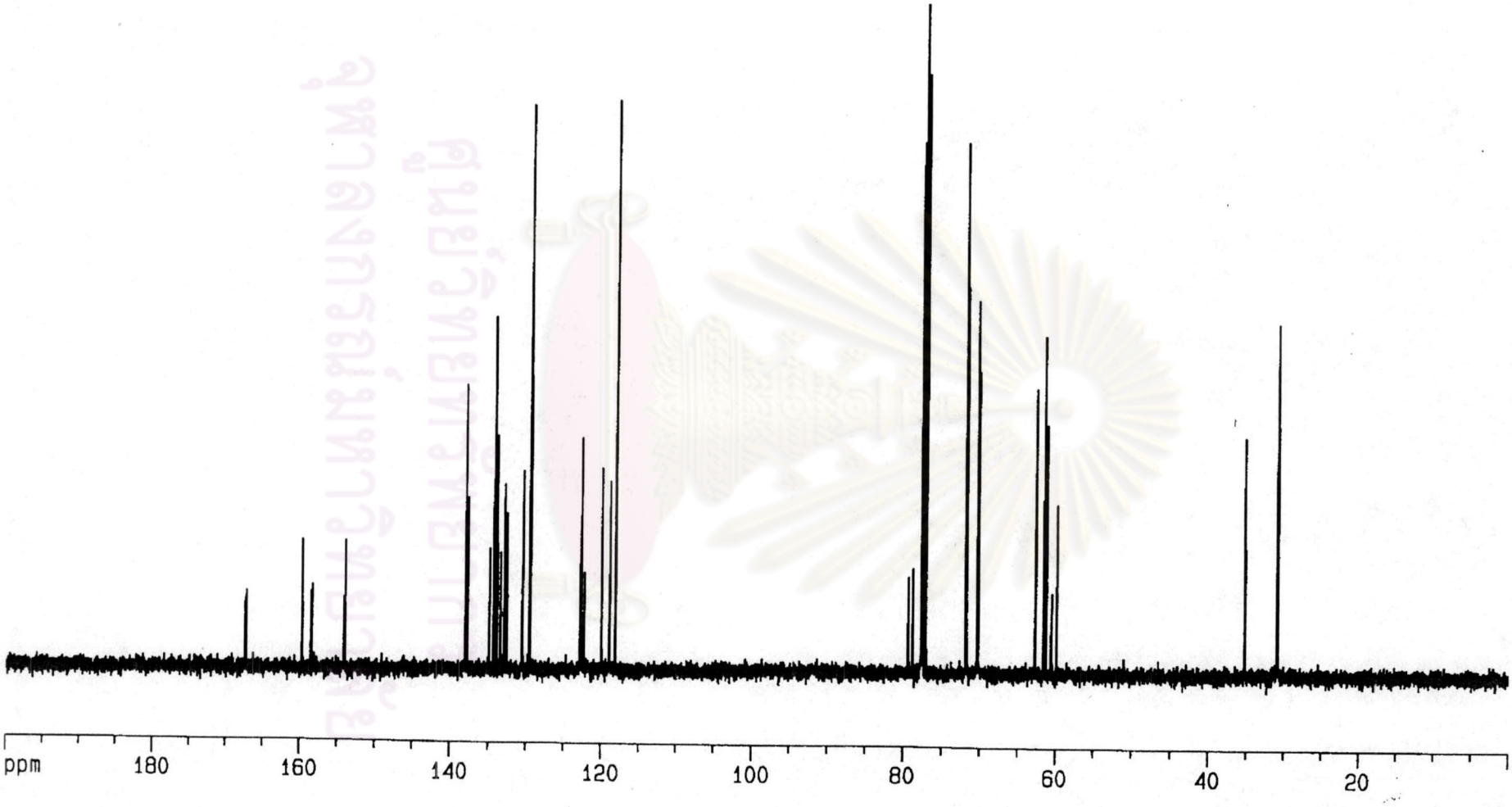


Figure A.15 ^{13}C-NMR of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

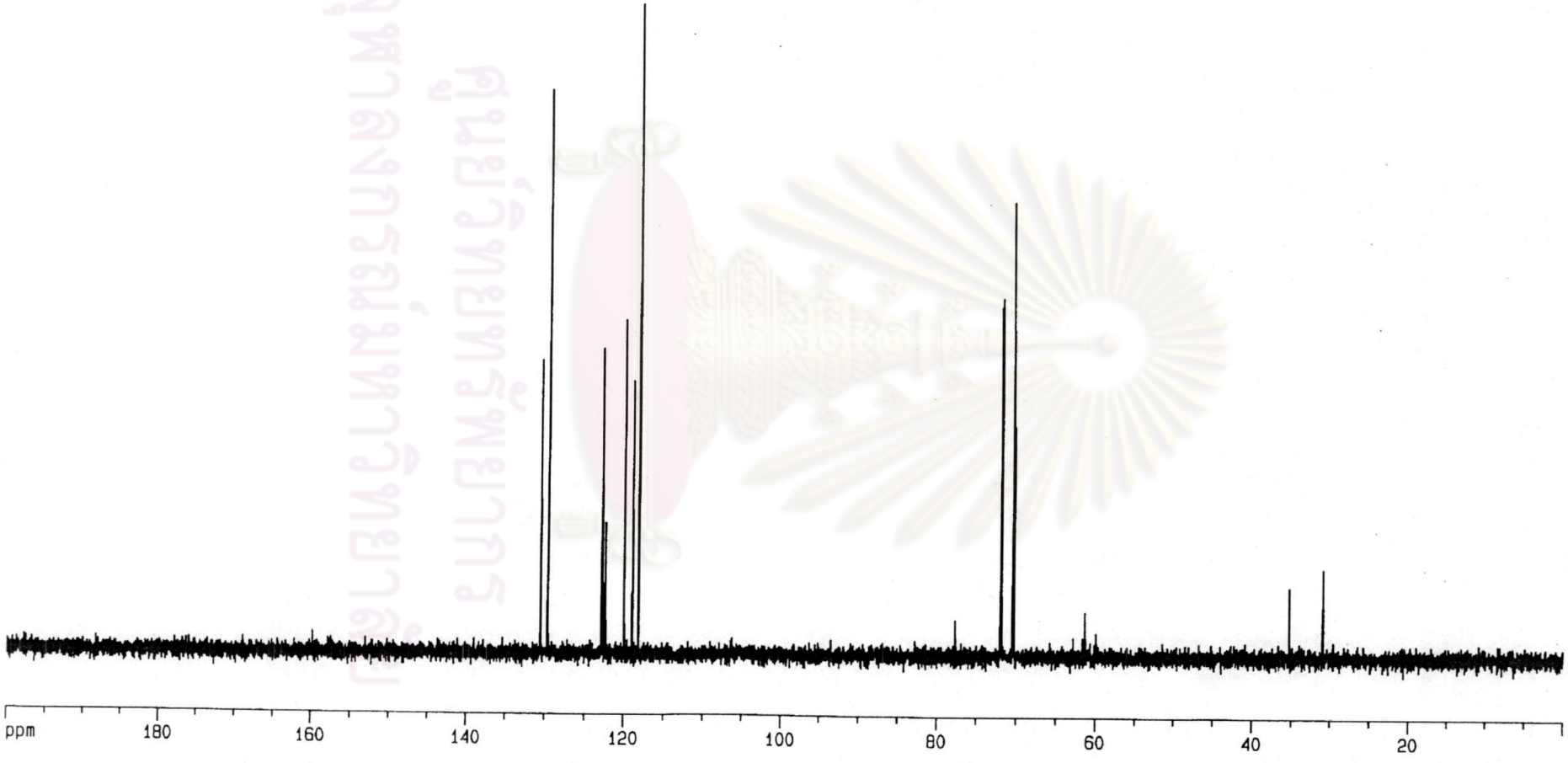
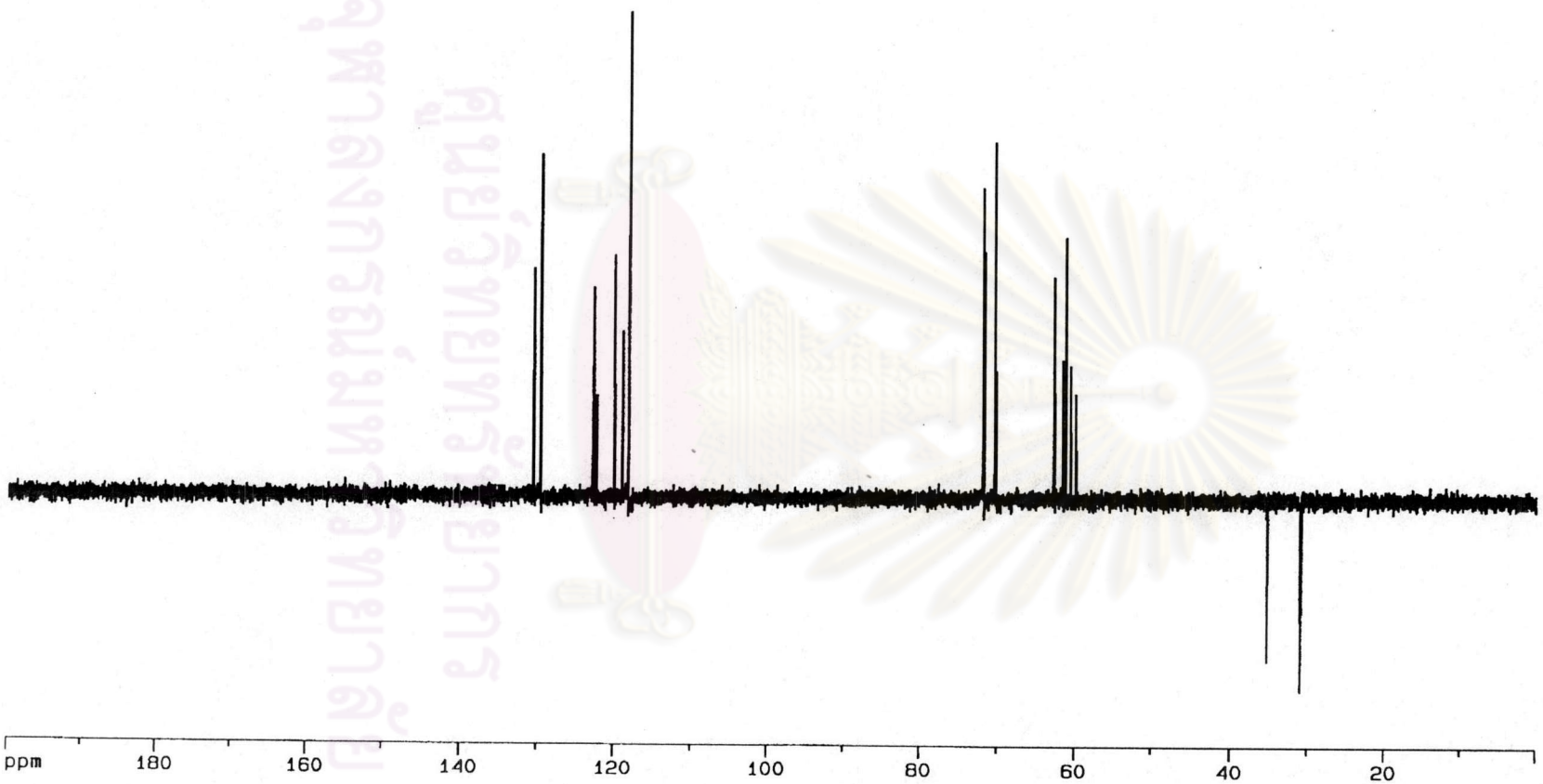


Figure A.16 ^{13}C-DEPT-90 of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz



Fgure A.17 ^{13}C-DEPT-135 of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

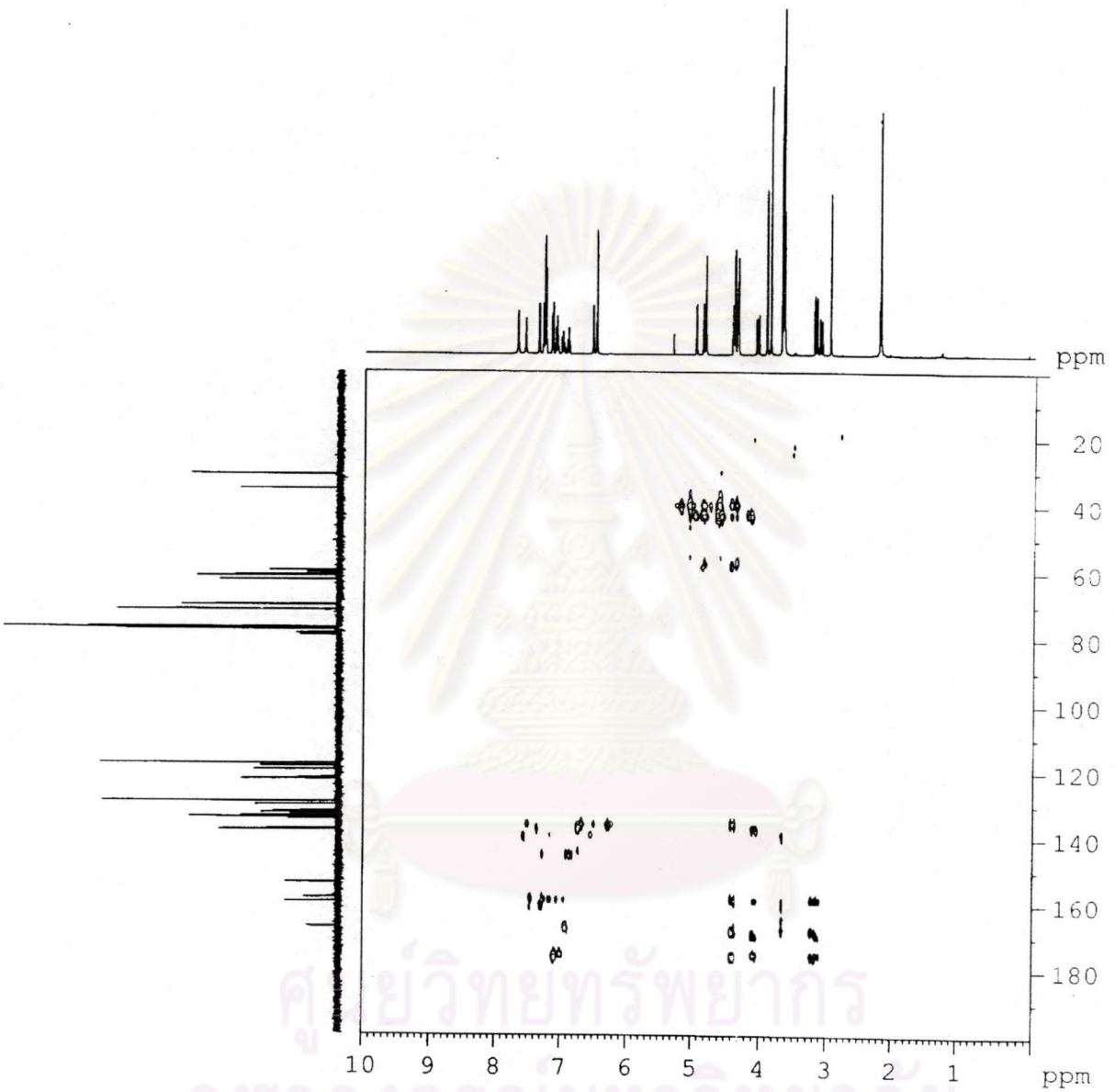


Figure A.18 HMBC of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

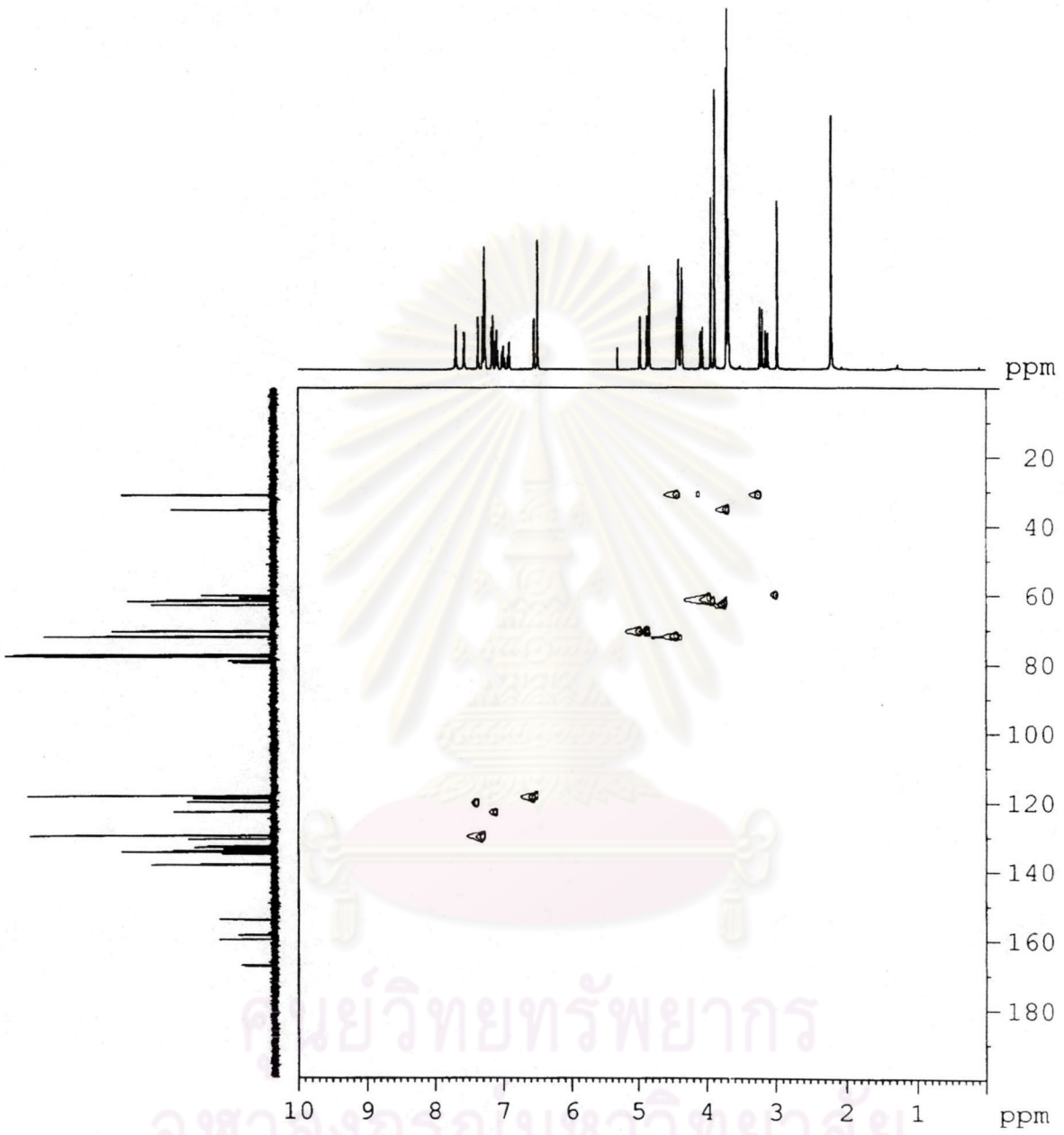


Figure A.19 HMQC of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

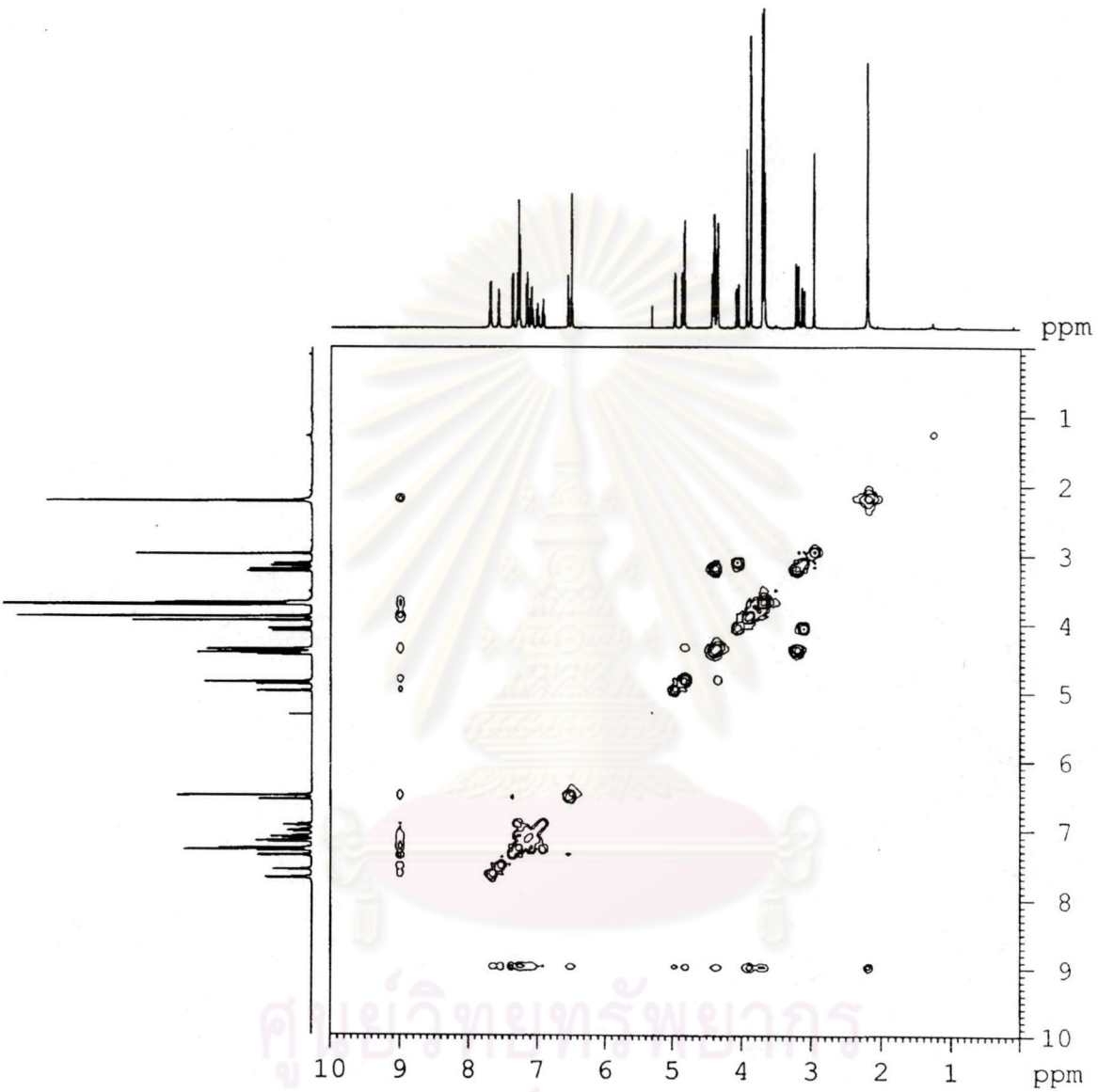


Figure A.20 COSY of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

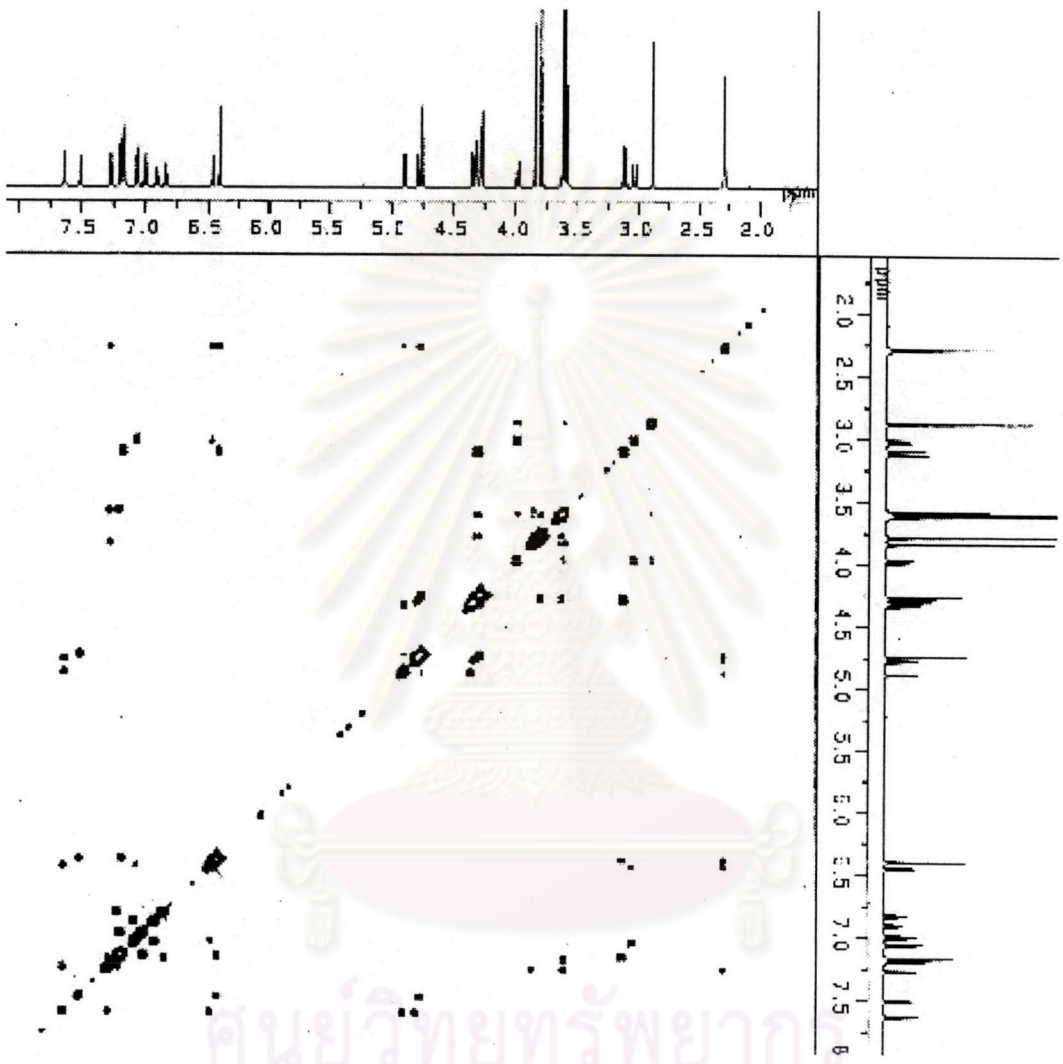


Figure A.21 NOESY of 5,7-diamideferrocenyl-25,26,27,28-tetramethoxycalix[4]arene (**5a**) in $CDCl_3$ 400 MHz

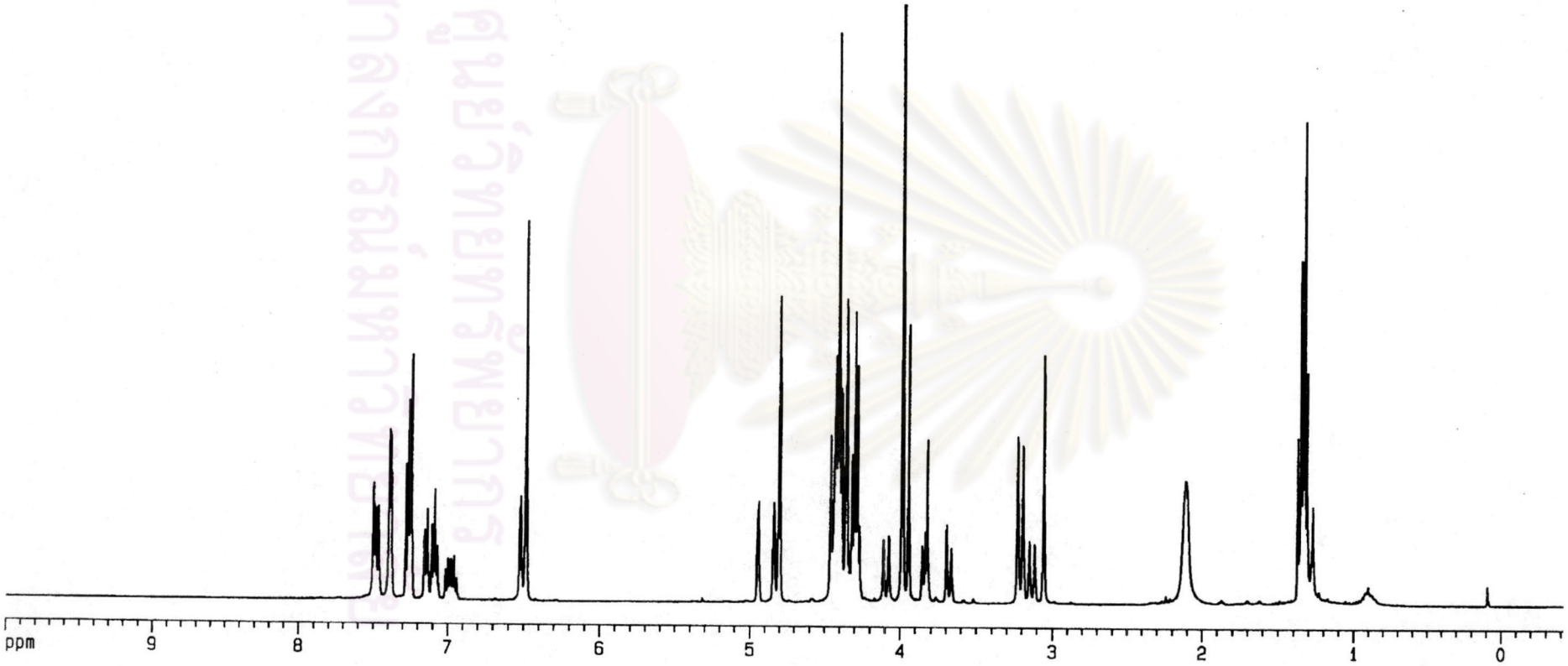


Figure A.22. ^{1}H-NMR of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz

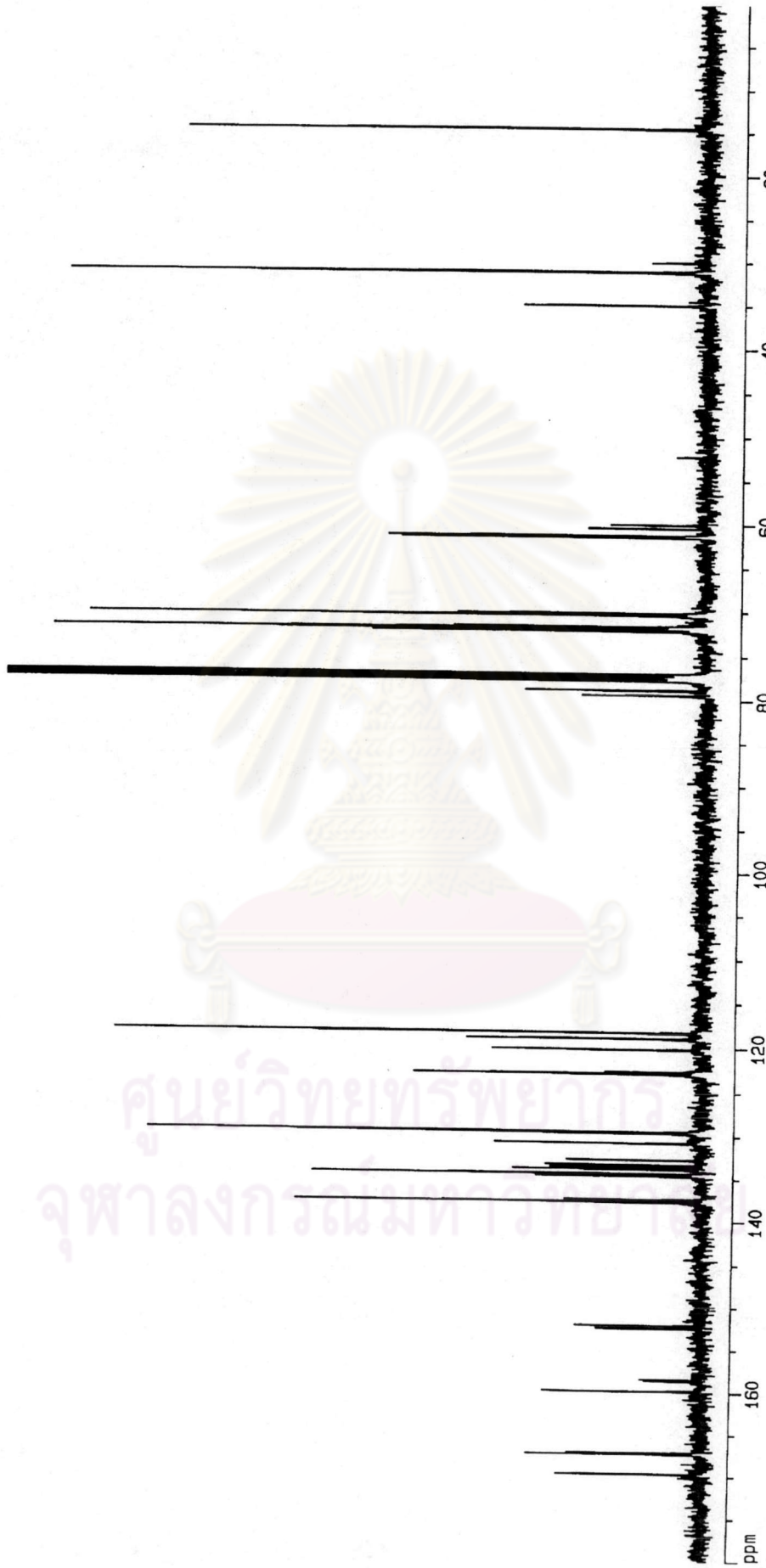


Figure A.23. ^{13}C-NMR of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz

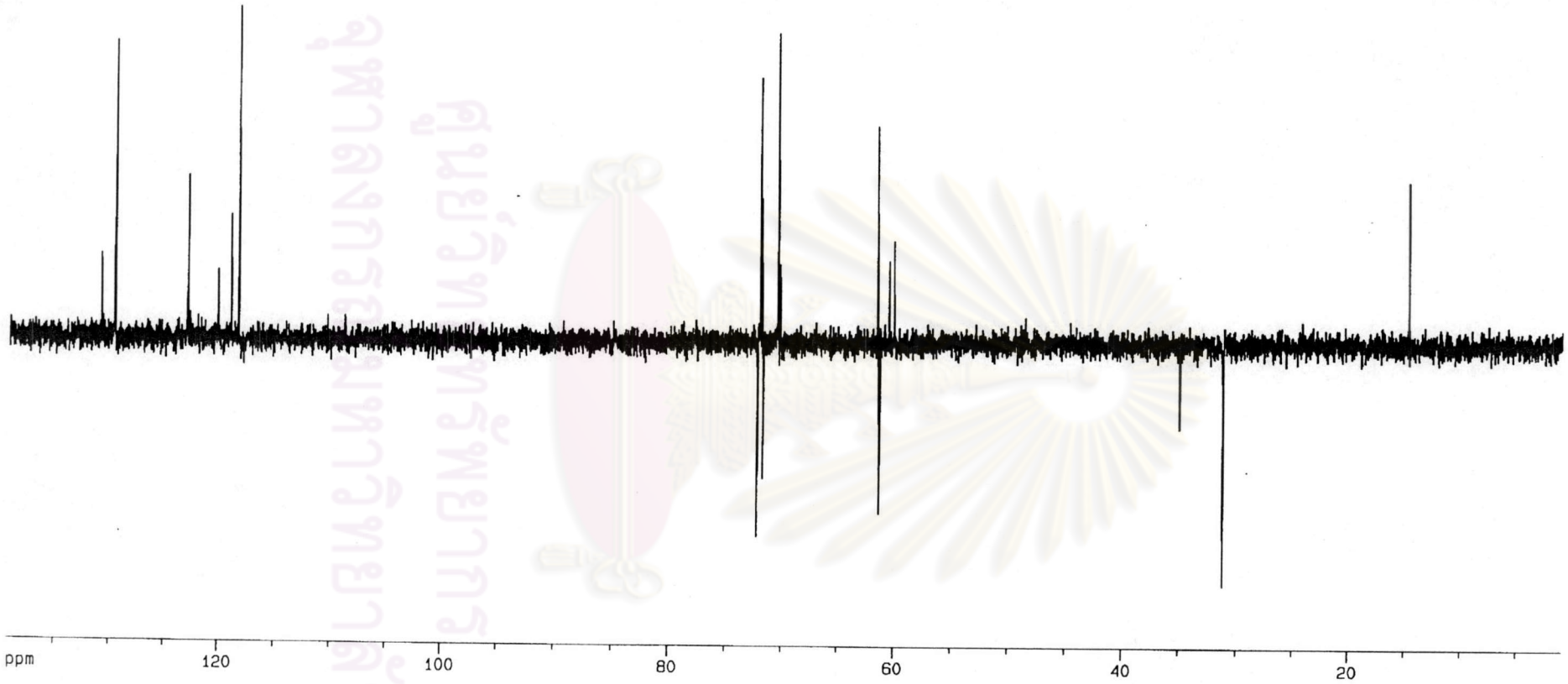


Figure A.24 ^{13}C-DEPT-135 of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz.

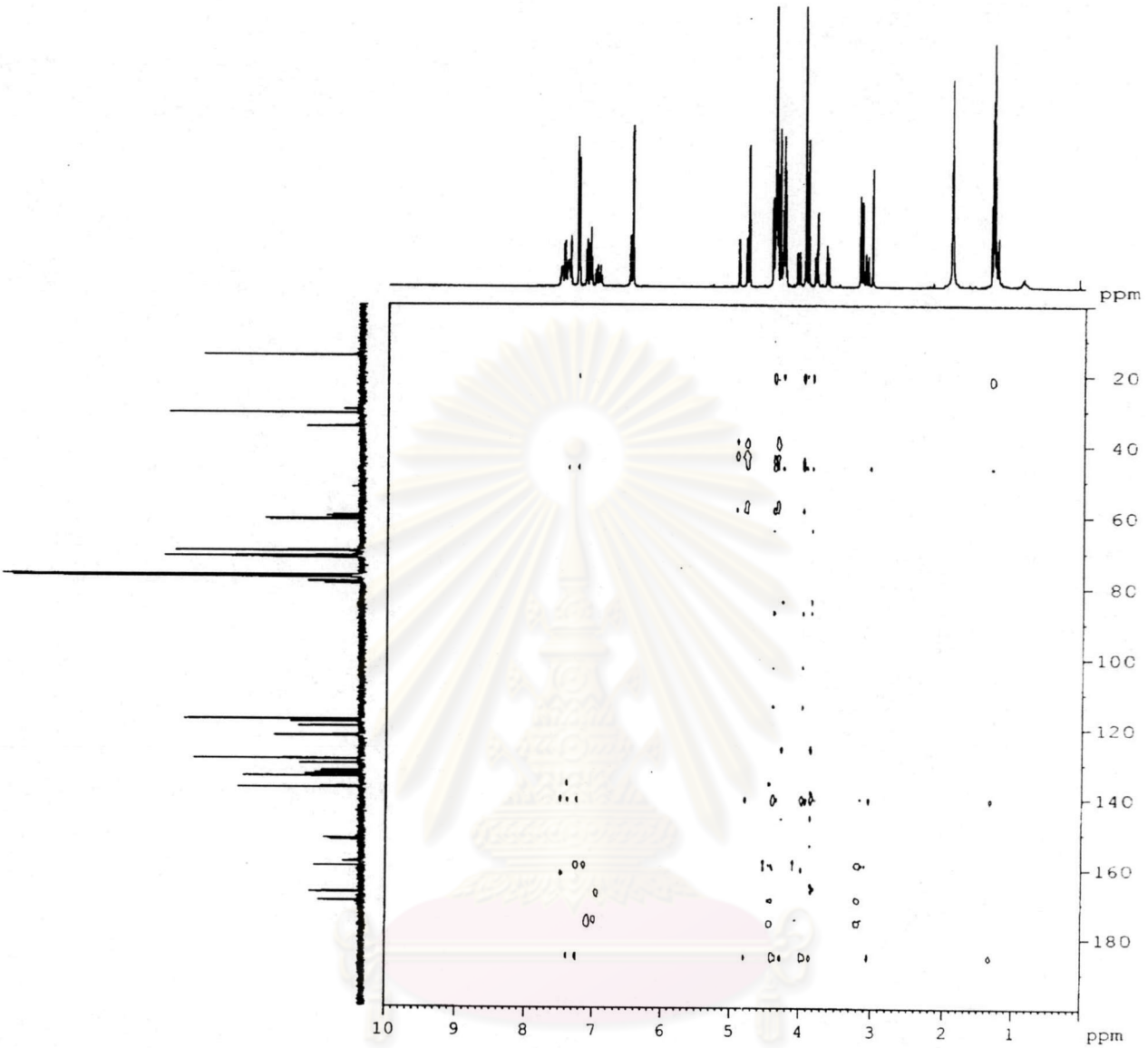


Figure A.25 HMBC of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4] arene (**5b**) in $CDCl_3$ 400 MHz

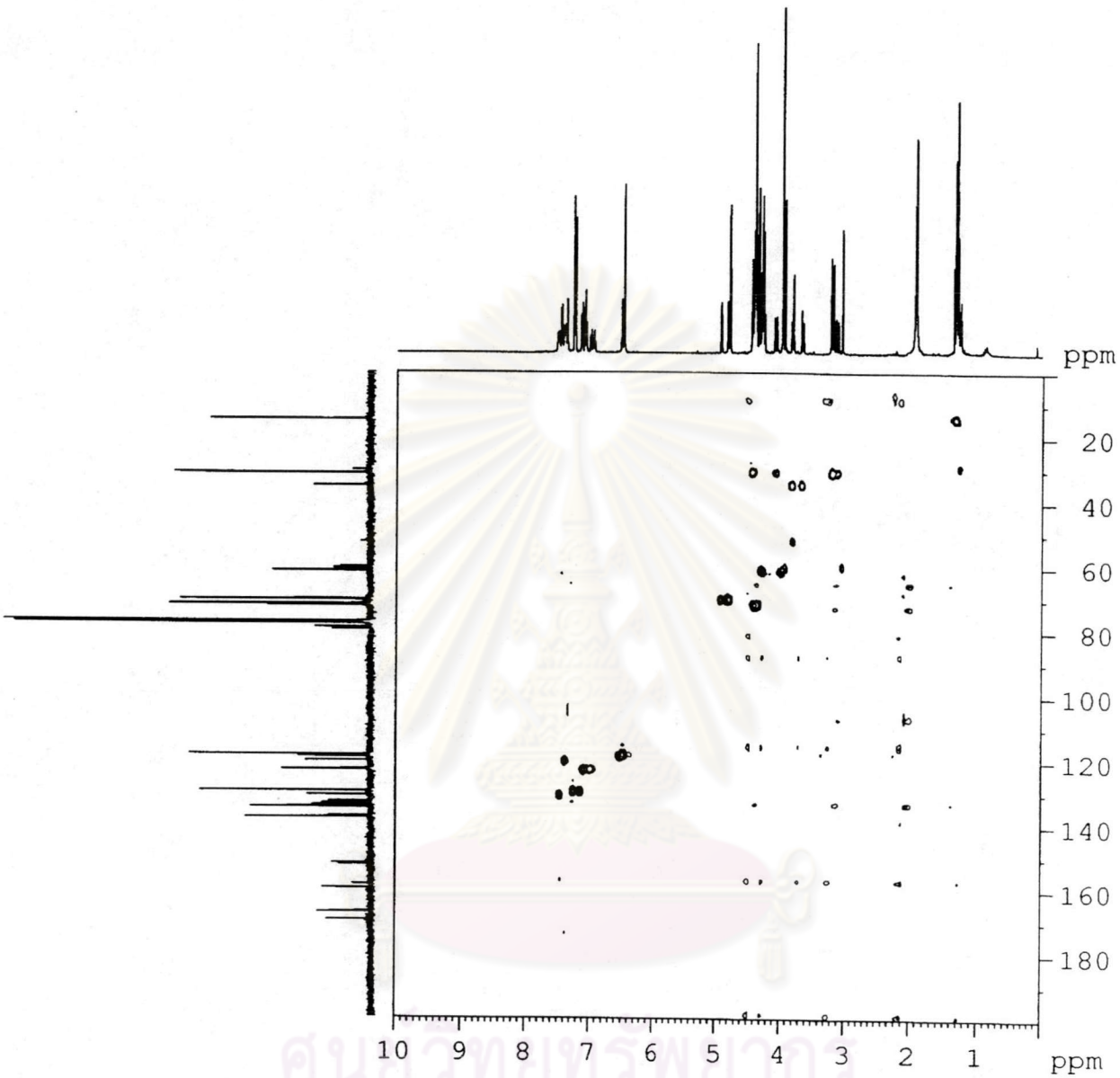


Figure A.26. HMQC of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz

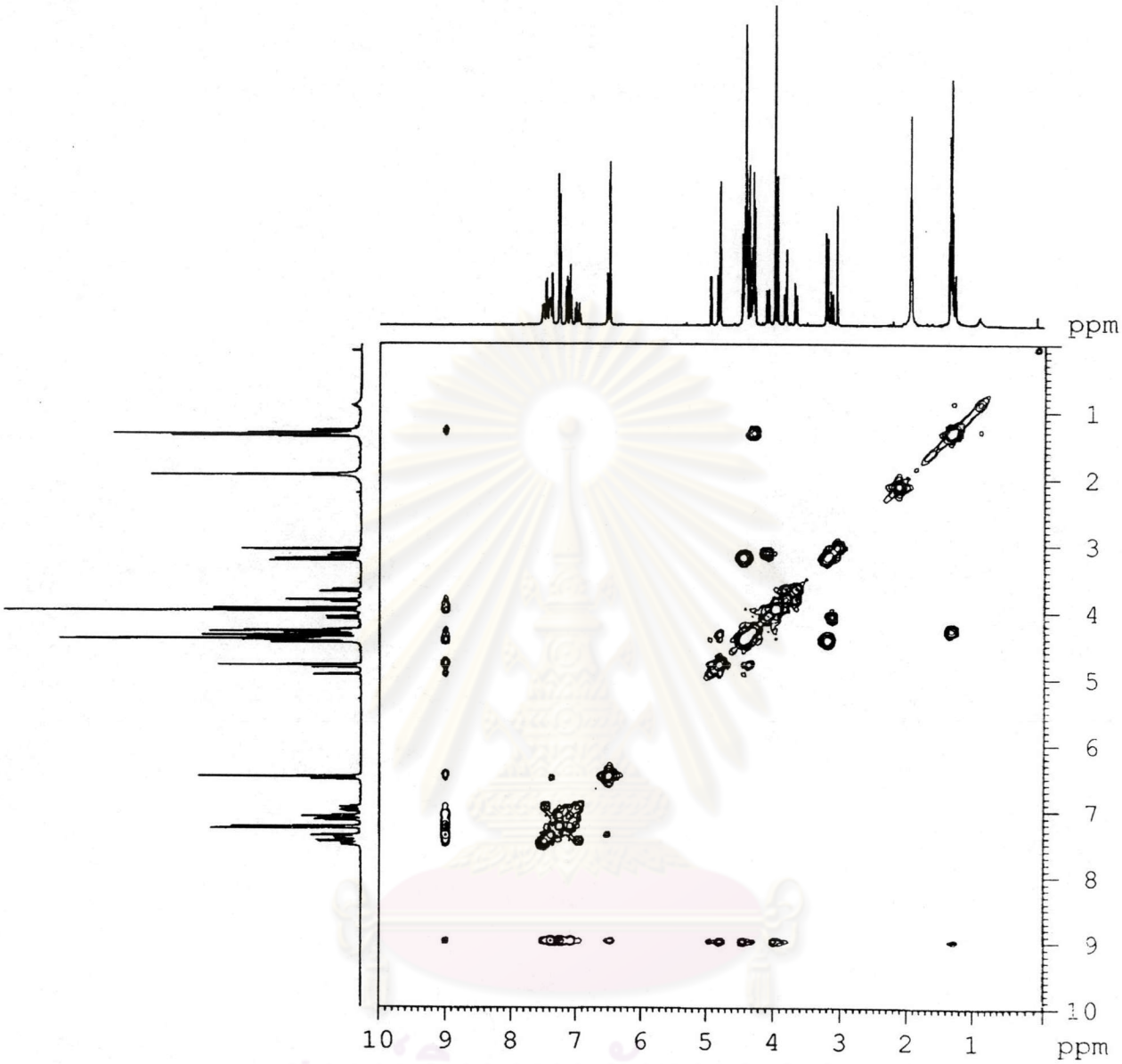


Figure A.27 COSY of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz

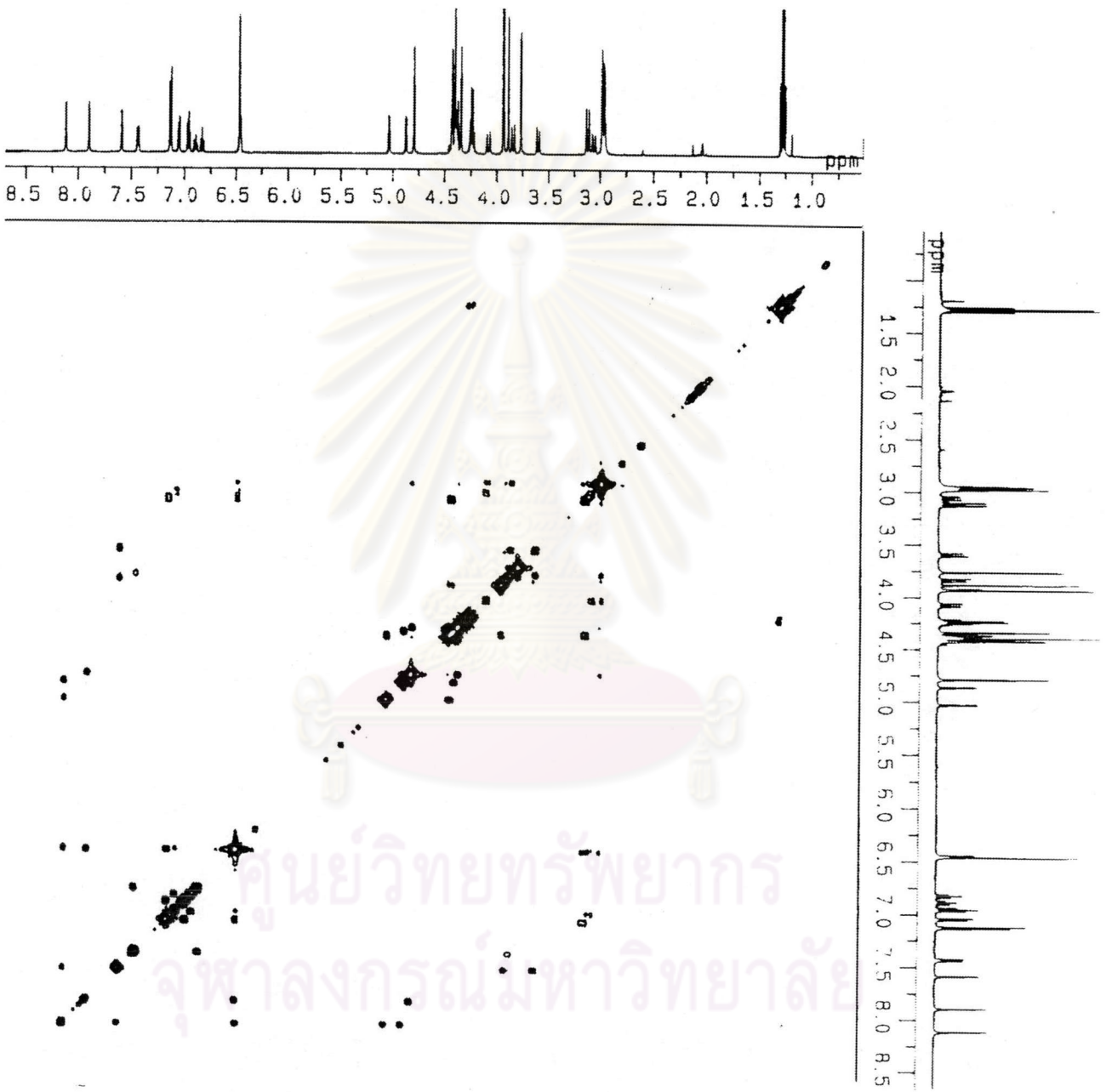


Figure A.28 NOESY of 5,7-diamideferrocenyl-25,26,27,28-tetramethylethylestercalix[4]arene (**5b**) in $CDCl_3$ 400 MHz

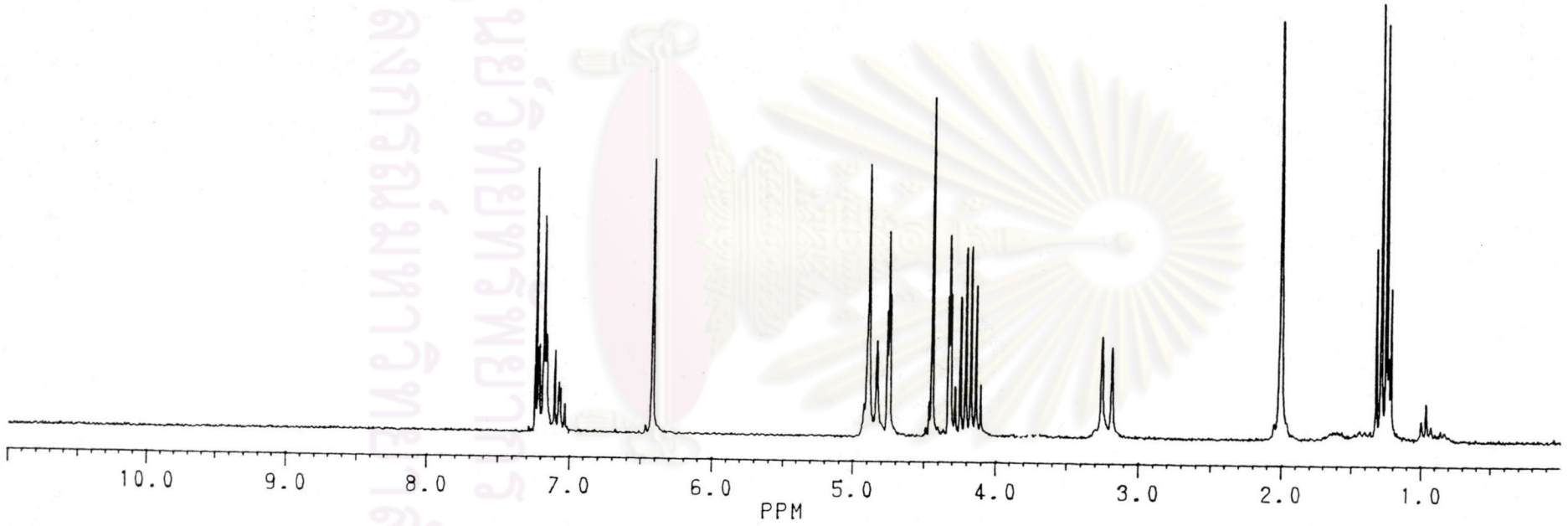


Figure A.29 ^{1}H-NMR of 5,7-diamideferrocenyl-25,26,27,28-dimethoxydimethylethylestercalix[4] arene (**5c**) in $CDCl_3$ 200 MHz

APPENDIX B

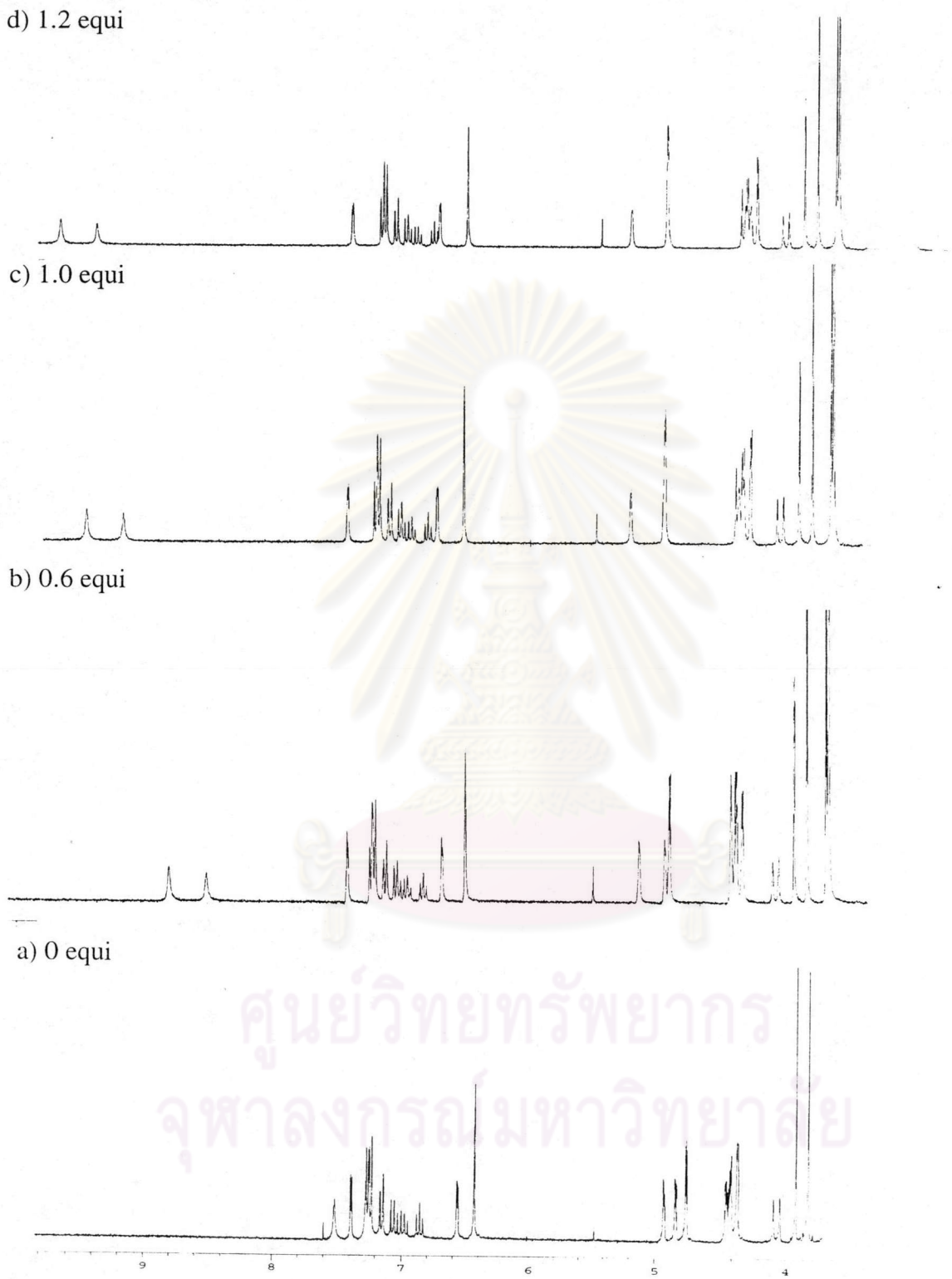


Figure B.1 ^{1}H-NMR titration of **5a** and Acetate at (a) absence of Acetate, (b) 0.6 equi., (c) 1.0 equi, (d) 1.2 equi in CD_3CN-d^3 with 400 MHz

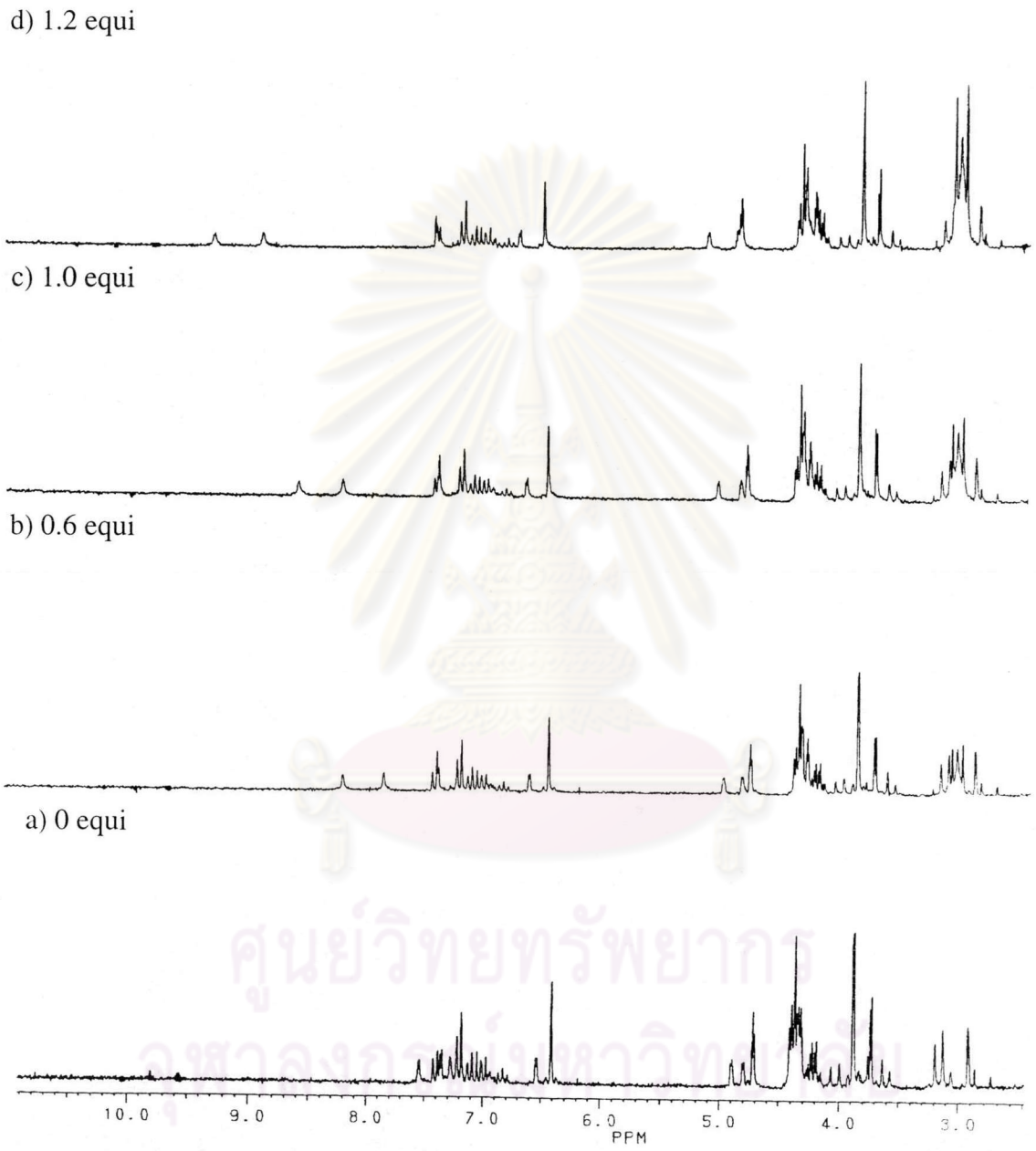
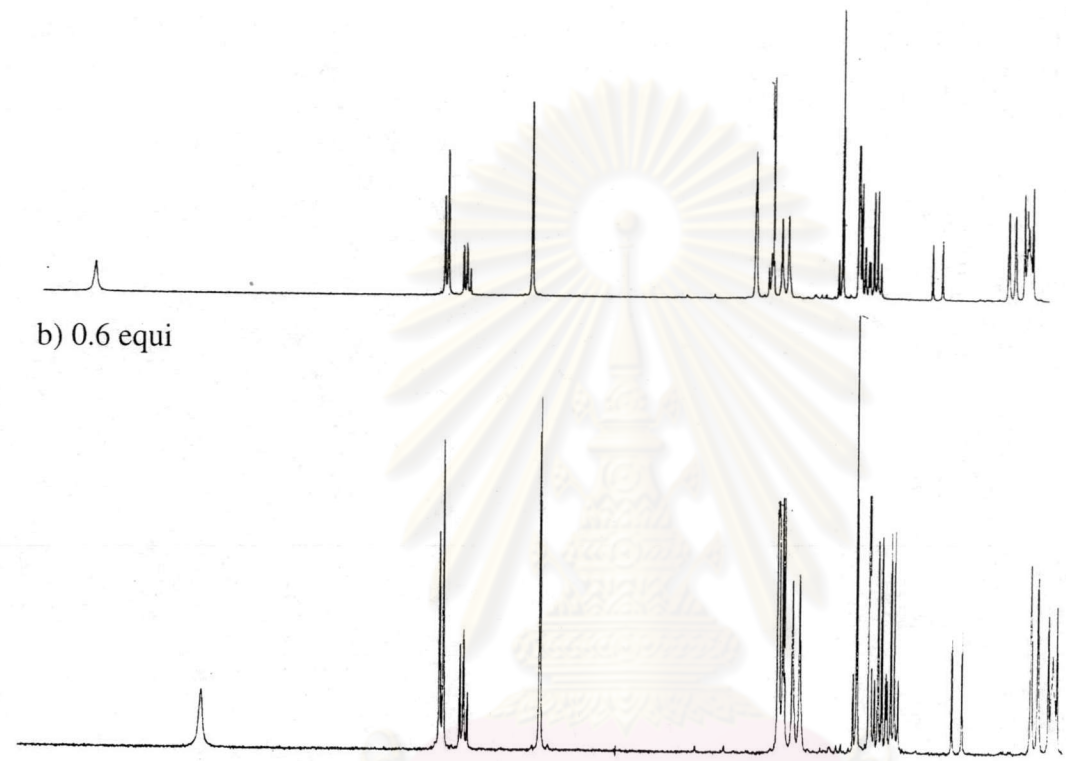


Figure B.2 ^{1}H-NMR titrations of **5c** and Acetate (a) absence of Acetate, (b) 0.6 equi, (c) 1.0 equi, (d) 1.2 equi in CDCN with 400 MHz

c) 1.0 equi



b) 0.6 equi

(a) 0 equi

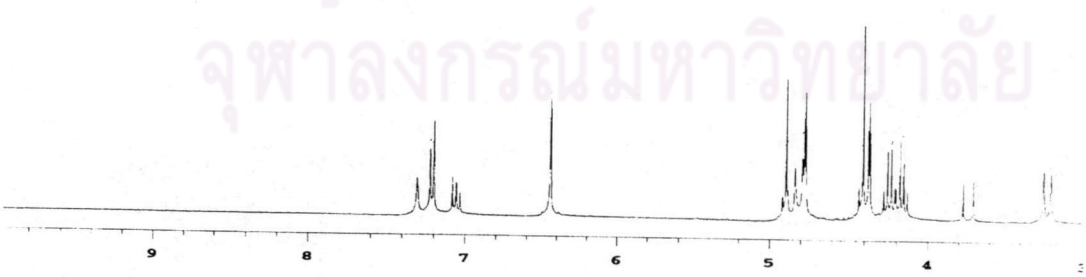


Figure B.3 ^{1}H-NMR titration of **5b** and Acetate at (a) absence of Acetate, (b) 0.6 equi and (c) 1.0 equi in CD_3CN-d^3 with 200 MHz

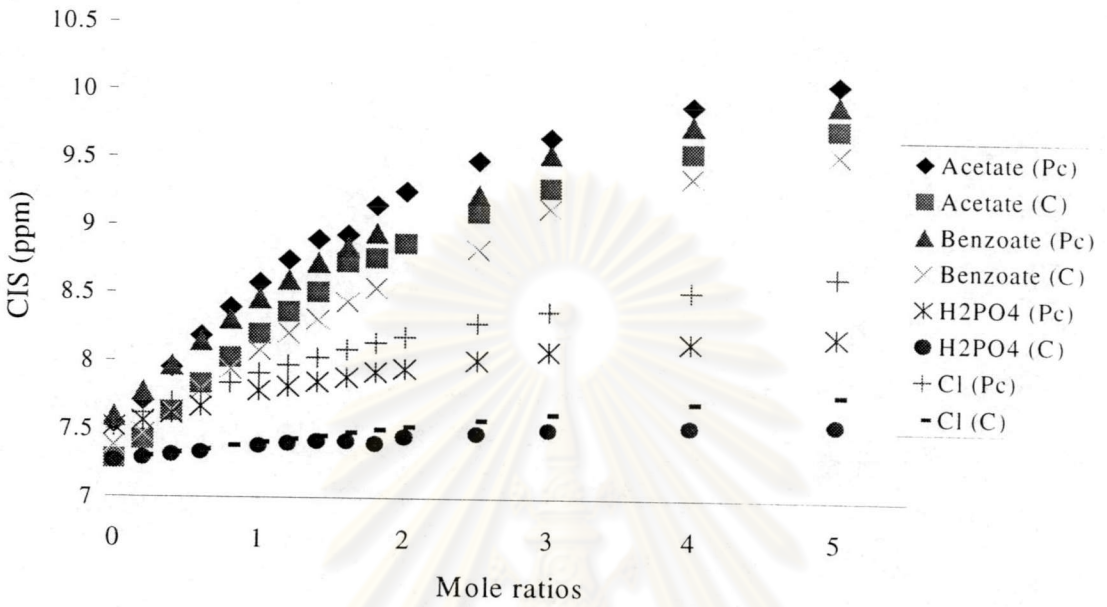


Figure B.4 Titration curves of **5b** with various anions in CD_3CN-d^6

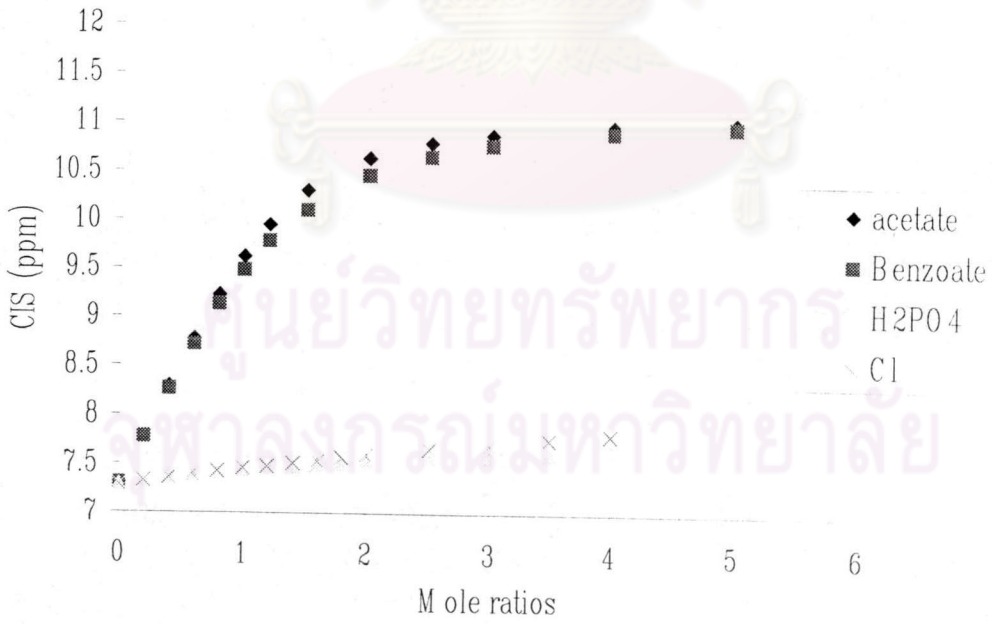


Figure B.5 Titration curves of **5c** with various anions in CD_3CN-d^6

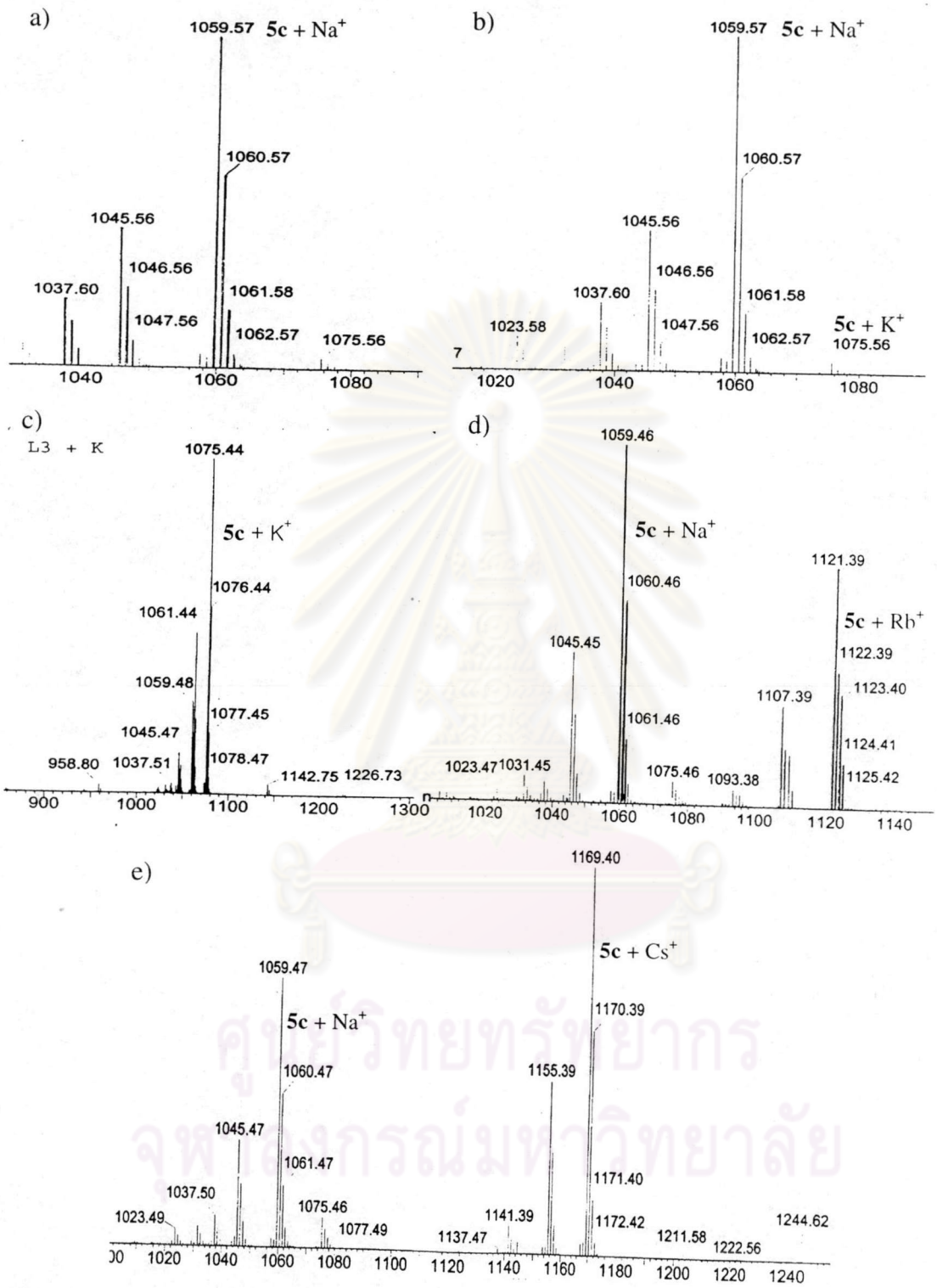


Figure B.6 Mass Spectrum (ESI-TOF) of **5c** and cations (a) **5c** + Na^+, (b, c) **5c** + K^+, (d) **5c** + Rb^+ and (e) **5c** + Cs^+

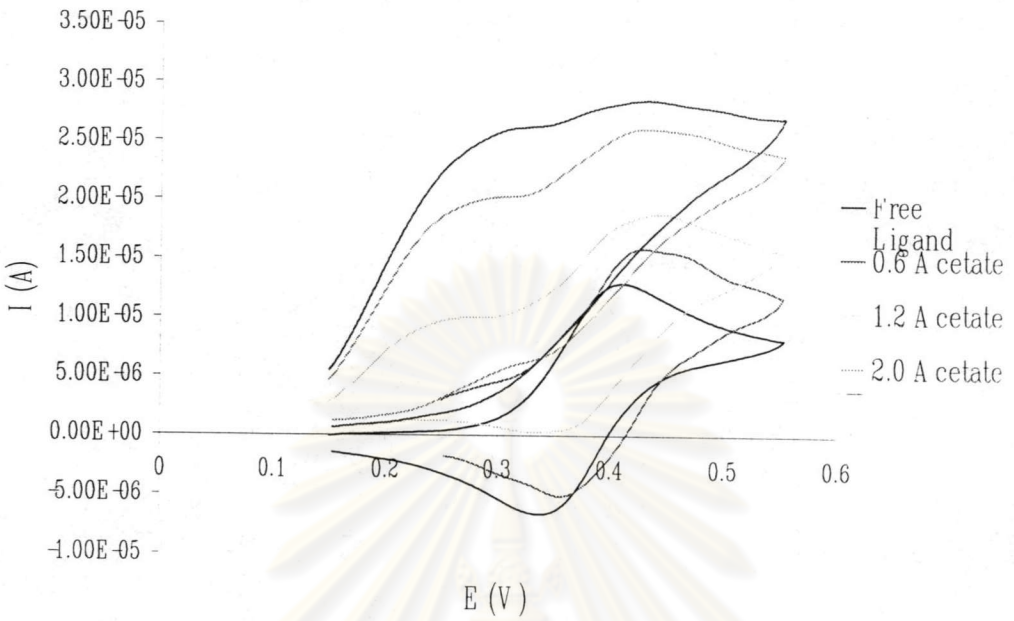


Figure B.7 CV titrations of **5a** and Acetate in AN with 0.1 M. TBAPF at 50 mV/s

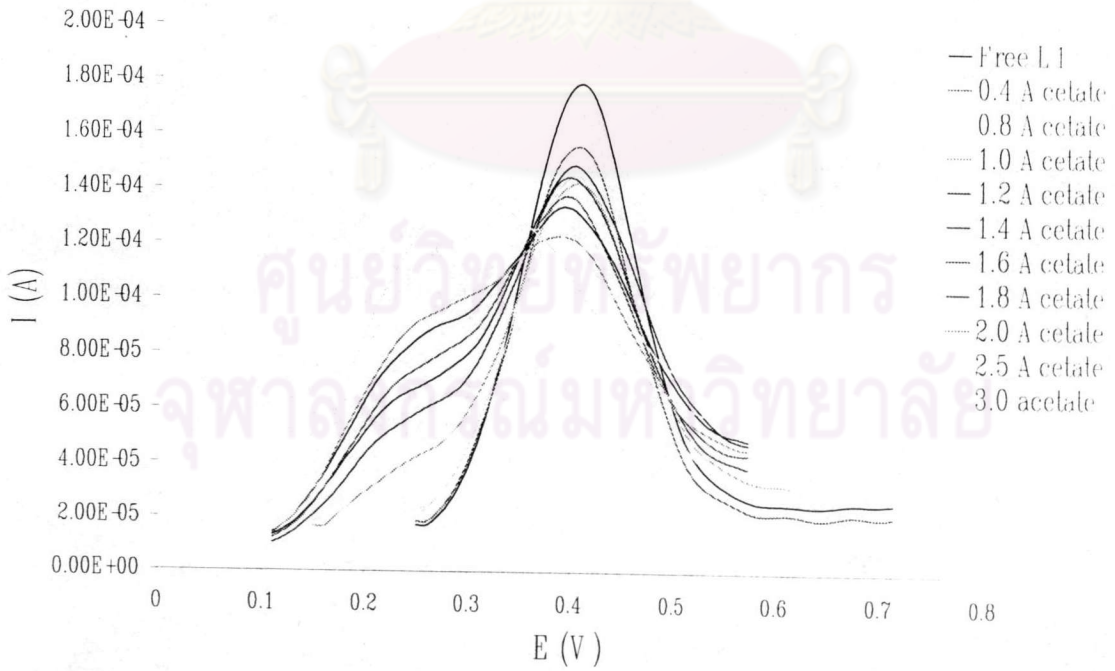


Figure B.8 SW titrations of **5a** and Acetate in AN with 0.1 M. TBAPF at 50 mV/s

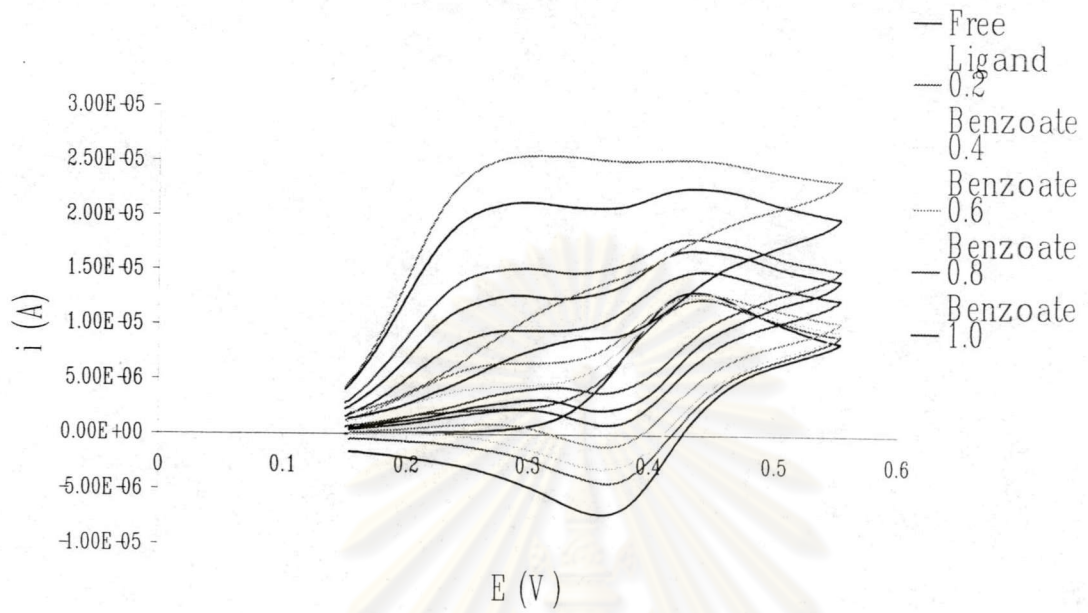


Figure B.9 CV titrations of **5b** and Benzoate in AN with 0.1 M TBAPF at 50 mV/s

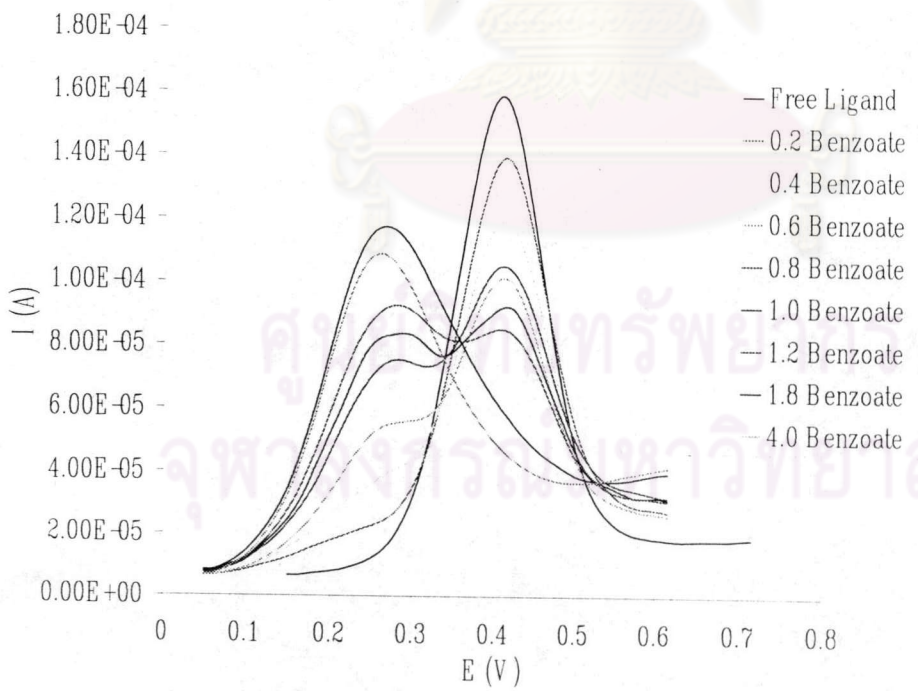


Figure B.10 SW titrations of **5b** and Benzoate in AN with TBAPF at 50 mV/s

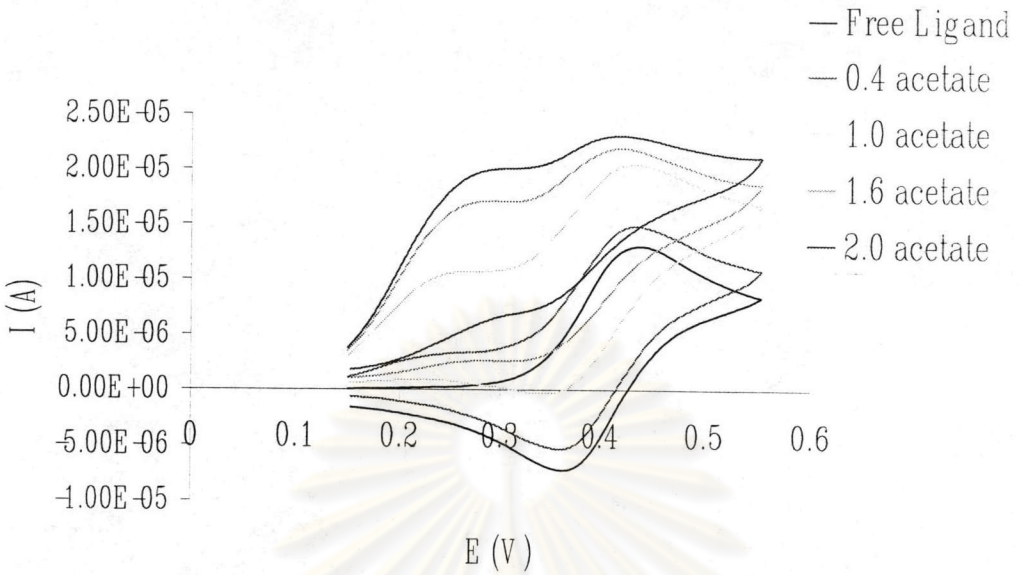


Figure B.11 CV titrations of **5b** and Acetate in AN with 0.1 M TBAPF at 50 mV/s

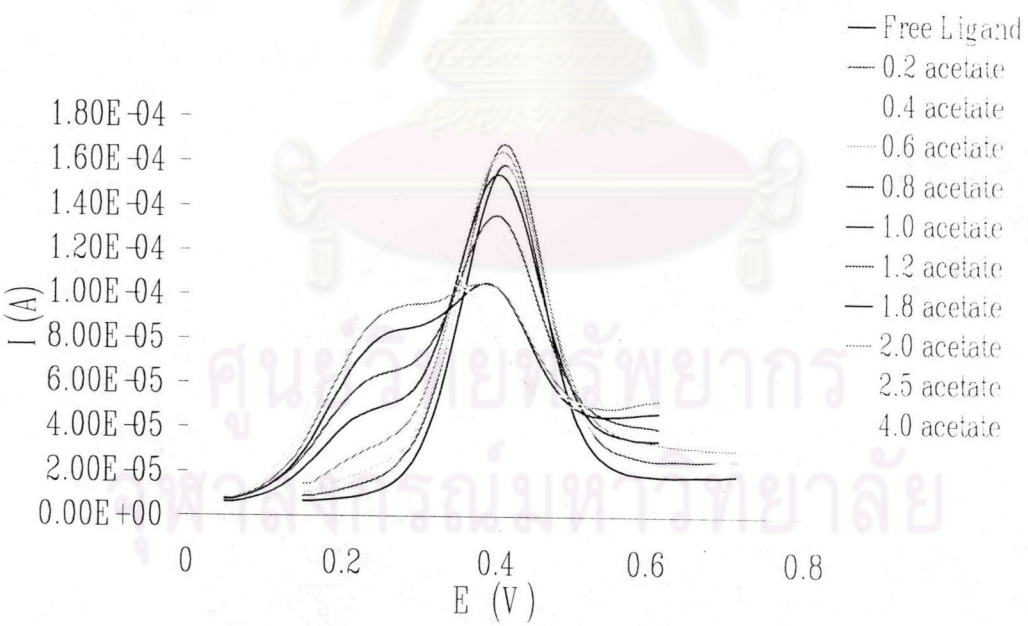


Figure B.12 SW titrations of **5b** and Acetate in AN with 0.1 M. TBAPF at 50 mV/s

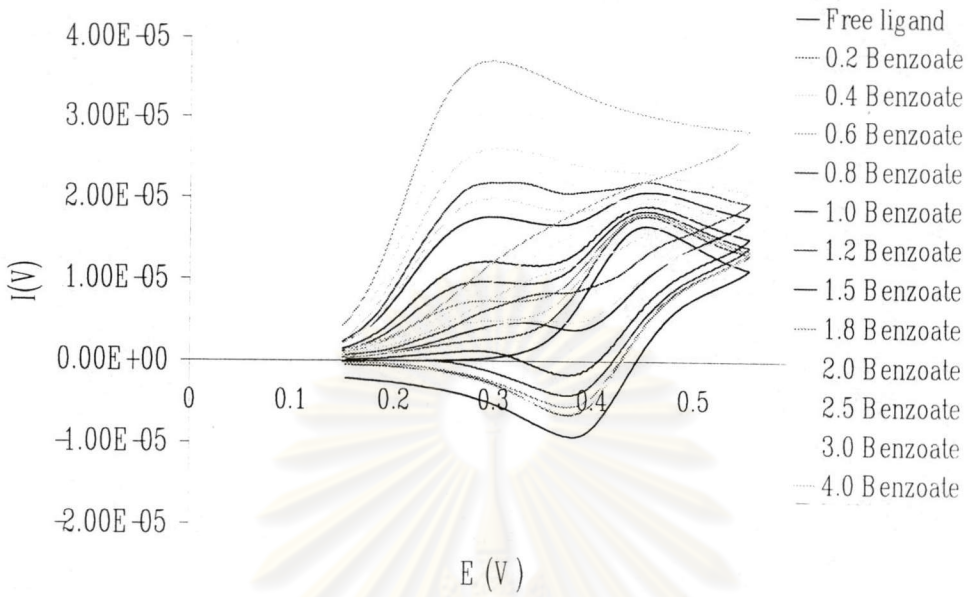


Figure. B. 13 CV titration of 5c and Benzoate in AN with 0.1 M TBAPF at 50 mV/s

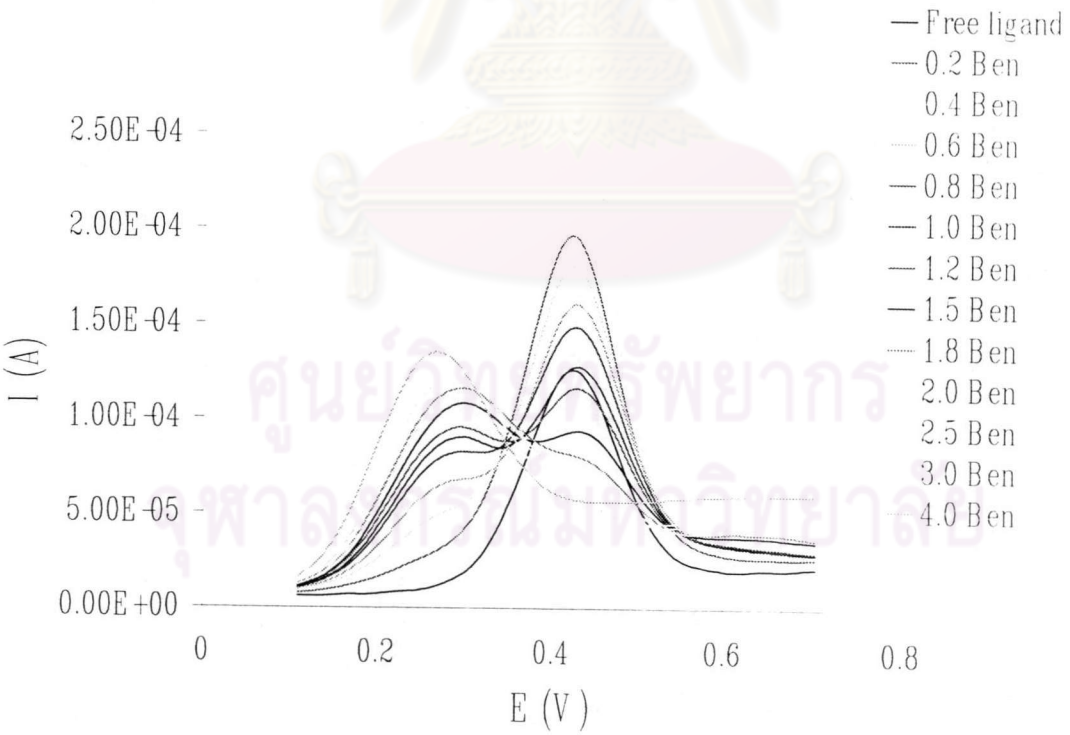


Figure B.14 SW titrations of **5c** and Benzoate in AN with 0.1 M TBAPF at 50 mV/s

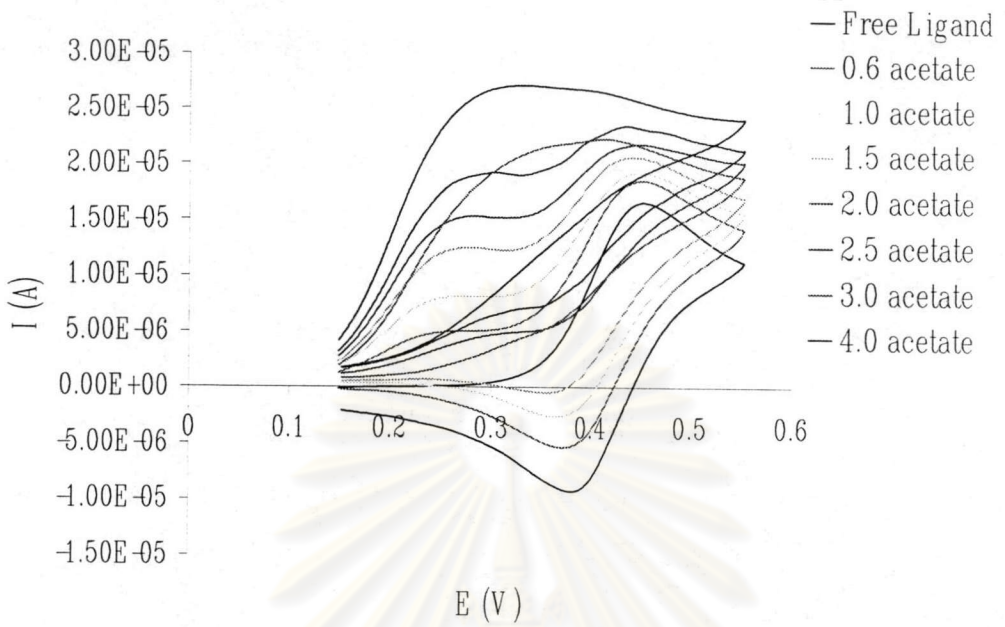


Figure B.15 CV titrations of **5c** and Acetate in AN with 0.1 M TBAPF at 50 mV/s

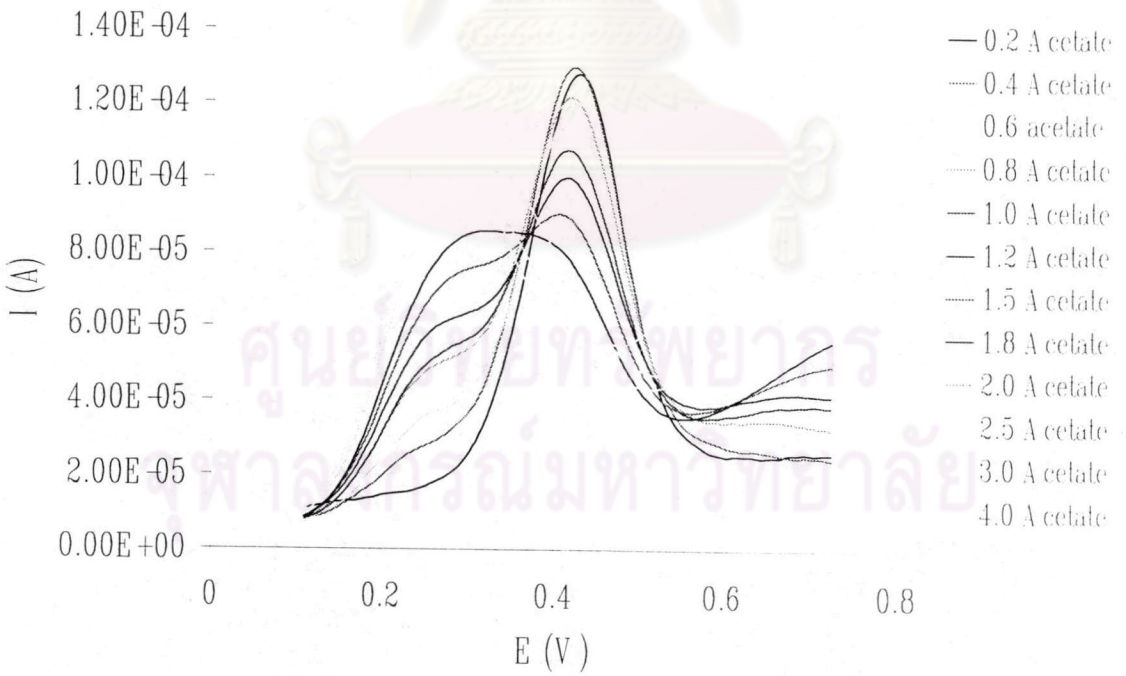


Figure B.16 SW titrations of **5c** and Acetate in AN with 0.1 M TBAPF at 50 mV/s

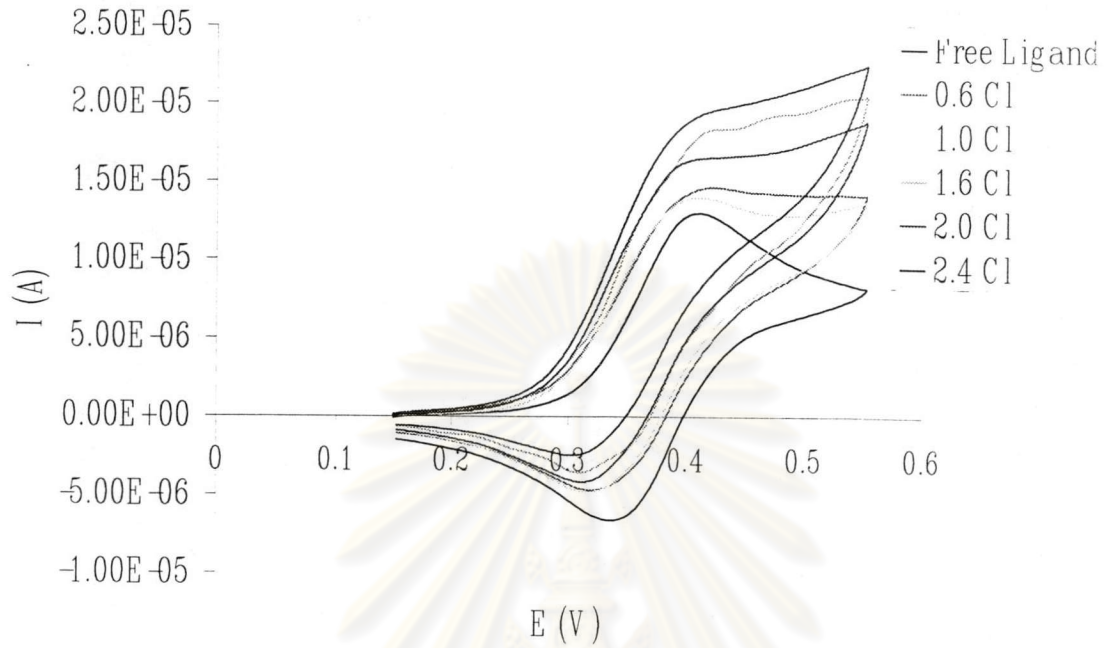


Figure B.17 CV titrations of **5a** and Cl^- in AN with 0.1 M TBAPF at 50 mV/s

VITA

Miss Boosayarat Tomapatanaget was born on July 24, 1972 in Suphanburi, thailand. She graduated with high school degree from The Sagnaunying Suphanburi, Suphanburi in 1990. She received her Bachelor's degree of Science in Chemistry from Chulalongkorn University in 1995. Since then, she has been a graduate student studying inorganic chemistry and become a member of Supramolecular Chemistry Laboratory under supervision of Assist. Prof. Dr. Thawatchai Tuntulani. She had an opportunity to do the research in Prof. Paul D. Beer's group at Oxford University in 2001 under financial support from Thailand Research fund. She graduated with a Ph.D. Degree in Chemistry in the academic year 2002.

Publications

1. B. Tomapatanaget, B. Pulpoka, T. Tuntulani, *Chem. Lett.* **1998**, 1037.
2. B. Tomapatanaget, T. Tuntulani, *Tetrahedron Lett.* **2001**, *42*, 8105.
3. J. A. Wisner, P. D. Beer, N. G. Berry, B. Tomapatanaget, *P. Natl. Acad. Sci. USA*. **2002** , *99*, 4983.
4. B. Tomapatanaget, T. Tuntulani, O. Chailapakul, *Org. Lett.*, **2003**, *5*, 1539.