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APPENDICES

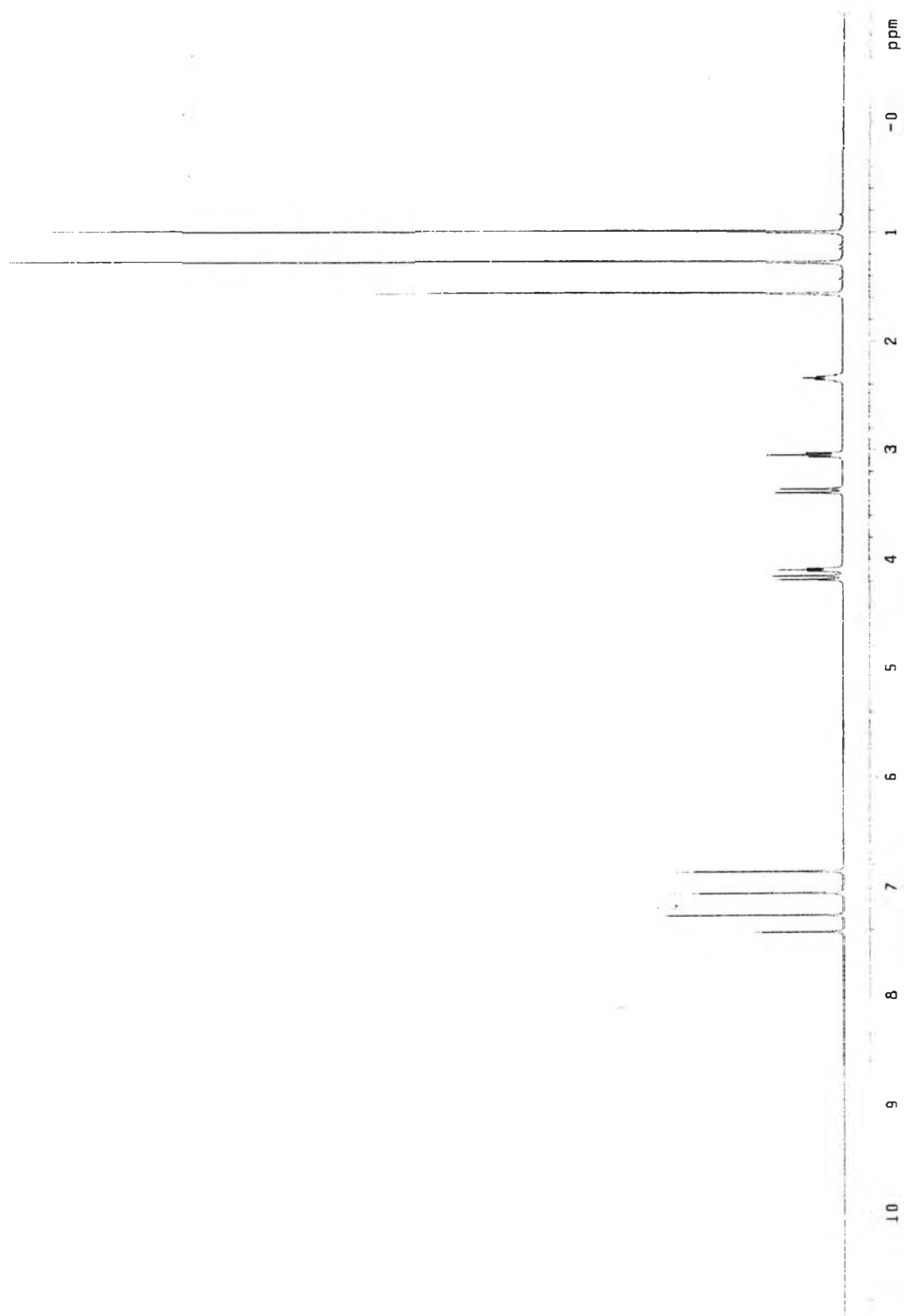


Figure A.1: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23 tetra-*p*-*tert*-butyl 25,27-bis(cyanopropoxy)calix[4]arene (3)

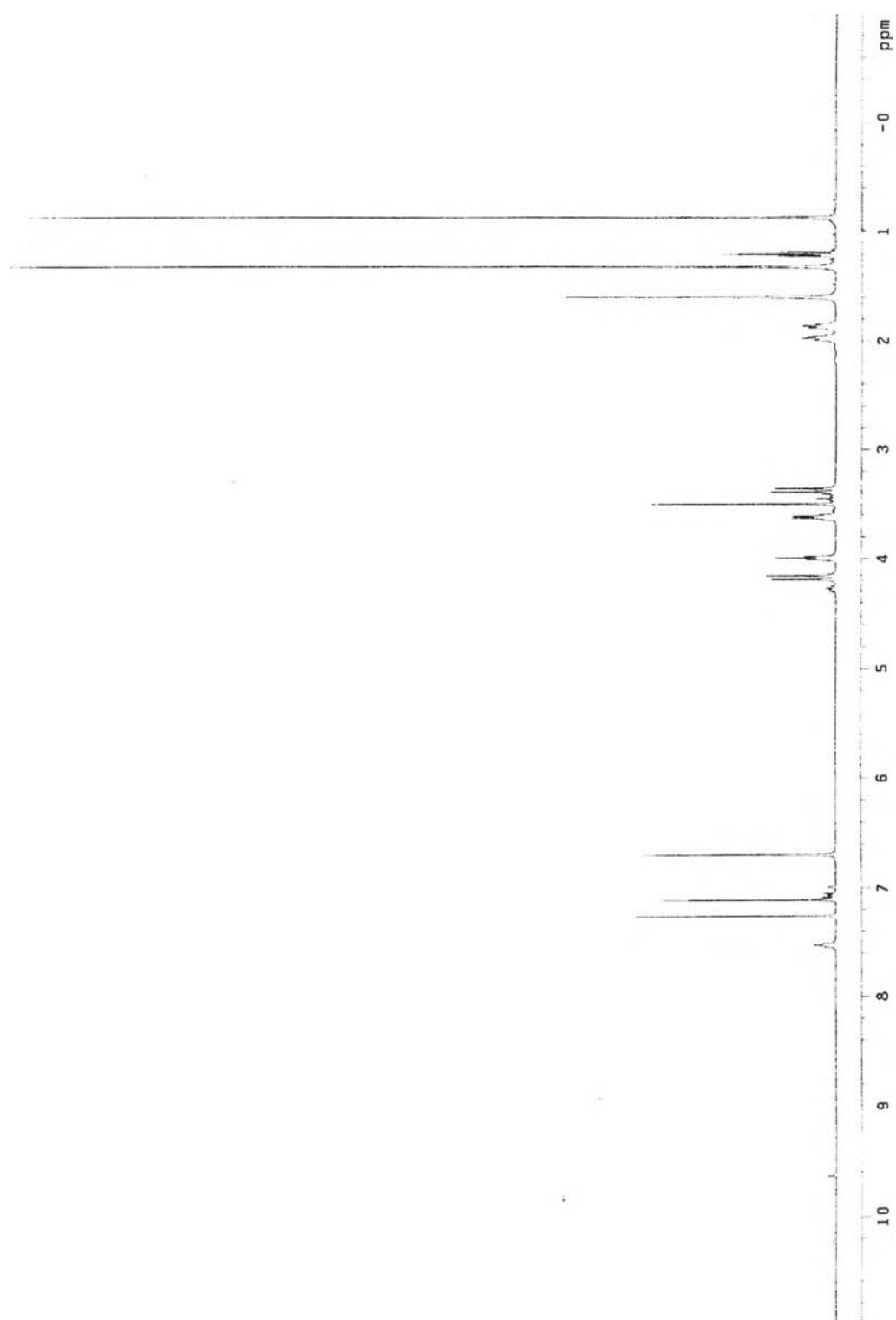


Figure A.2: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23 tetra-*p*-*tert*-butyl 25,27-bis(cyanoacetamidobutoxy)calix[4]arene (5)

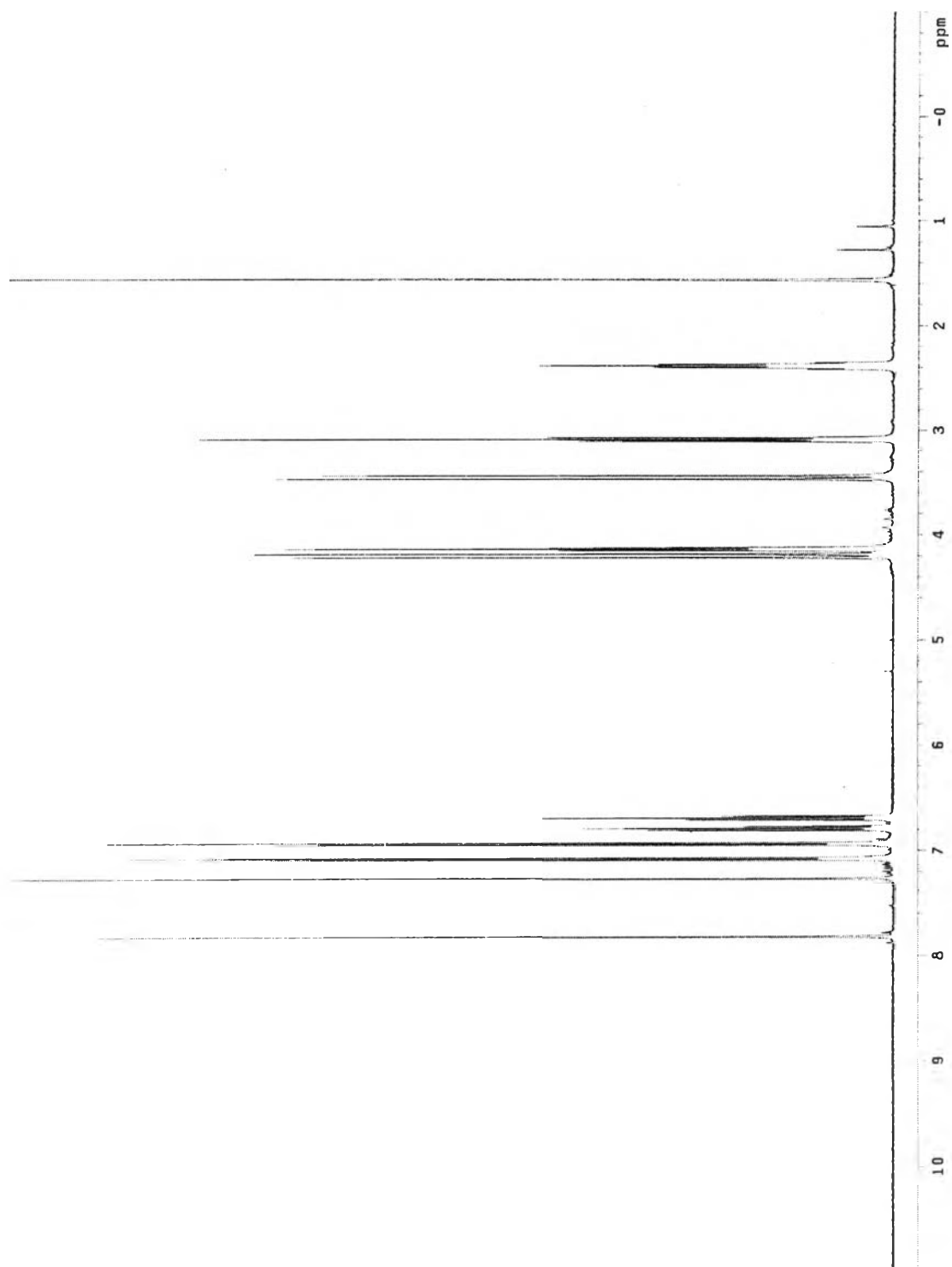


Figure A.3: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(cyanopropoxy)-26,28-dihydroxycalix[4]arene (6)

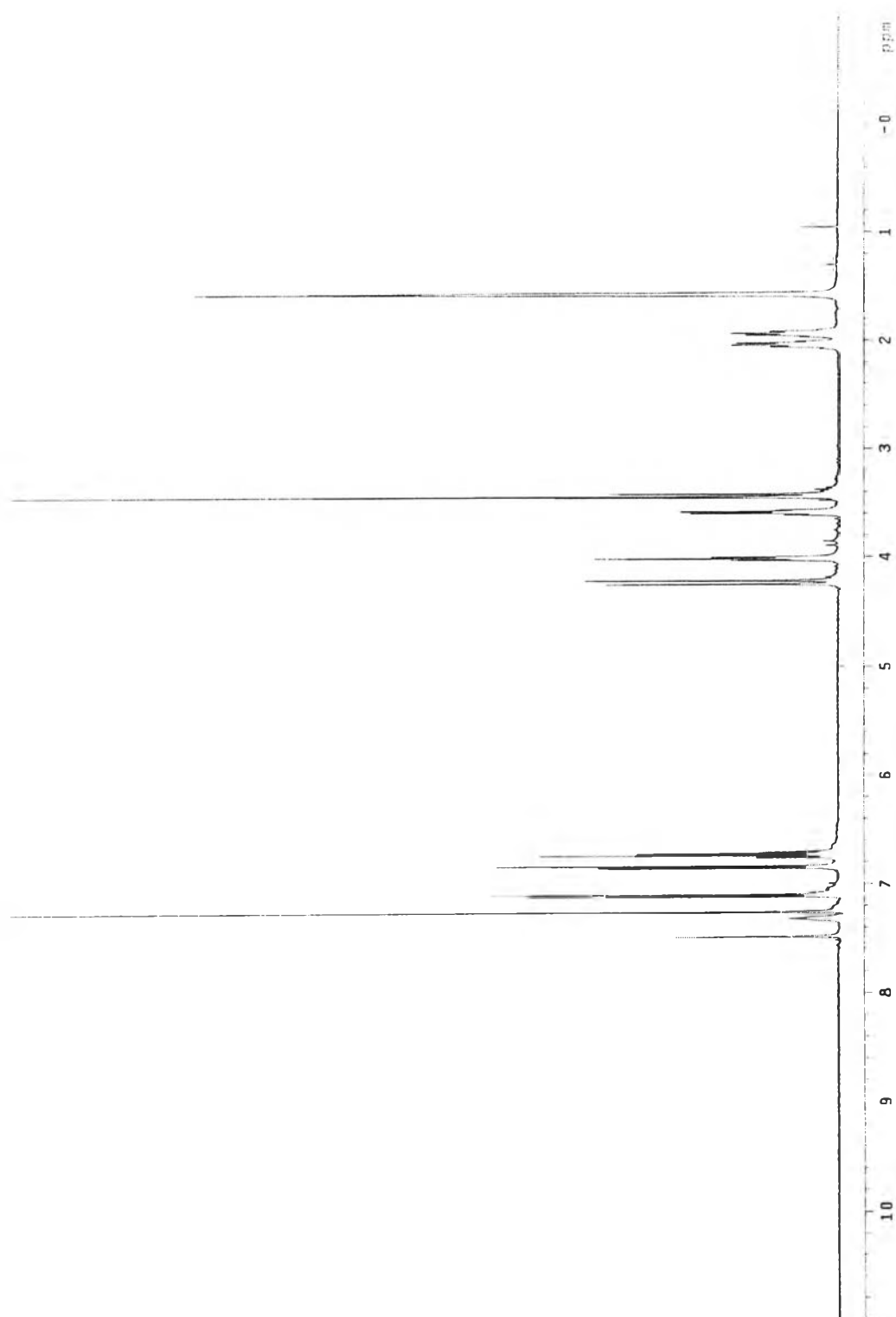


Figure A.4: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(cyanoacetamido butoxy)-26,28-dihydroxycalix[4]arene (**8**)



Figure A.5: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23-tetra-*p*-*tert*-butyl-25,27-bis(cyanomethoxy)calix[4]arene (**9**)

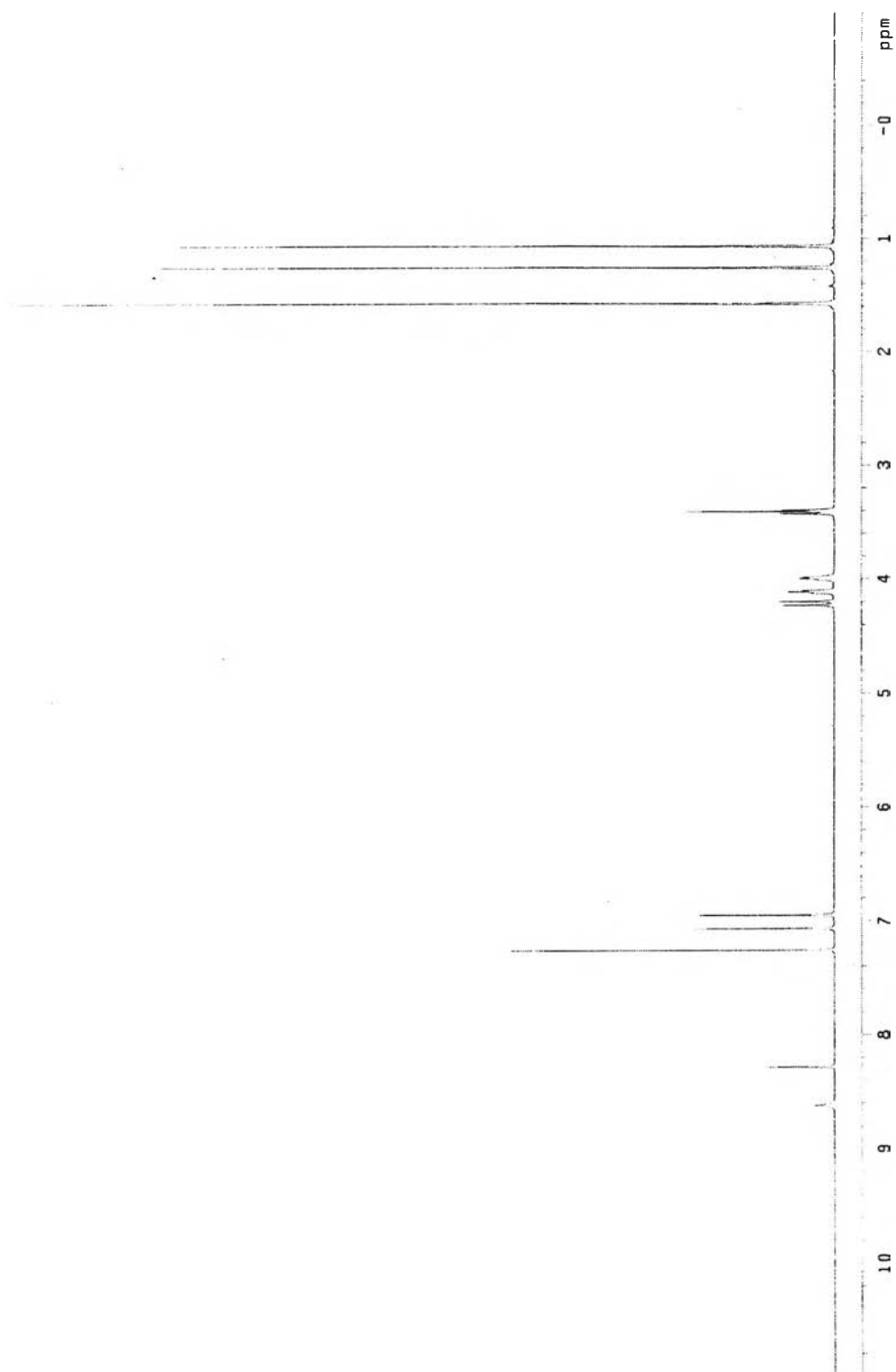


Figure A.6: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23-tetra-*p-tert*-butyl-25,27-bis(acetamidoethoxy)calix[4]arene (**11**)

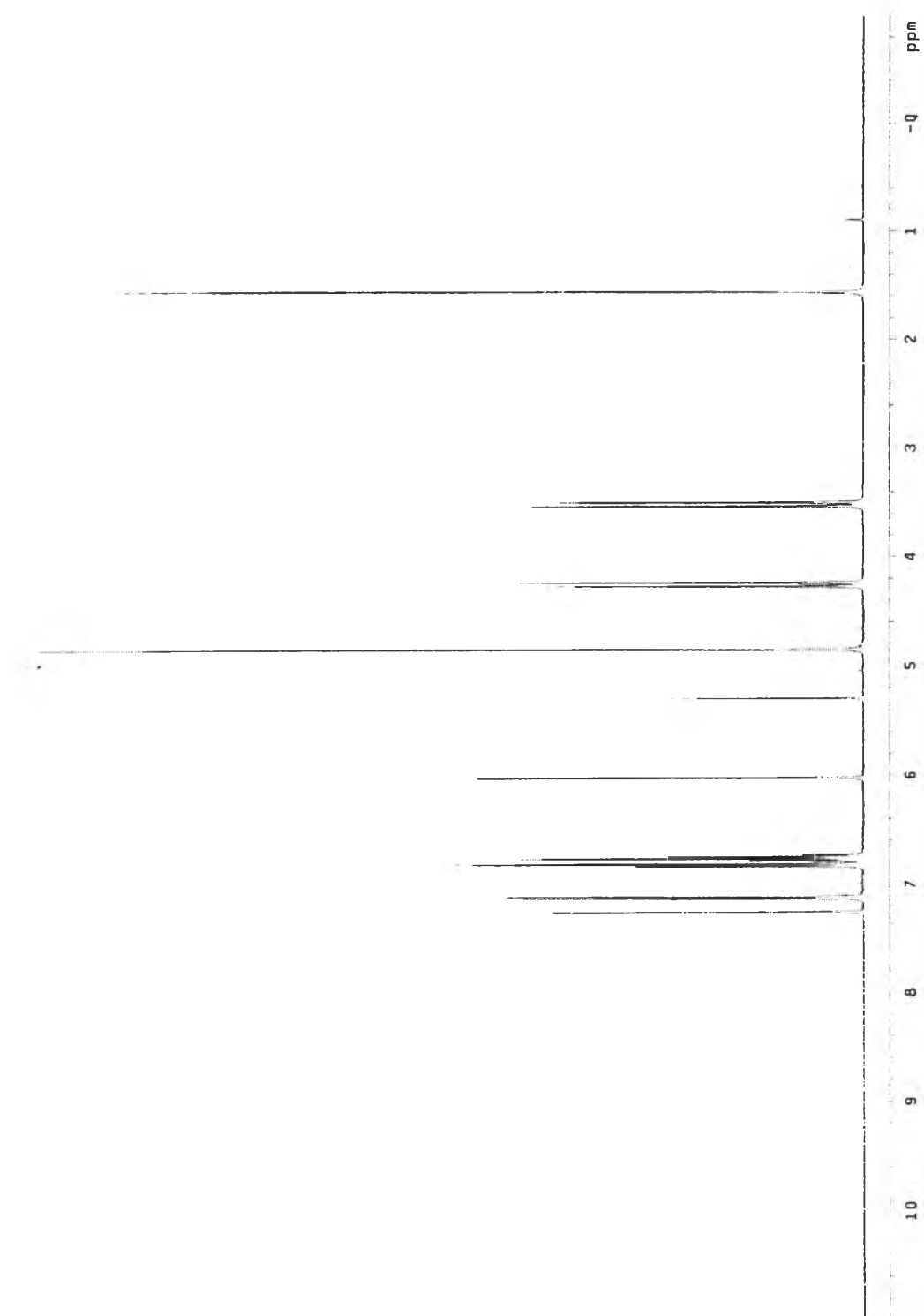


Figure A.7: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(cyanomethoxy)-26,28-dihydroxycalix[4]arene (**12**)

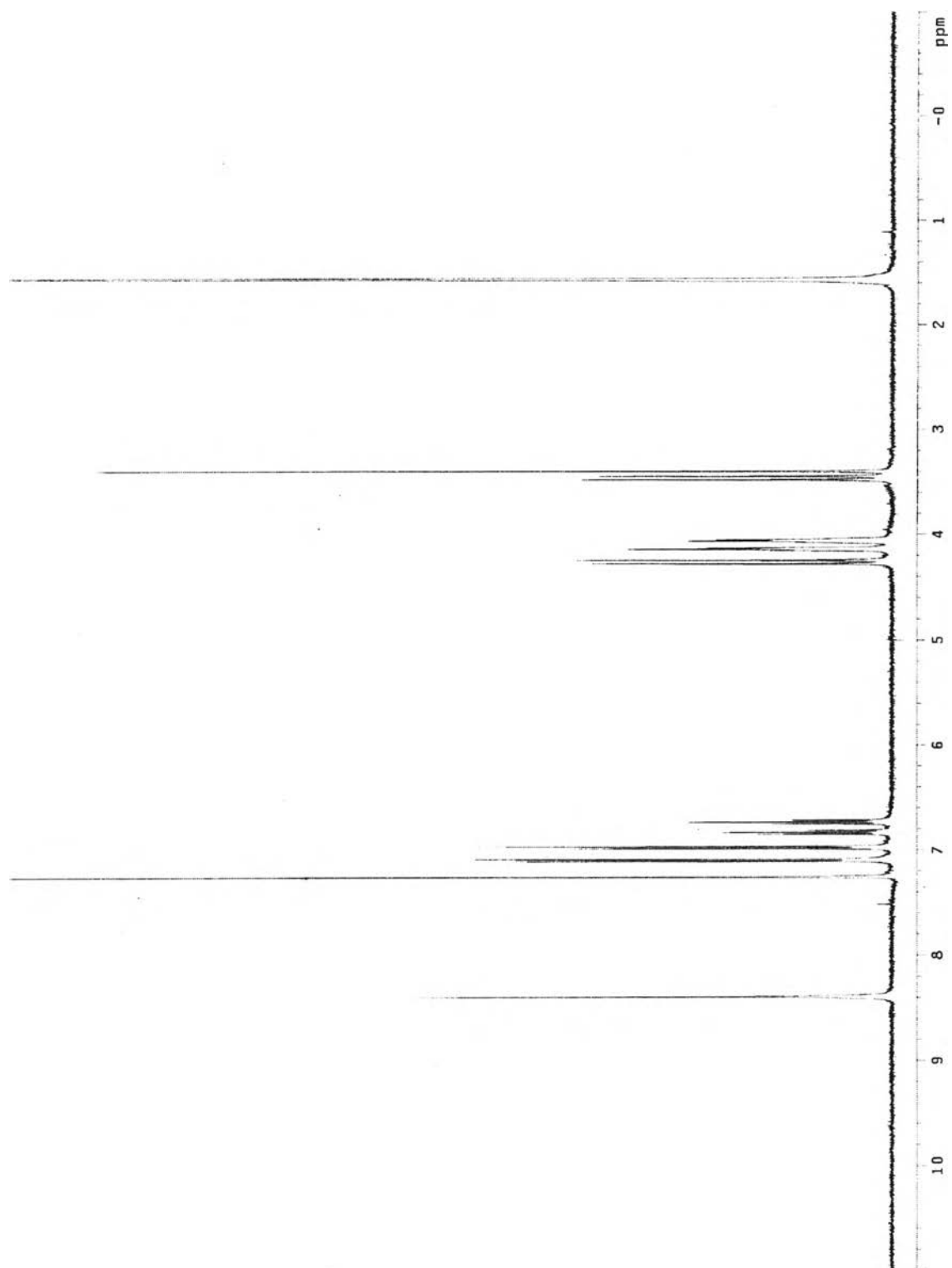


Figure A.8: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(cyanoacetamido ethoxy)-26,28-dihydroxycalixarene (**14**)

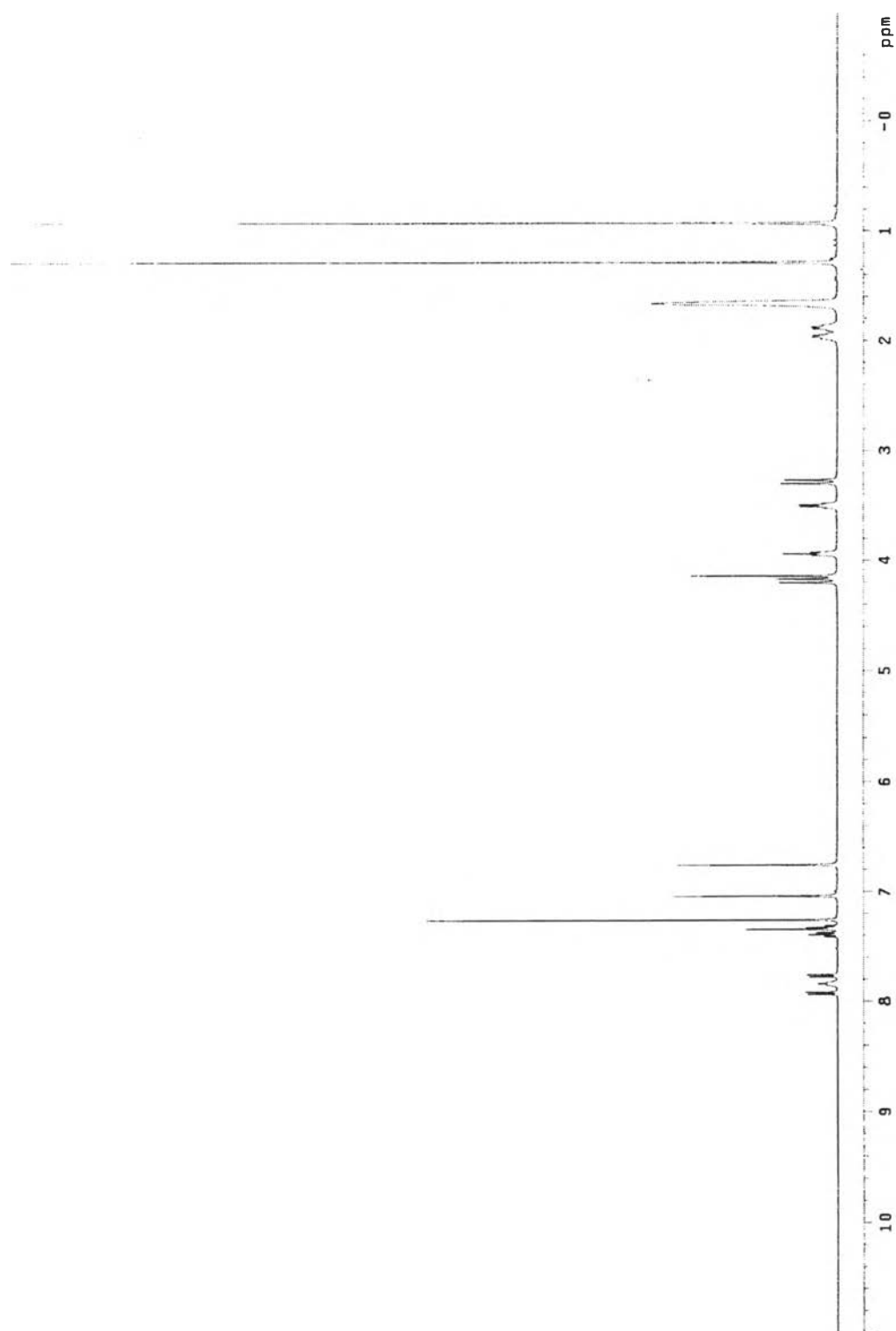
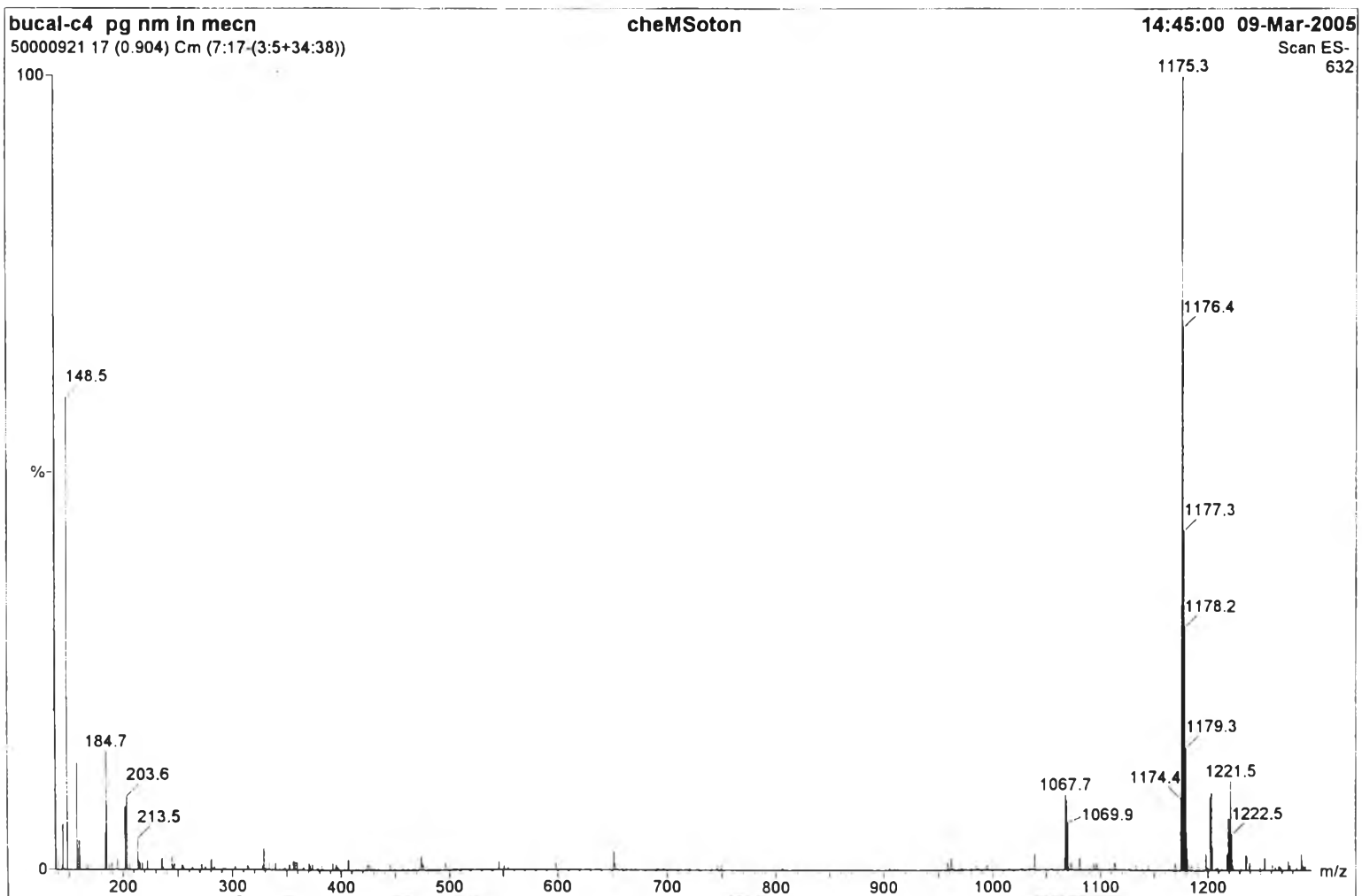


Figure A.9: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23-tetra-*p-tert*-butyl-25,27-bis(benzothiazolylacetamidobutoxy)calix[4]arene (**15**)

Figure A.10: ESI-MS spectrum of 5,11,17,23-tetra-*p-tert*-butyl-2,5,27-bis(benzothiazolyl)acetamidobutoxy)calix[4]arene (**15**)



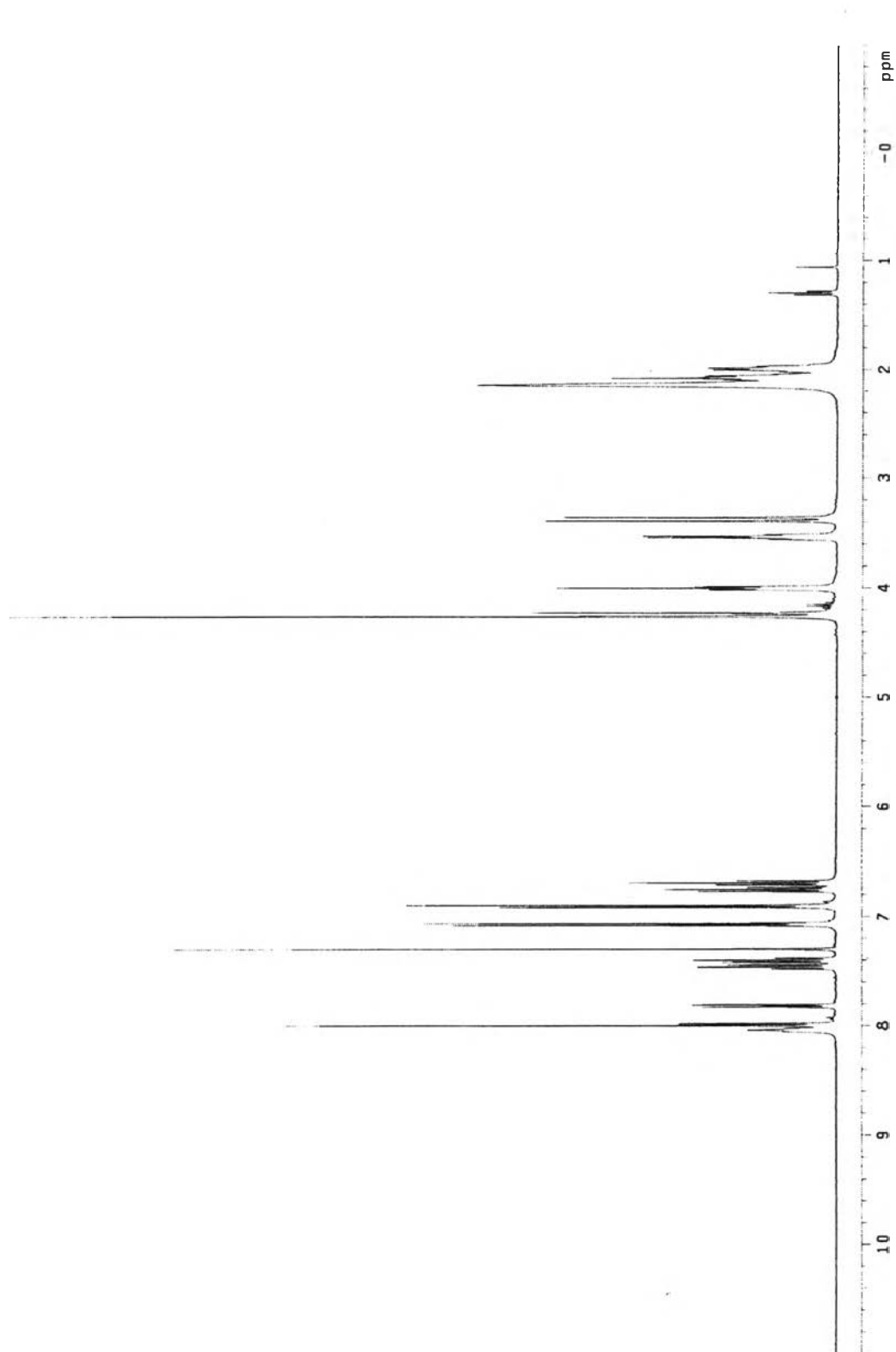


Figure A.11: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(benzothiazolyl acetamidobutoxy)-26,28-dihydroxycalix[4]arene (**16**)

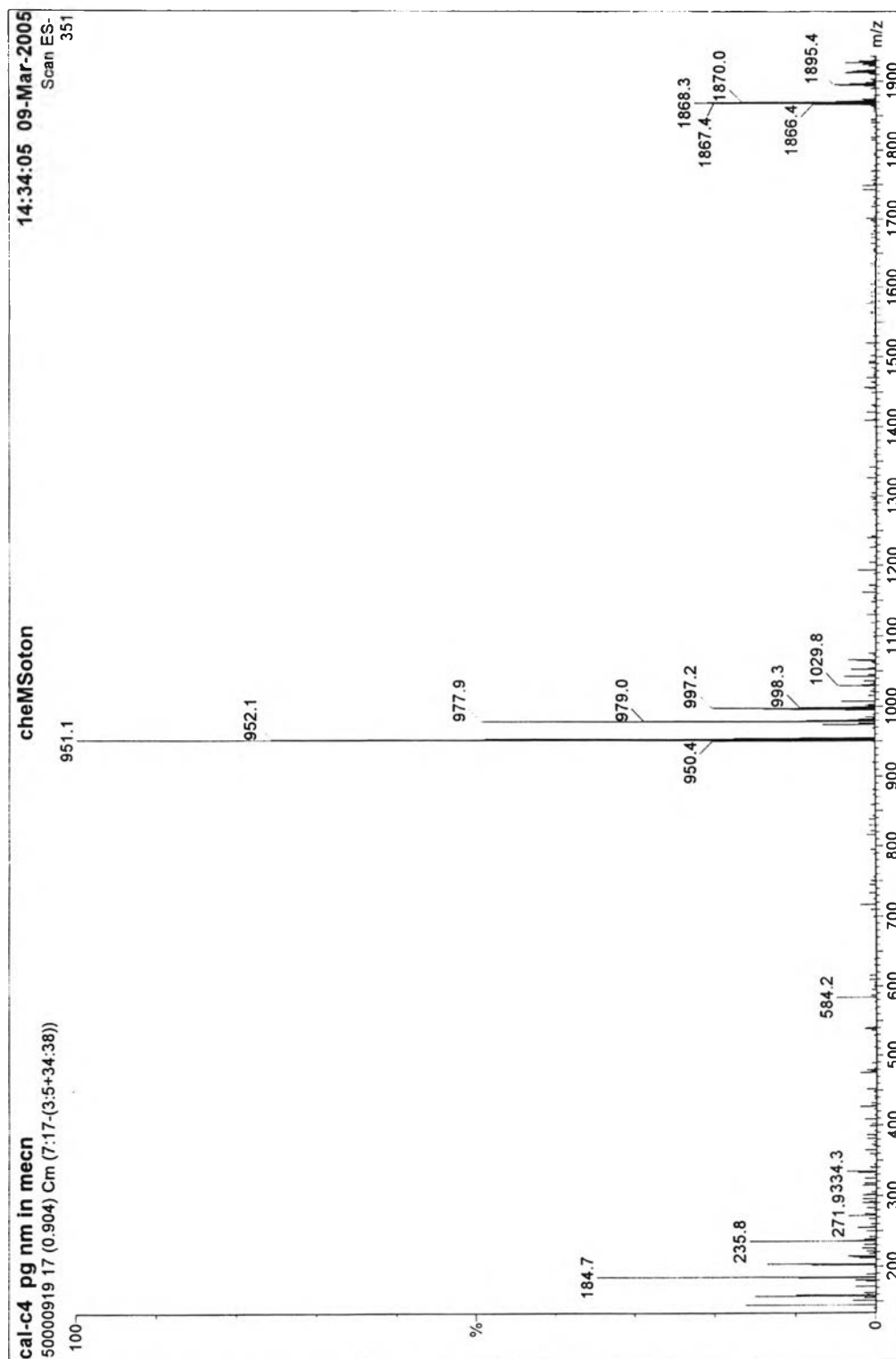


Figure A.12: ESI-MS spectrum of 25,27-bis(benzothiazolylacetamidobutoxy)-26,28-dihydroxycalix[4]arene (**16**)

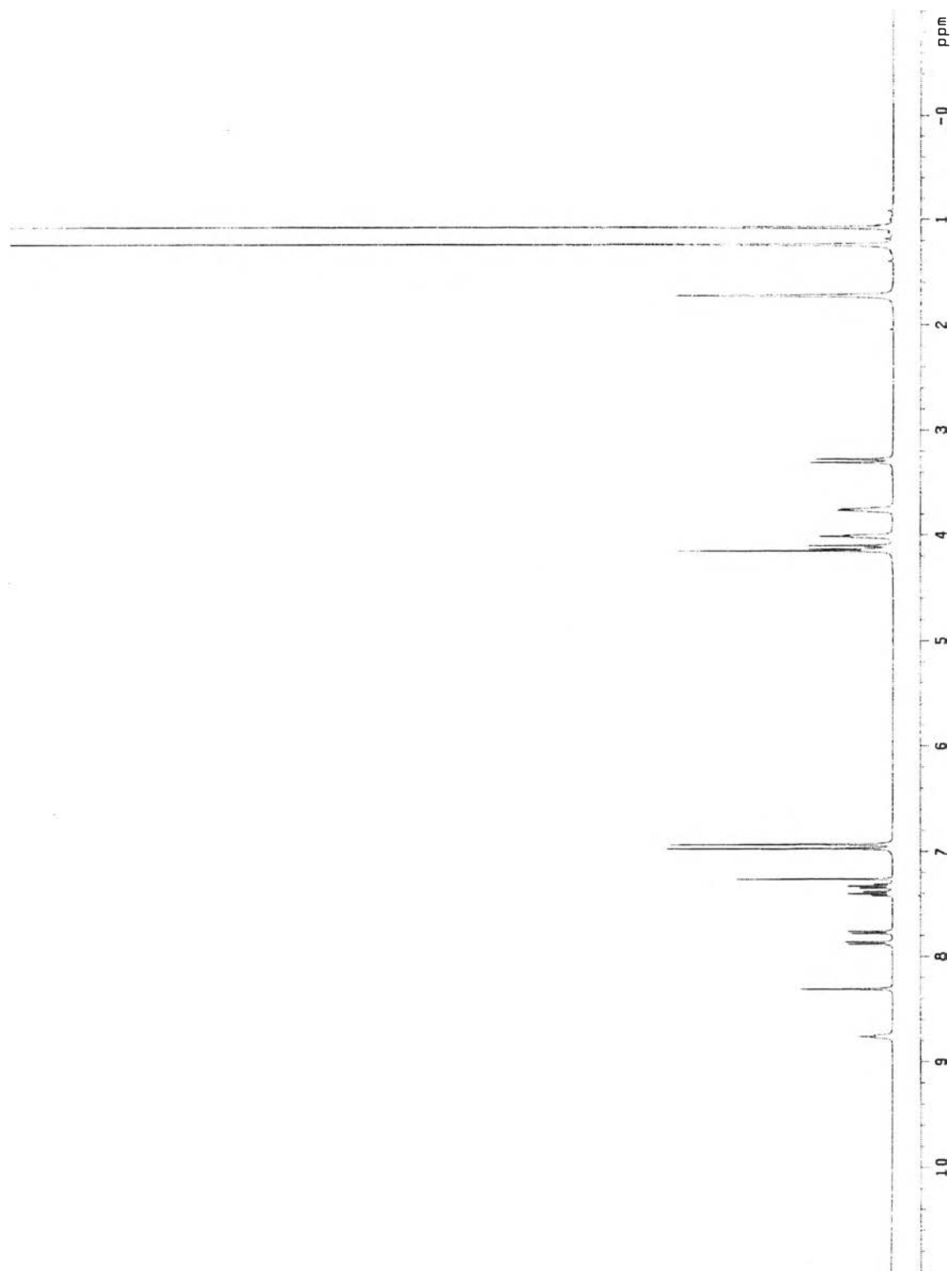
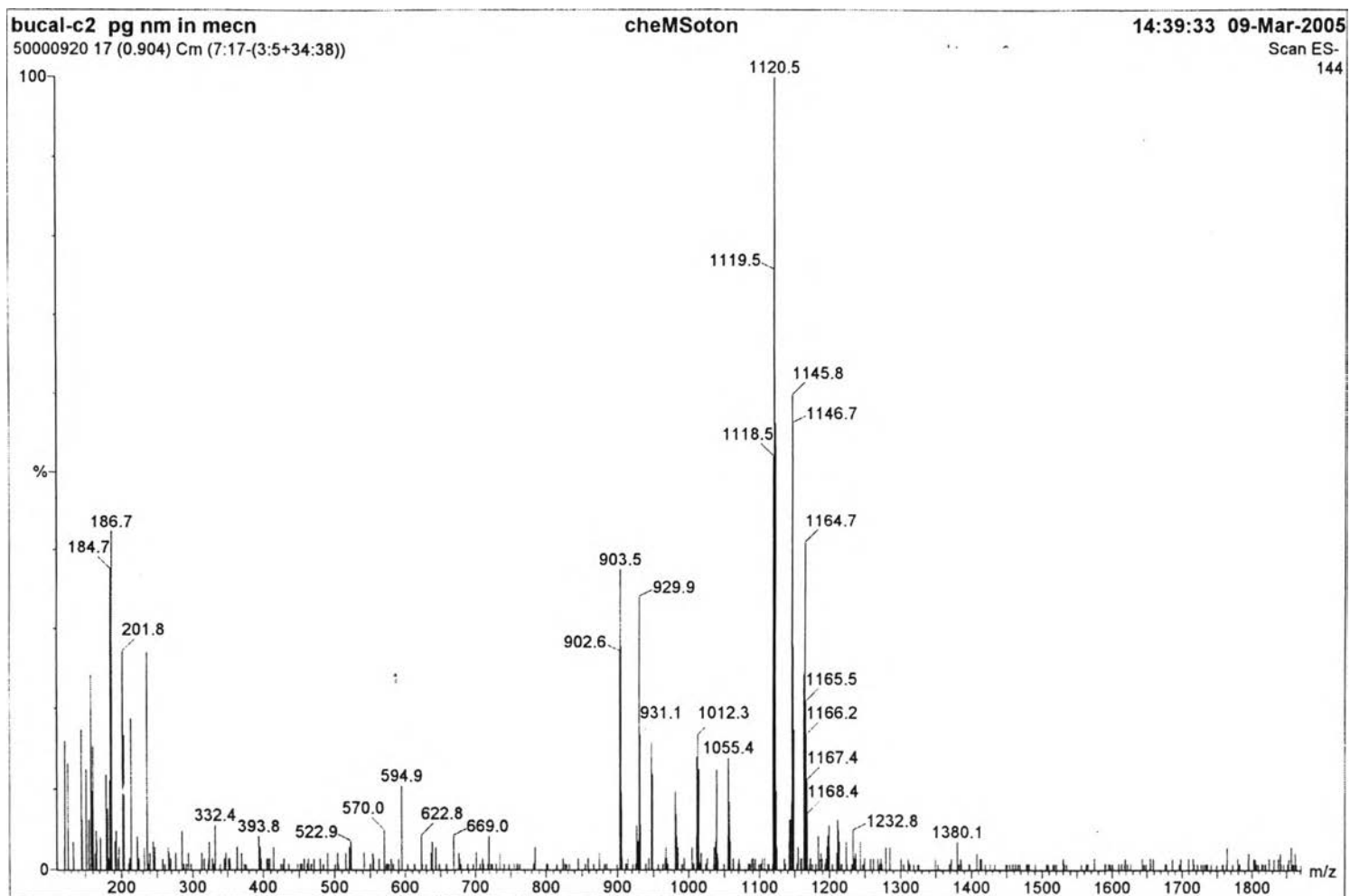


Figure A.13: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 5,11,17,23-tetra-*p-tert*-butyl-25,27-bis(benzothiazolylacetamidoethoxy)calix[4]arene (**17**)

Figure A.14: ESI-MS spectrum of 5,11,17,23-tetra-*p-tert*-butyl-25,27-bis(benzothiazolylacetamidoethoxy)calix[4]arene (**17**)



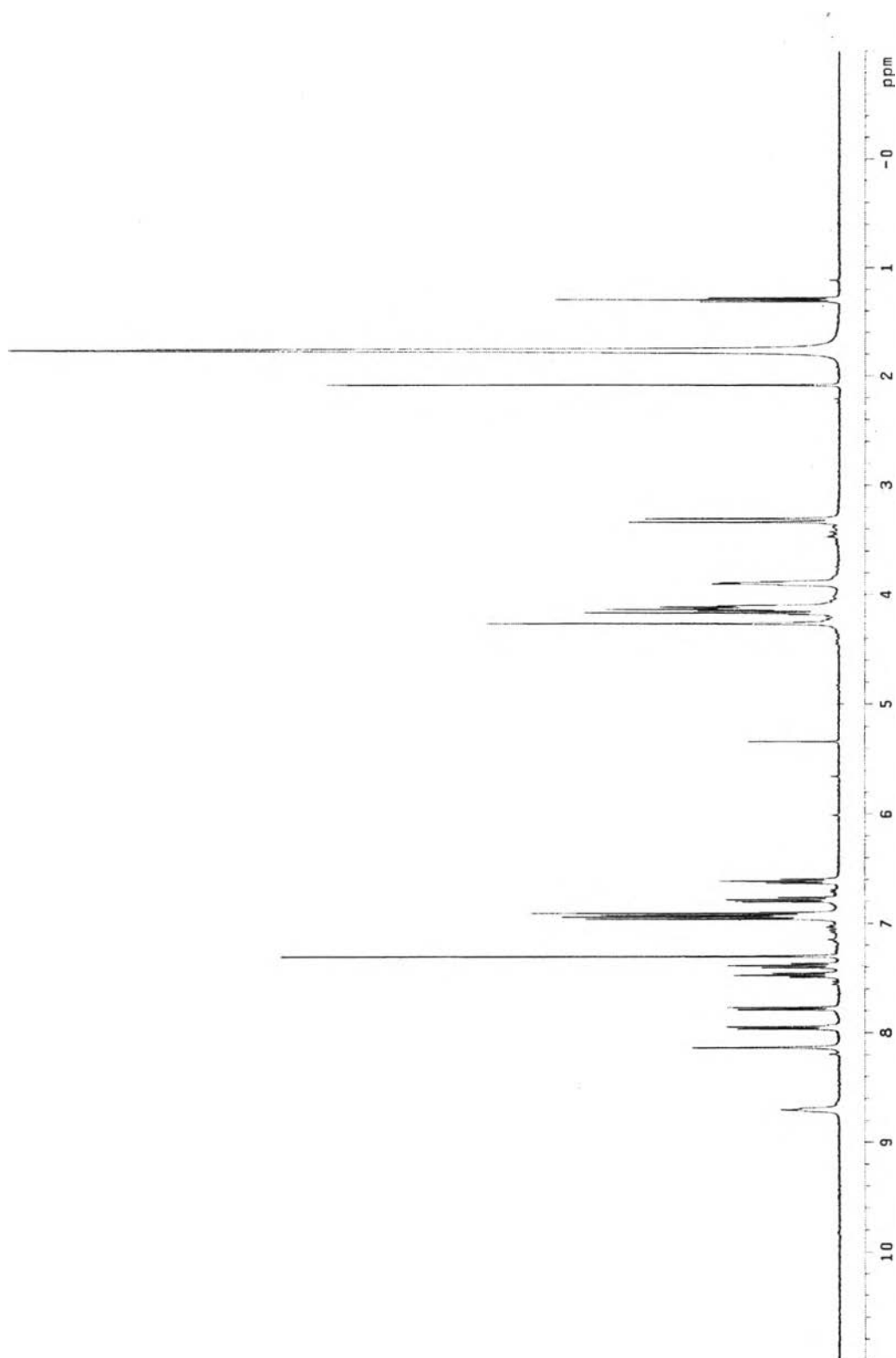


Figure A.15: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 25,27-bis(benzothiazolyl acetamidoethoxy)-26,28-dihydroxycalix[4]arene (**18**)

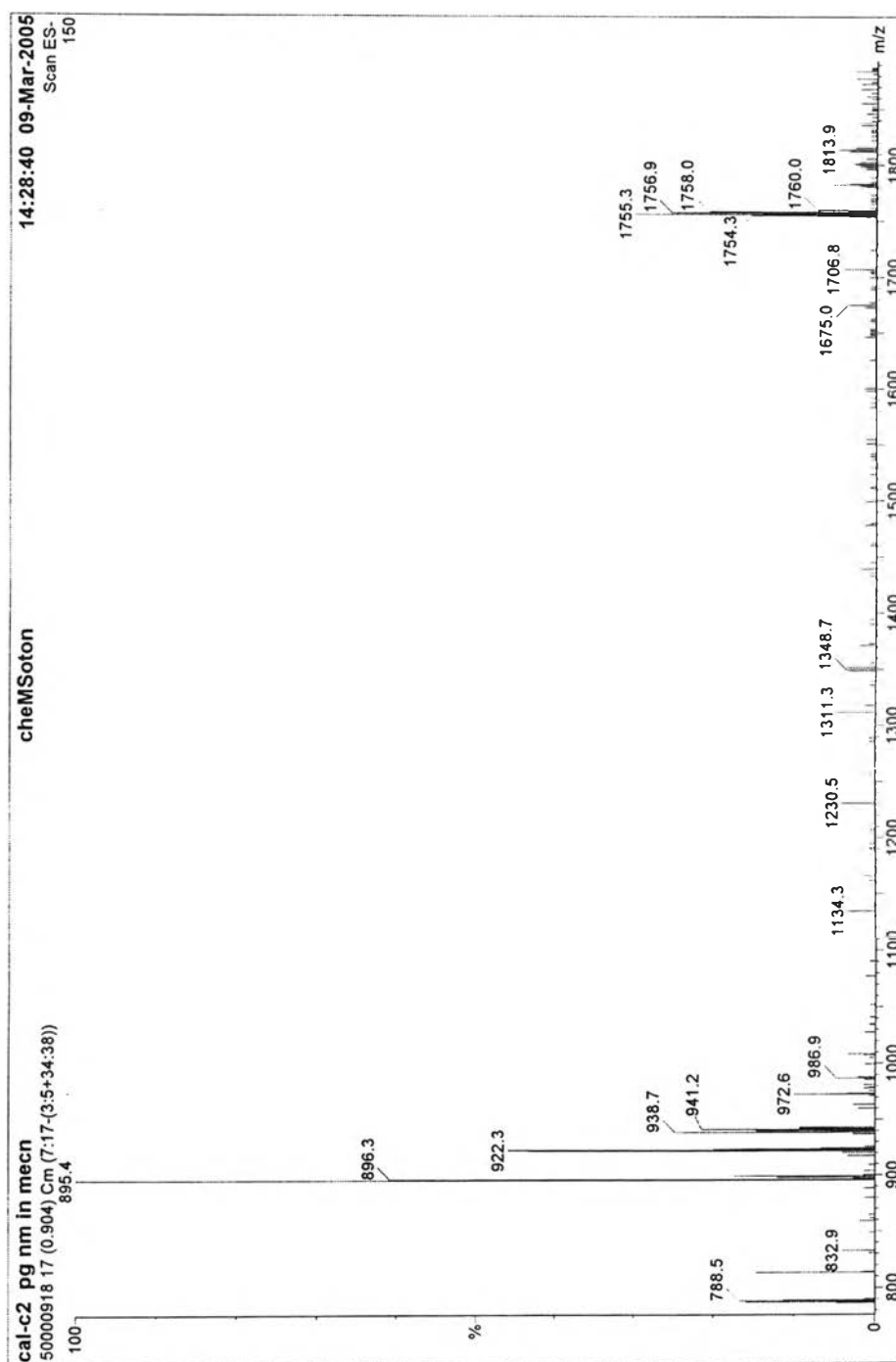


Figure A.16: ESI-MS spectrum of spectrum of 25,27-bis(benzothiazolyl)acetamidoethoxy)-26,28-dihydroxycalix[4]arene (**18**)

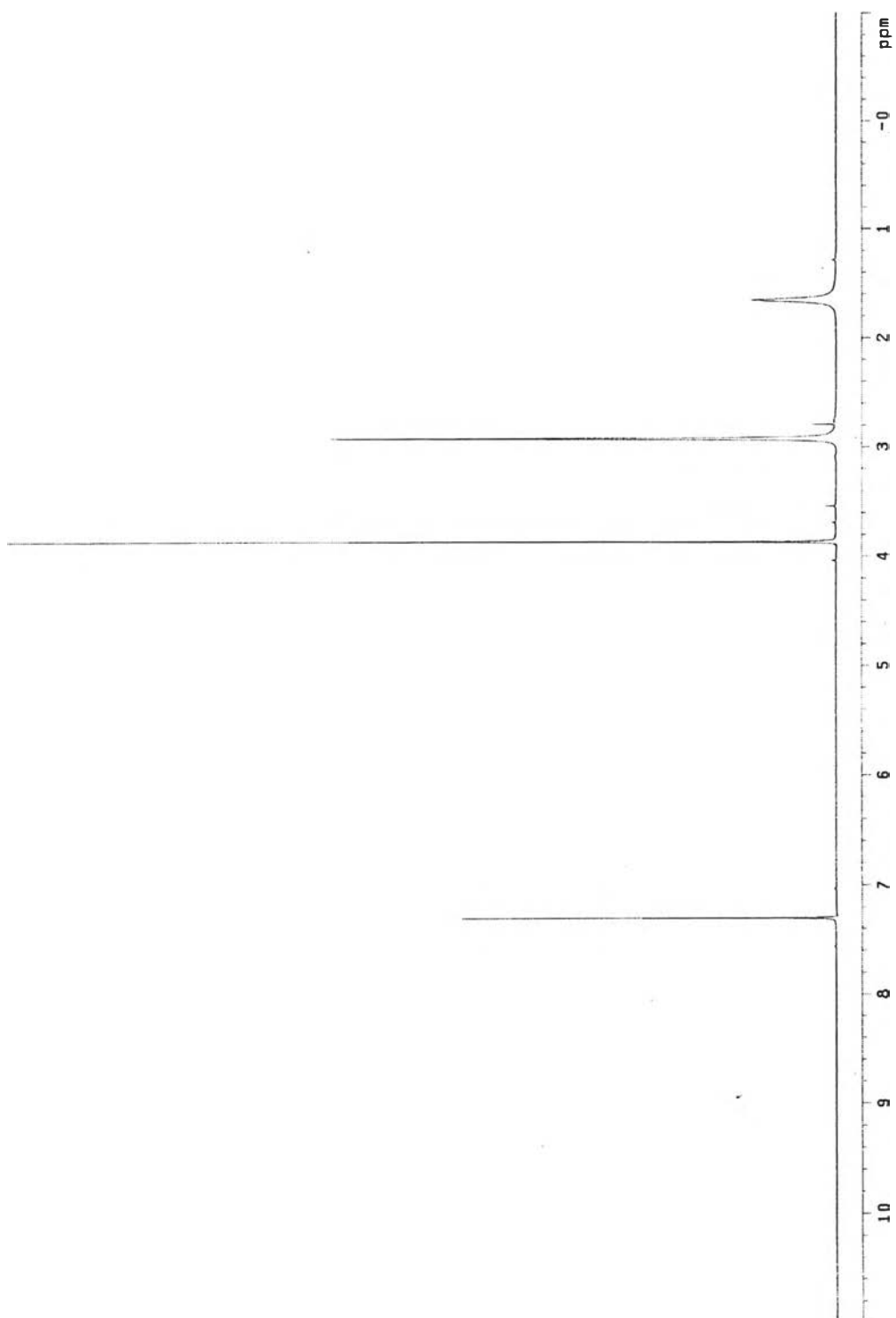


Figure A.17: ¹H-NMR spectrum (400 MHz, CDCl₃) of cyanoacetic acid active ester (5-(1,3-benzothiazol-2-yl-2-hydroxyl)aminobenzene) (**19**)

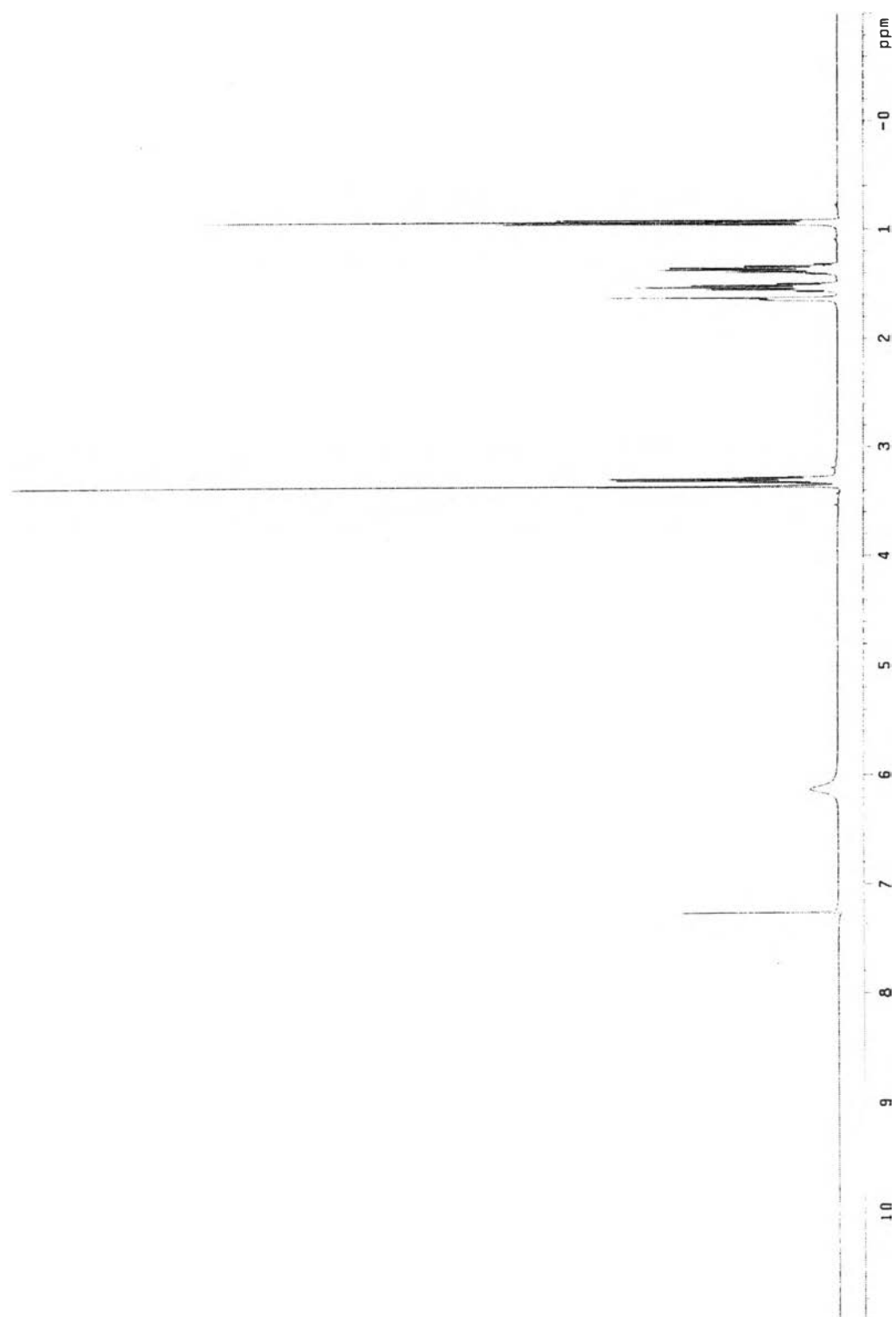


Figure A.18: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of *N*-butyl-2-cyanoacetamide (20)

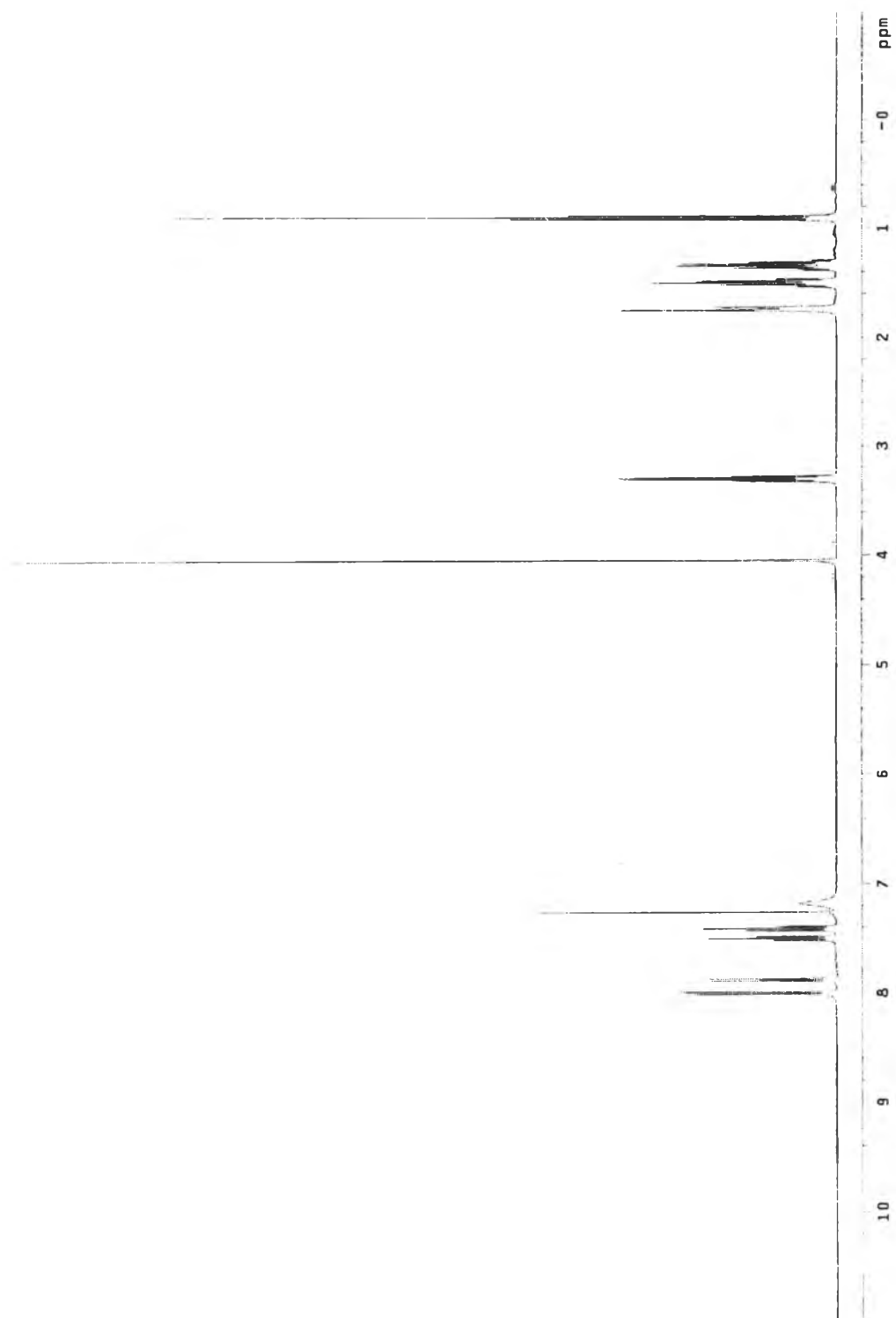


Figure A.19: $^1\text{H-NMR}$ spectrum (400 MHz, CDCl_3) of 2-(1,3-benzothiazol-2-yl)-*N*-butylacetamide (**21**)

VITA

Mr. Neramit Morakot was born on August 1, 1952 in Lampoon, Thailand. He received his Bachelor degree of Science in Chemistry in 1973 and Master degree of Science in Chemistry from University of Saskatchewan, Canada, in 1989. Since 2001, he has been a graduate student at the Department of Chemistry, Chulalongkorn University and worked under the supervision of Dr. Wanlapa Aeungmaitrepirom. Most work was done in Supramolecular Chemistry Research Unit laboratory headed by Associate Professor Dr. Thawatchai Tuntulani. He finished his Doctor of Philosophy degree in the academic year 2005.

