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APPENDIX



APPENDIX A



Appendix A: $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectra of boronic acid diacetylene monomers

Figure A1: $^1\text{H-NMR}$ of 10,12-*p*NB-PCDA (**1a**)

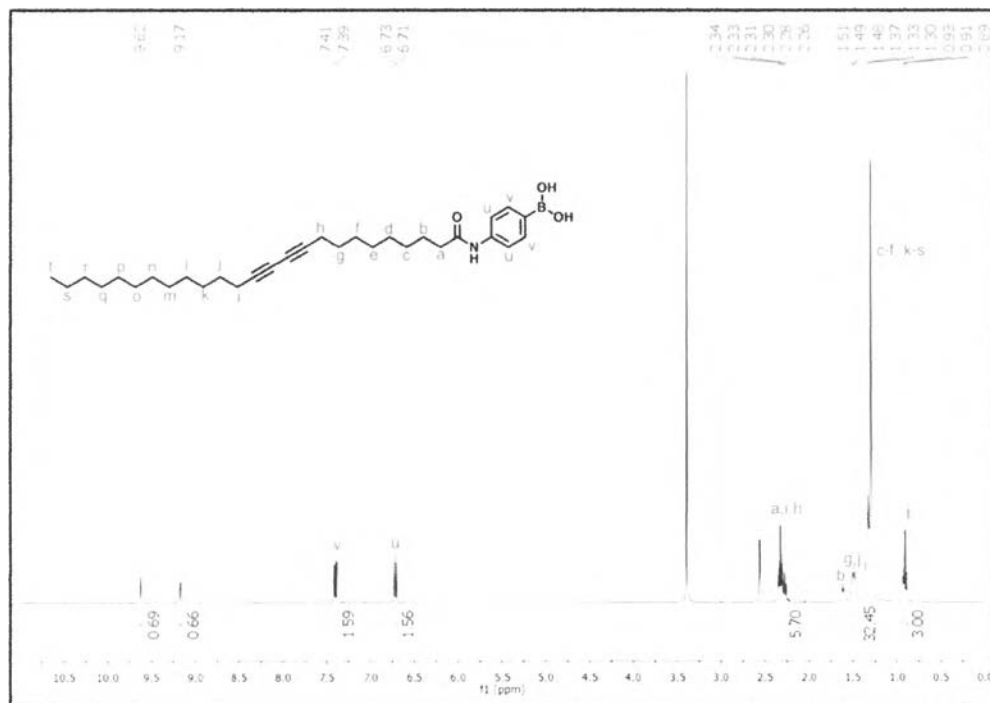


Figure A2: $^{13}\text{C-NMR}$ of 10,12-*p*NB-PCDA (**1a**)

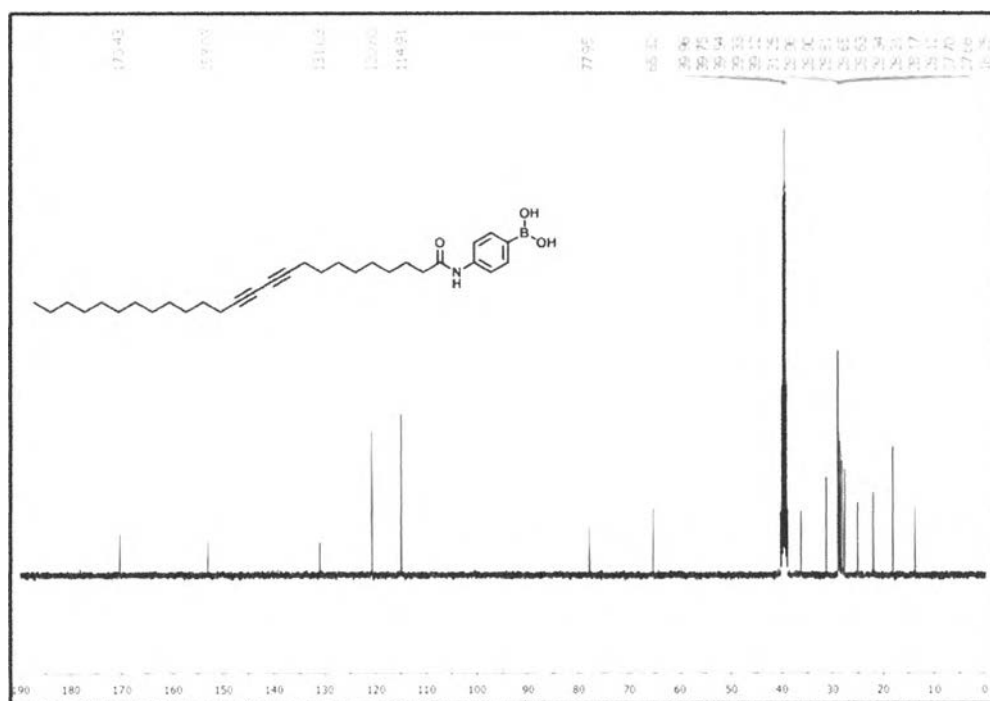
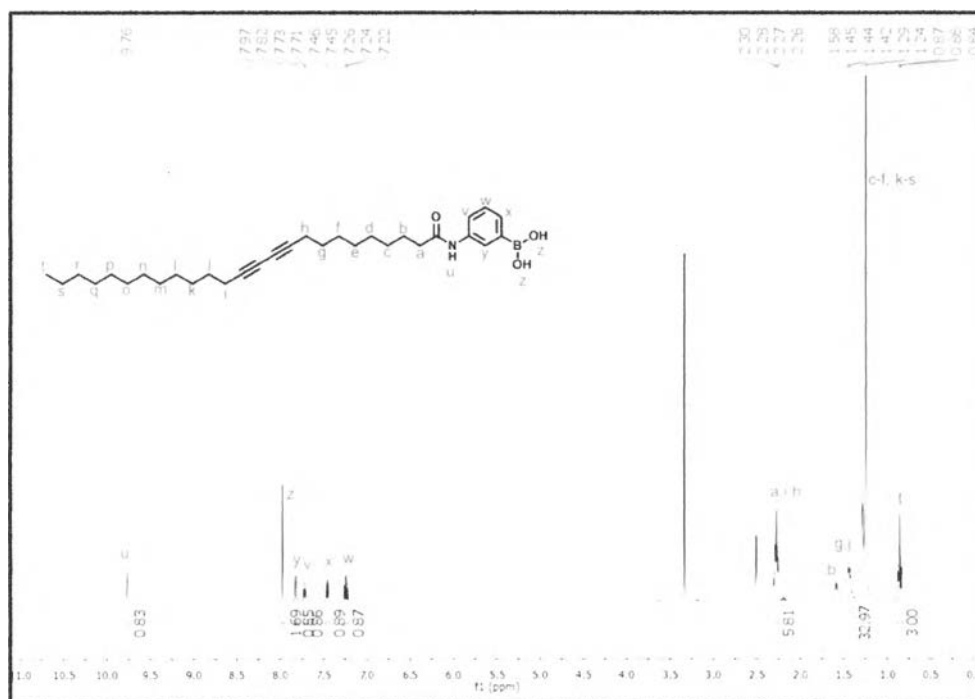


Figure A3: $^1\text{H-NMR}$ of 10,12-*m*NB-PCDA (2a)

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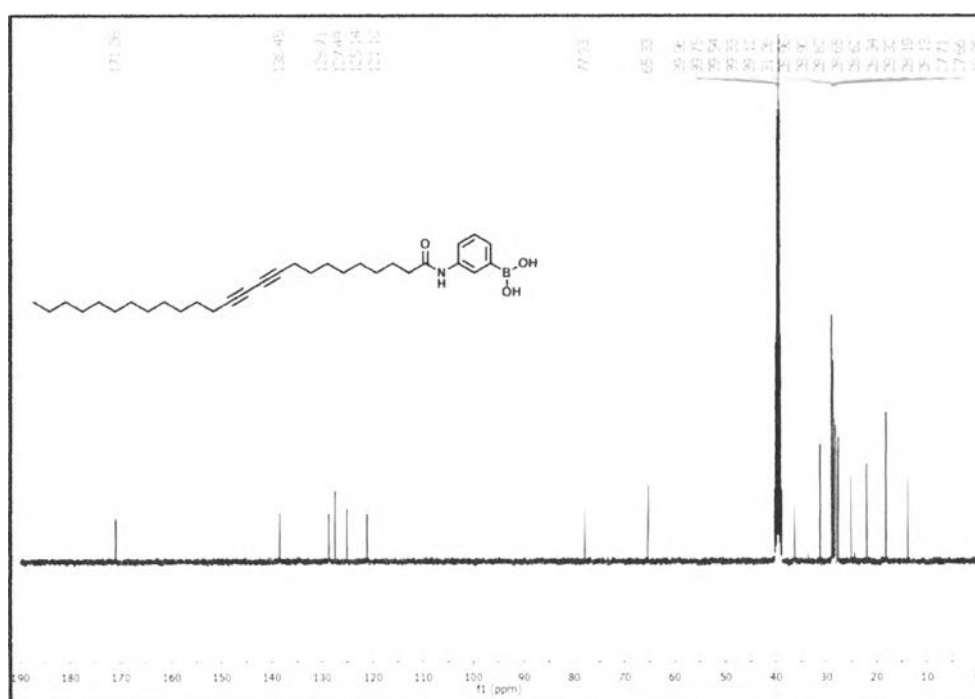
Figure A4: $^{13}\text{C-NMR}$ of 10,12-*m*NB-PCDA (2a)

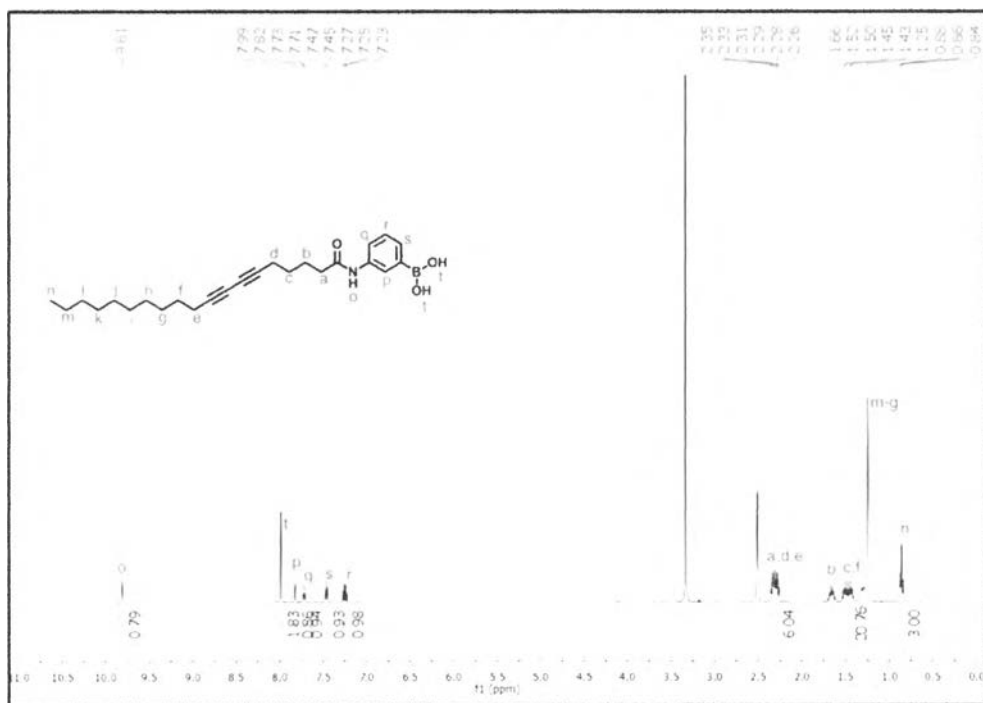
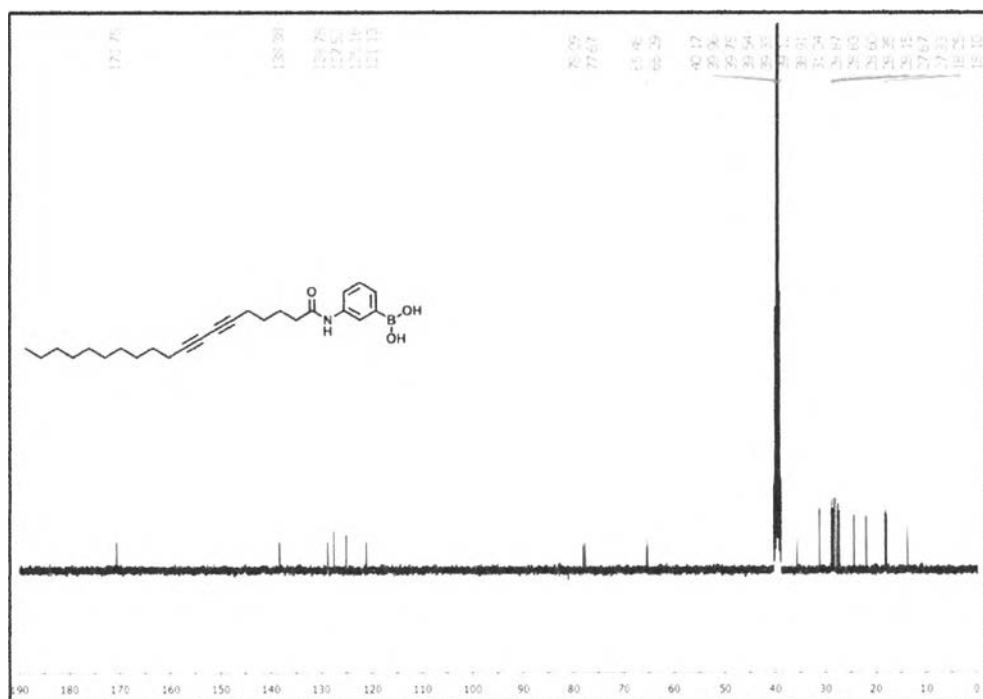
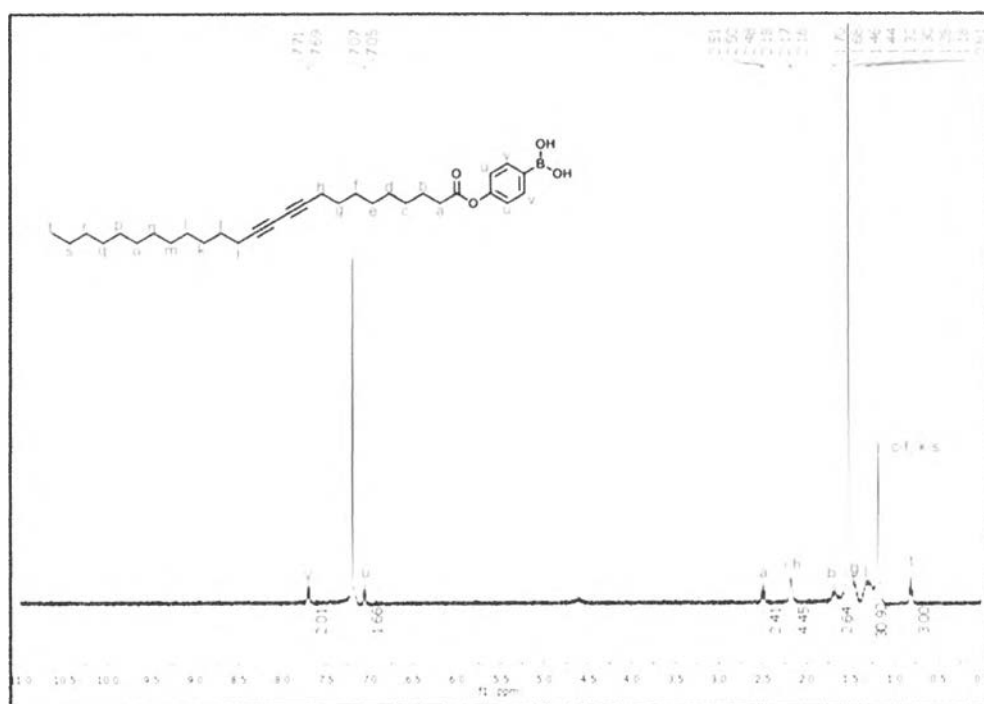
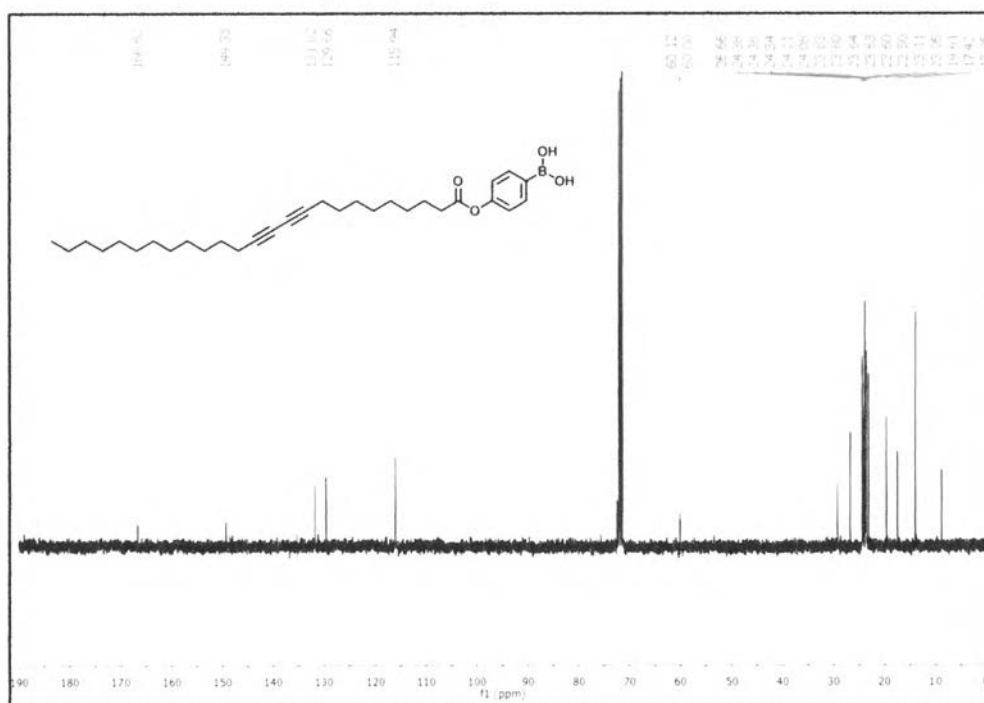
Figure A5: $^1\text{H-NMR}$ of 6,8-*m*NB-NCDA (3a)Figure A6: $^{13}\text{C-NMR}$ of 6,8-*m*NB-NCDA (3a)

Figure A7: $^1\text{H-NMR}$ of 10,12-*p*EB-PCDA (4e)Figure A8: $^{13}\text{C-NMR}$ of 10,12-*p*EB-PCDA (4e)

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 เลขทะเบียน..... 7241
 วันเดือนปี..... 16 ส.ค. 2560

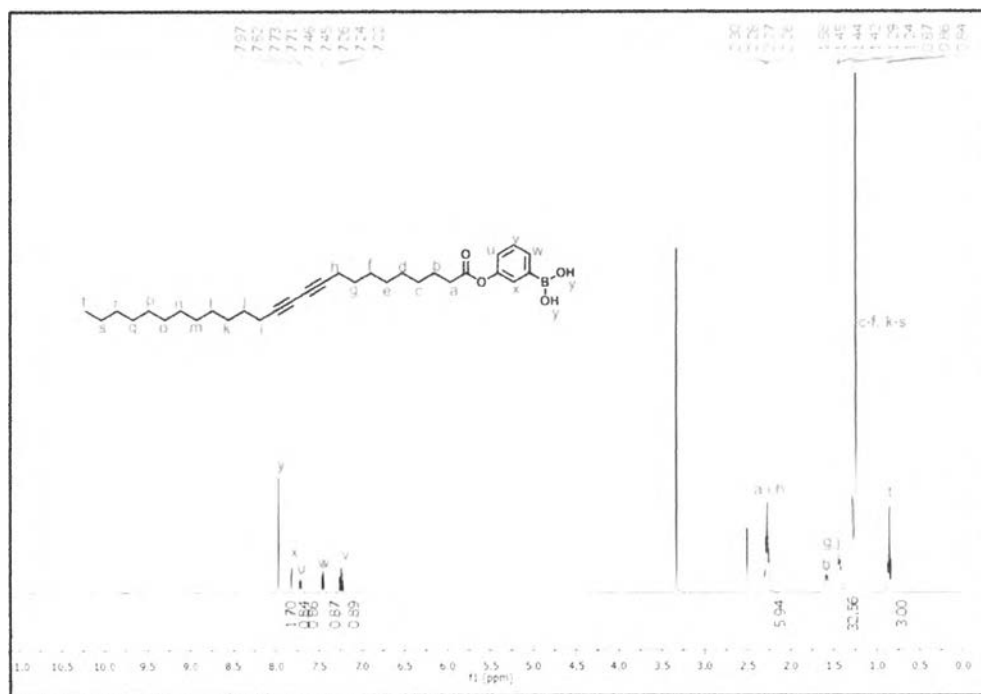
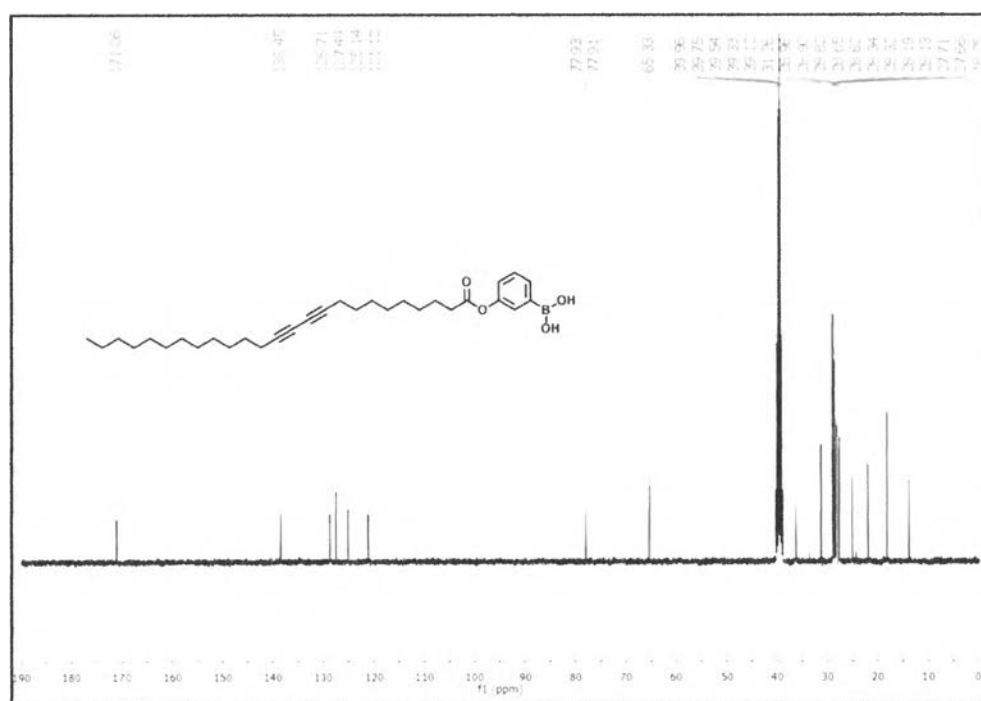
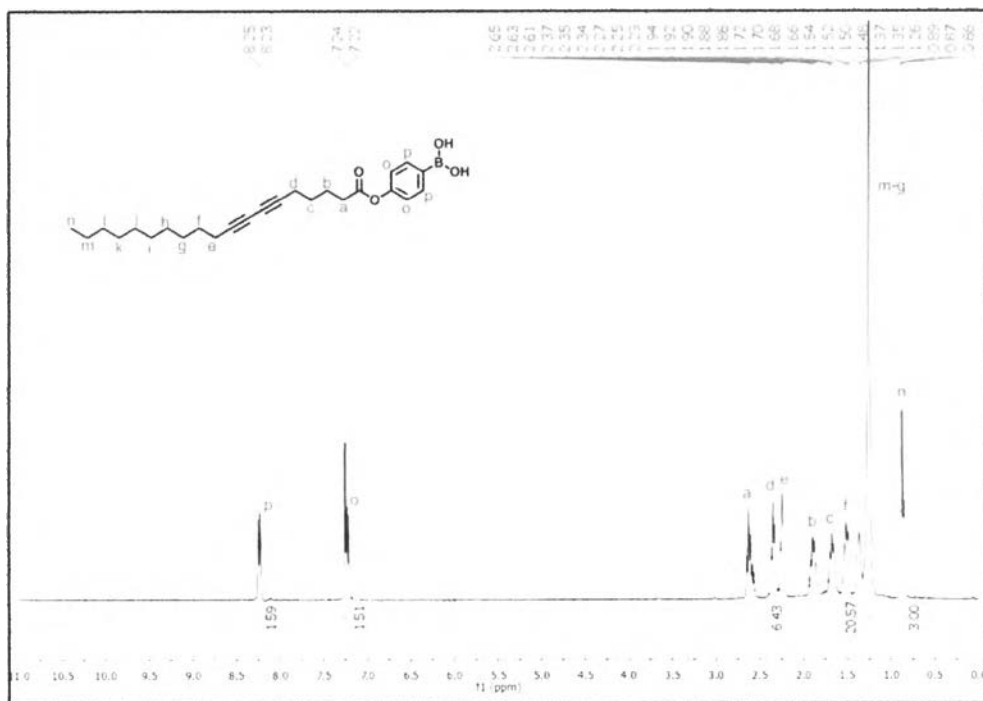
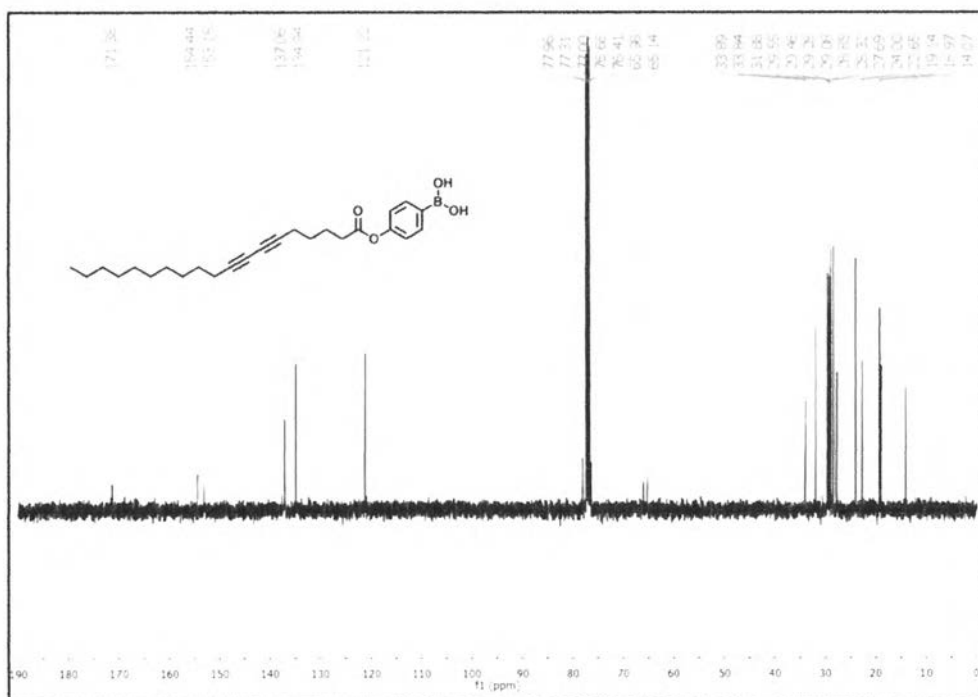
Figure A9: $^1\text{H-NMR}$ of 10,12-*m*EB-PCDA (5e)Figure A10: $^{13}\text{C-NMR}$ of 10,12-*m*EB-PCDA (5e)

Figure A11: $^1\text{H-NMR}$ of 6,8-*p*EB-NCDA (**6e**)Figure A12: $^{13}\text{C-NMR}$ of 6,8-*p*EB-NCDA (**6e**)

APPENDIX B



Appendix B: $^1\text{H-NMR}$ and $^{13}\text{C-NMR}$ spectra of salicylic acid diacetylene monomers

Figure B1: $^1\text{H-NMR}$ of 10,12-TEGASA-PCDA (7s)

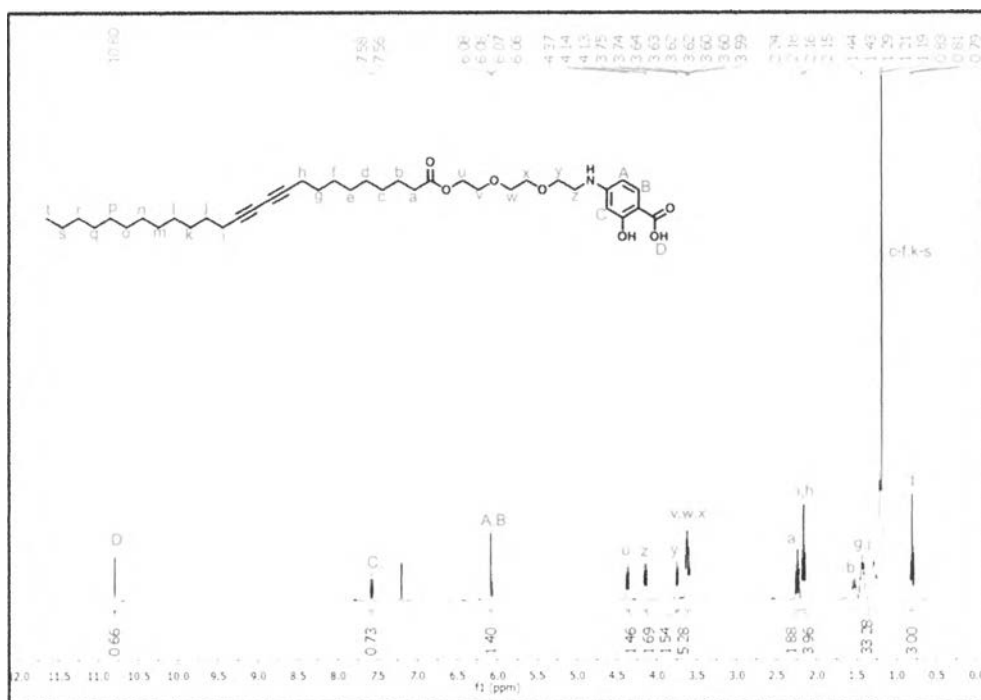


Figure B2: $^{13}\text{C-NMR}$ of 10,12-TEGASA-PCDA (7s)

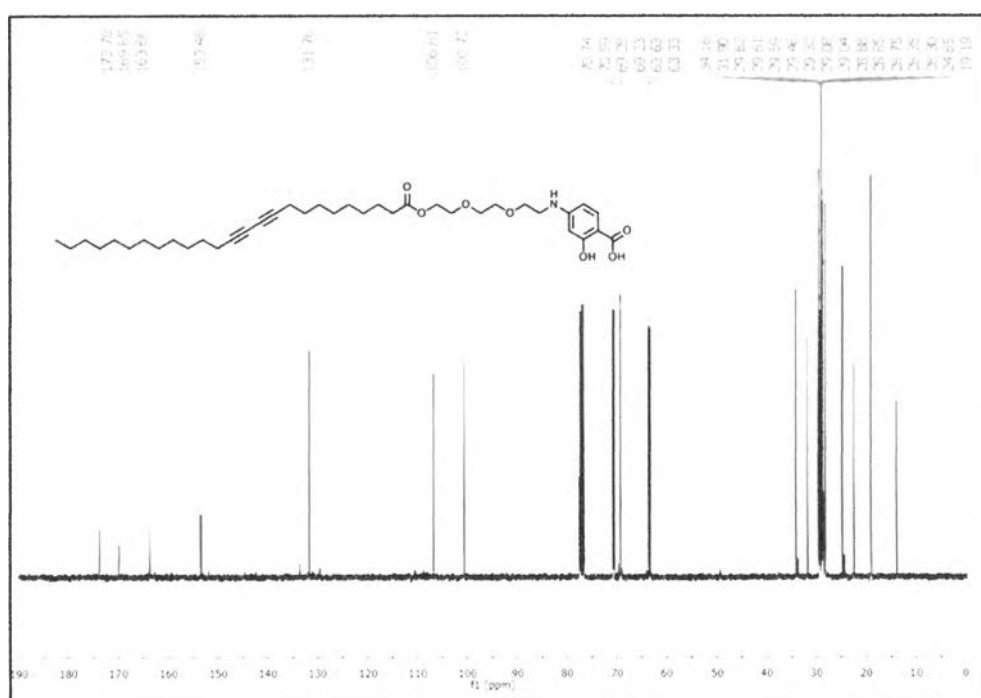
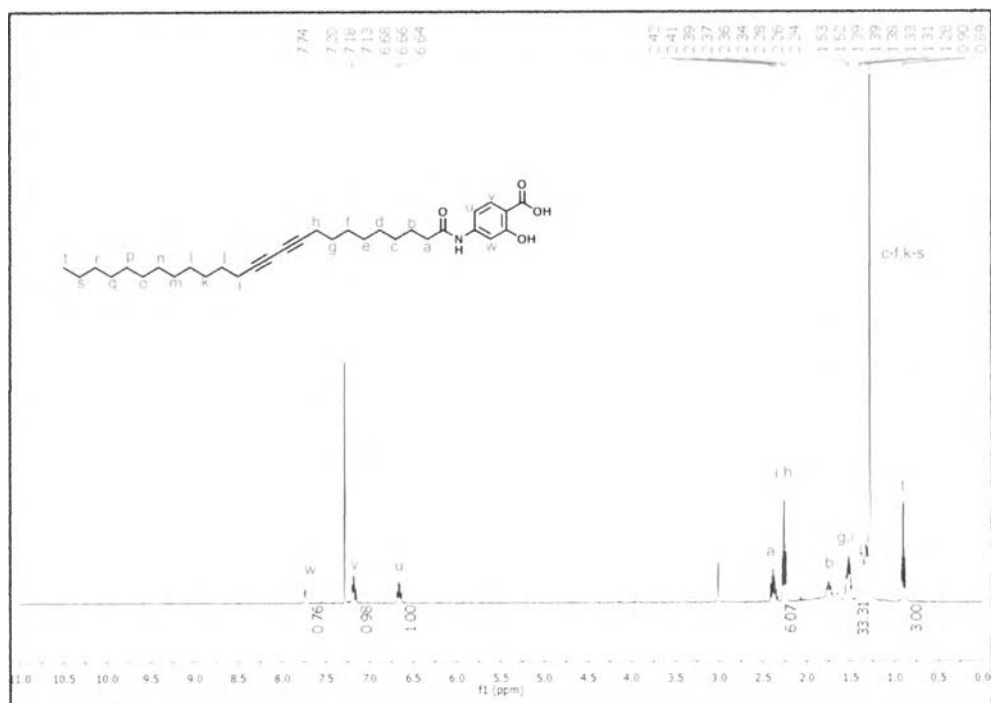
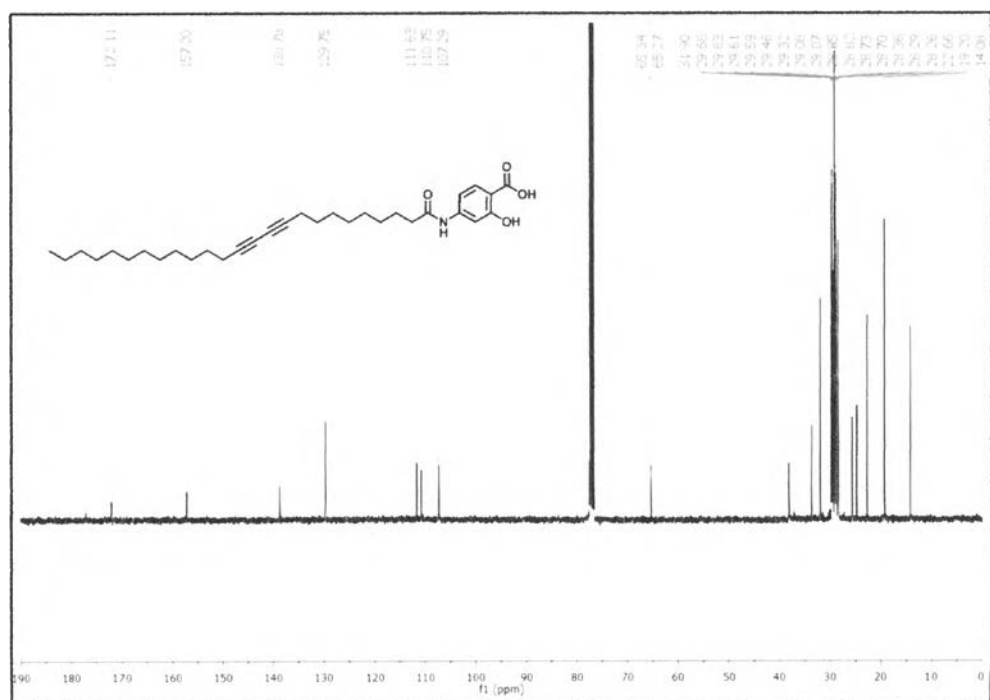


Figure B3: $^1\text{H-NMR}$ of 10,12-*p*ASA-PCDA (8s)Figure B4: $^{13}\text{C-NMR}$ of 10,12-*p*ASA-PCDA (8s)

APPENDIX C



Appendix C: Particle size distribution of polydiacetylene sols from dynamic light scattering technique (DLS)

	Particle size (nm)
1 st	215.4
2 nd	214.5
3 rd	214.0
Mean	214.6

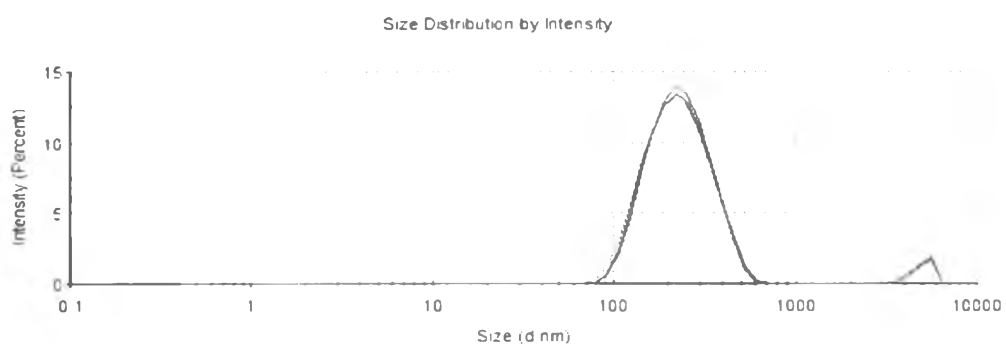


Figure C1: Particle size distribution of 10,12-*p*NB-PDA (**1a**)

	Particle size (nm)
1 st	137.9
2 nd	138.8
3 rd	138.6
Mean	138.4

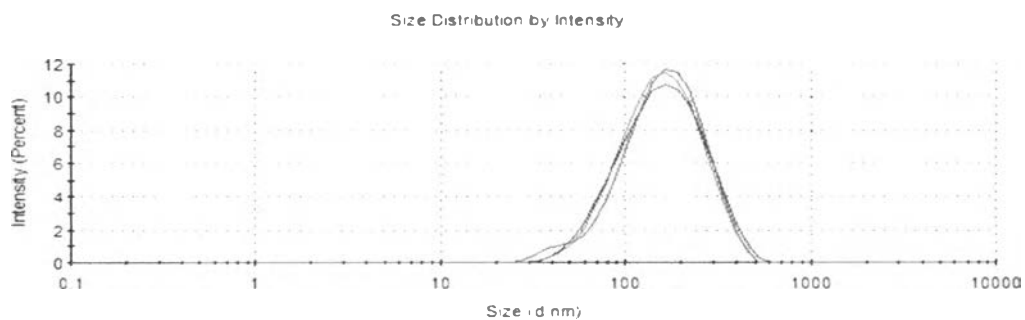


Figure C2: Particle size distribution of 10,12-*m*NB-PDA (**2a**)

	Particle size (nm)
1 st	352.0
2 nd	355.9
3 rd	349.5
Mean	352.4

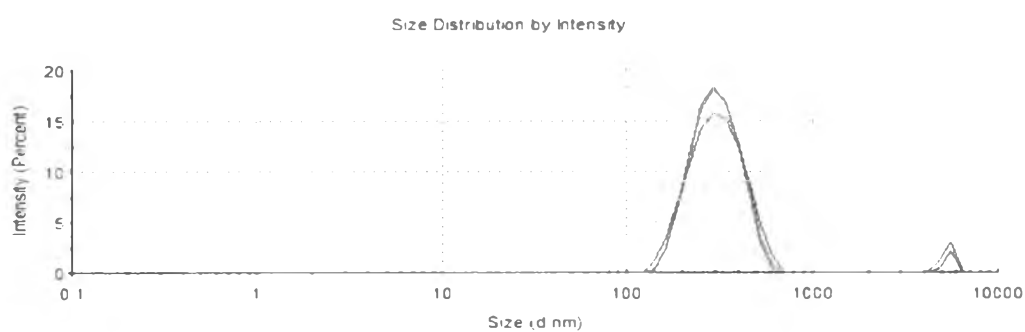


Figure C3: Particle size distribution of 6,8-*m*NB-PDA (**3a**)

	Particle size (nm)
1 st	77.19
2 nd	75.80
3 rd	75.98
Mean	76.32

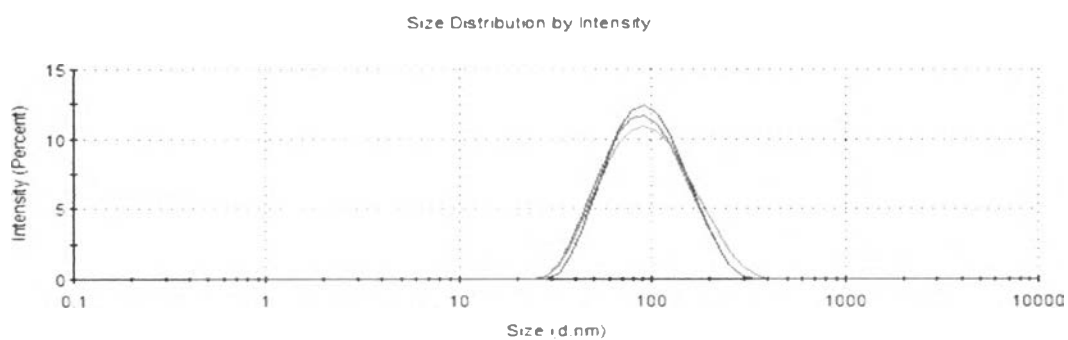


Figure C4: Particle size distribution of 10,12-*p*EB-PDA (**4e**)



	Particle size (nm)
1 st	172.7
2 nd	170.7
3 rd	167.1
Mean	170.2

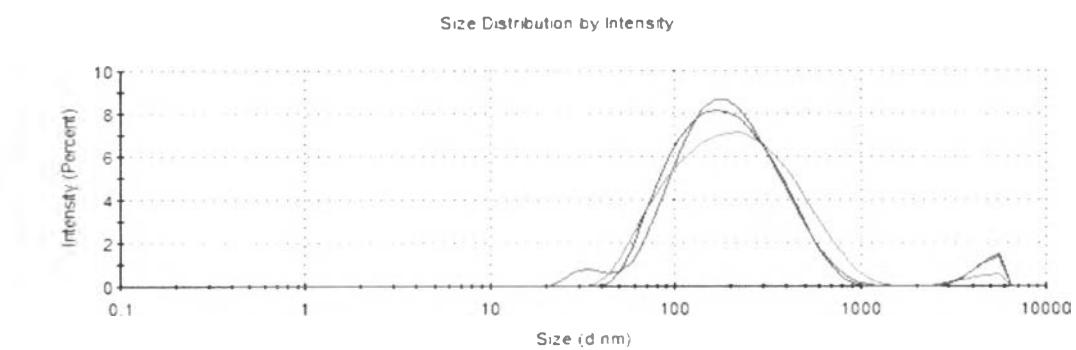
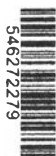


Figure C5: Particle size distribution of 10,12-*m*EB-PDA (5e)



VITA

Sattaya Suklim was born on July 15th, 1988 in Trang, Thailand. He received a Bachelor's Degree of Science, majoring in Chemistry from Faculty of Science, Slipakorn University in 2011 after that he has been a graduate student studying Petrochemistry and Polymer Science as his major course from Faculty of Science, Chulalongkorn University. He has presented his research on "Colorimetric sensors from polydiacetylene containing boronic acid" in The 3rd Polymer Conference of Thailand (PCT3) by poster presentation and "Synthesis of polydiacetylenes containing boronic acid and their thermochromic response toward temperature, pH, surfactants and volatile organic compounds" in Pure and Applied Chemistry International Conference (PACCON 2014) by poster presentation. Then, he went to Japan Advanced Institute of Science and Technology (JAIST) to associate in JASSO program for 42 days.

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