



## REFERENCES

- [1] Fan, L.-J., et al. Fluorescent conjugated polymer molecular wire chemosensors for transition metal ion recognition and signaling. *Coordination Chemistry Reviews* 253(3-4) (2009): 410-422.
- [2] Lakowicz, J.R. *Principles of Fluorescence Spectroscopy*. Third ed.: Springer, 2006.
- [3] Mark, B. *Quenching processes* Available from: <http://www.rose-hulman.edu/~brandt/Fluorescence/> [June]
- [4] de Silva, A.P., et al. Signaling Recognition Events with Fluorescent Sensors and Switches. *Chemical Reviews* 97(5) (1997): 1515-1566.
- [5] Chattopadhyay, N., Serpa, C., Pereira, M.M., de Melo, J.S., Arnaut, L.G., and Formosinho, S.o.J. Intramolecular Charge Transfer of p-(Dimethylamino)benzethyne- A Case of Nonfluorescent ICT State. *J. Phys. Chem. A* 105 (2001): 10025-10030.
- [6] Huang, W., Zhang, X., Ma, L.-H., Wang, C.-J., and Jiang, Y.-B. Intramolecular charge transfer dual fluorescence of substituted-phenyl p-dimethylaminobenzoates with comparable electron acceptors. *Chemical Physics Letters* 352 (2002): 401–407.
- [7] Jiang, Z., Tang, L., Shao, F., Zheng, G., and Lu, P. Synthesis and characterization of 9-(cycloheptatrienyldene)fluorene derivatives: New fluorescent chemosensors for detection of Fe(III) and Cu(II). *Sensors and Actuators B: Chemical* 134(2) (2008): 414-418.
- [8] Zhu, L., Qin, J., and Yang, C. New metal-coordination-inhibited charge transfer emission for terfluorenes: highly sensitive and selective detection for Hg(II) with ratiometric "turn-on" fluorescence response. *Chem Commun (Camb)* 46(46) (2010): 8755-7.
- [9] Xu, Q., An, L., Yu, M., and Wang, S. Design and Synthesis of a New Conjugated Polyelectrolyte as a Reversible pH Sensor. *Macromolecular Rapid Communications* 29(5) (2008): 390-395.
- [10] Sundari, R., Ahmad, M., and Heng, L.Y. Development of an optical fibre reflectance sensor for copper (II) detection based on immobilised salicylic acid. *Sensors and Actuators B: Chemical* 113(1) (2006): 201-206.
- [11] Sirilaksanapong, S., Sukwattanasinitt, M., and Rashatasakhon, P. 1,3,5-Triphenylbenzene fluorophore as a selective Cu(II) sensor in aqueous media. *Chem Commun (Camb)* 48(2) (2012): 293-5.

- [12] Auttaponpitak, P., Sukwattanasinitt, M., and Rashatasakhon, P. Water-soluble branched phenylene-ethynylene fluorophores with N-phenylcarbazole core. *Sensors and Actuators B: Chemical* 178 (2013): 296-301.
- [13] Niamnont, N., Kimpitak, N., Tumcharern, G., Rashatasakhon, P., and Sukwattanasinitt, M. Highly sensitive salicylic fluorophore for visual detection of picomole amounts of Cu(II). *RSC Advances* 3(47) (2013): 25215.
- [14] BLOM, Petra, Francoise, M., HOFLACK, Jan, and Jozef, M.C. *Macrocyclic flt3 kinase inhibitors* 2013.
- [15] Zhang, X., Ji, X., Jiang, S., Liu, L., Weeks, B.L., and Zhang, Z. Highly efficient synthesis of 9-fluorenones from 9H-fluorenes by air oxidation. *Green Chemistry* 13(7) (2011): 1891.
- [16] Du, H., Fuh, R.-C.A., Li, J., Corkan, L.A., and Lindsey, J.S. PhotochemCAD: A Computer-Aided Design and Research Tool in Photochemistry. *Photochemistry and Photobiology* 68(2) (1998): 141-142.
- [17] Burrows, H.D., et al. Fluorescence Enhancement of the Water-Soluble Poly{1,4-phenylene-[9,9-bis-(4-phenoxybutylsulfonate)]fluorene-2,7-diyl} Copolymer in n-Dodecylpentaoxyethylene Glycol Ether Micelles. *Macromolecules* 37(20) (2004): 7425-7427.
- [18] Rodríguez, J.G., Tejedor, J.L., La Parra, T., and Diaz, C. Synthesis of conjugated 2,7-bis(trimethylsilylethynyl)-(phenylethynyl)fluoren-9-one and 9-(p-methoxyphenyl)-9-methyl derivatives: optical properties. *Tetrahedron* 62(14) (2006): 3355-3361.
- [19] Estrada, L.A., Cai, X., and Neckers, D.C. Nonradiative Decay Mechanism of Fluoren-9-ylidene Malononitrile Ambipolar Derivatives. *The Journal of Physical Chemistry A* 115(11) (2011): 2184-2195.
- [20] Estrada, L.A. and Neckers, D.C. Synthesis and Photophysics of Ambipolar Fluoren-9-ylidene Malononitrile Derivatives. *The Journal of Organic Chemistry* 74(21) (2009): 8484-8487.
- [21] Hatai, J., Pal, S., Jose, G.P., and Bandyopadhyay, S. Histidine Based Fluorescence Sensor Detects Hg(II) in Solution, Paper Strips, and in Cells. *Inorganic Chemistry* 51(19) (2012): 10129-10135.
- [22] Vij, V., Bhalla, V., and Kumar, M. Attogram Detection of Picric Acid by Hexa-peri-Hexabenzocoronene-Based Chemosensors by Controlled Aggregation-Induced Emission Enhancement. *ACS Appl Mater Interfaces* 5(11) (2013): 5373-5380.



# ព័ត៌មានប័ណ្ណ អនុការណ៍យោ

## APPENDIX



2905392220

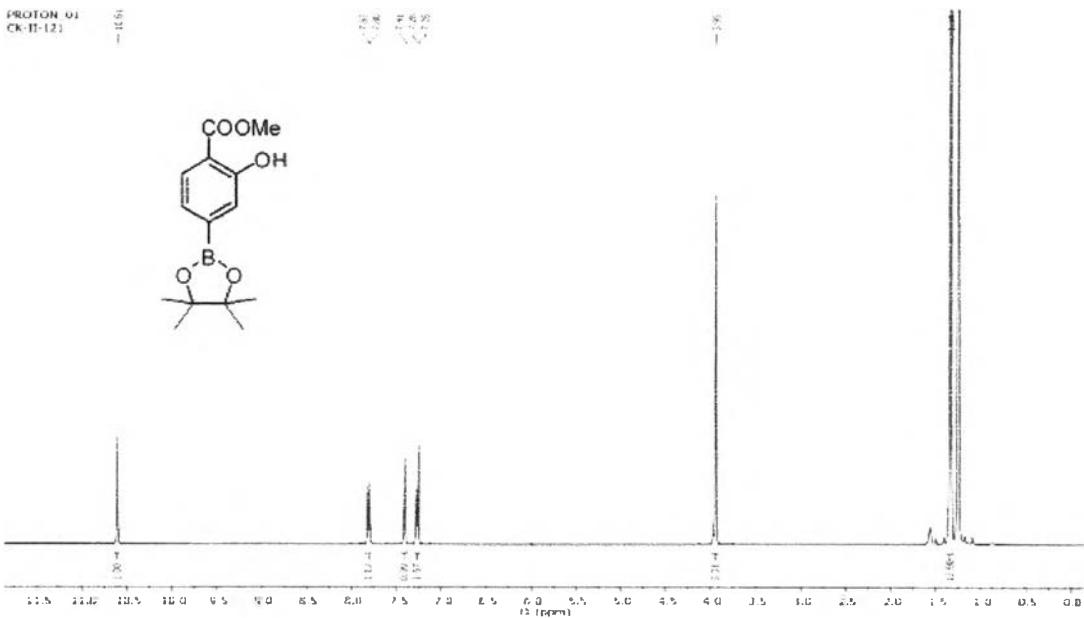
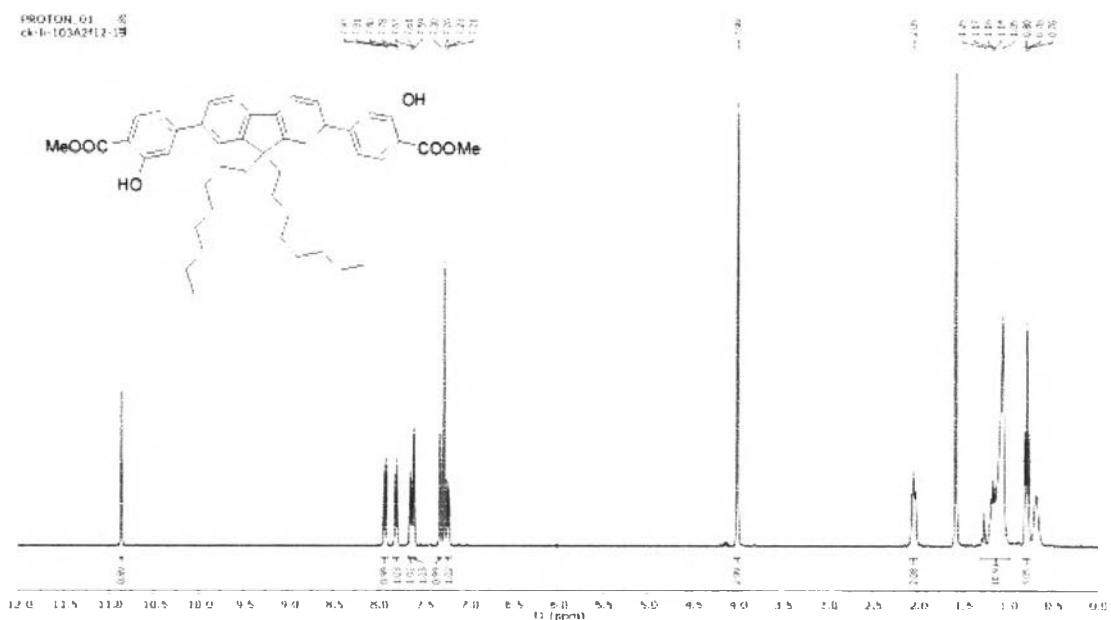
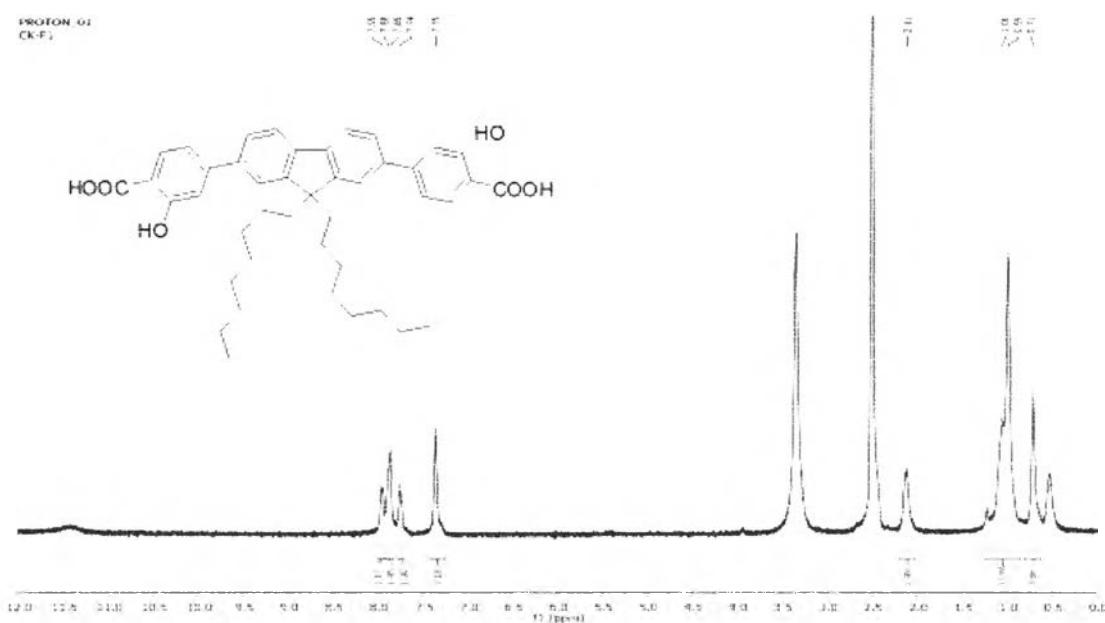


Figure A.1  $^1\text{H}$ -NMR of **1** in  $\text{CDCl}_3$

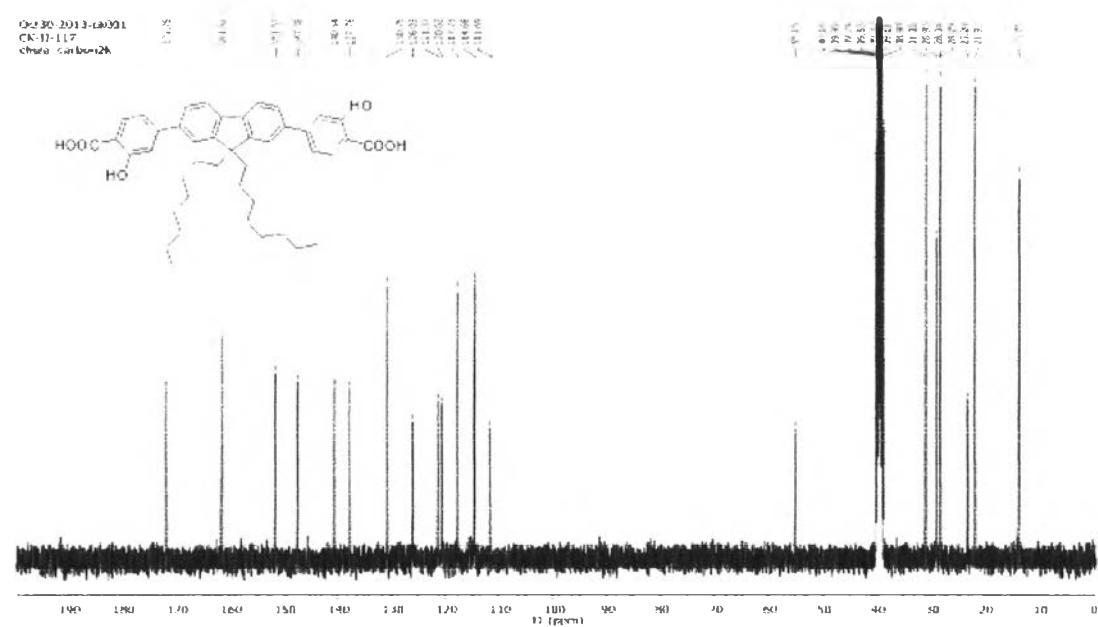
2905392820



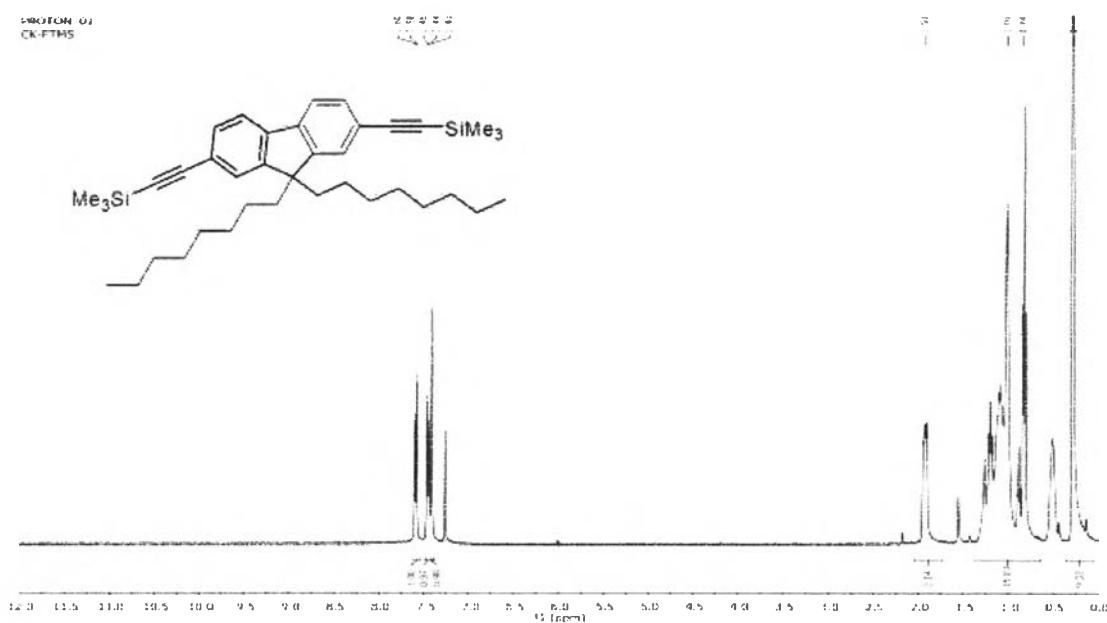


**Figure A.3** <sup>1</sup>H-NMR of F1 in DMSO-d<sub>6</sub>

2905382020

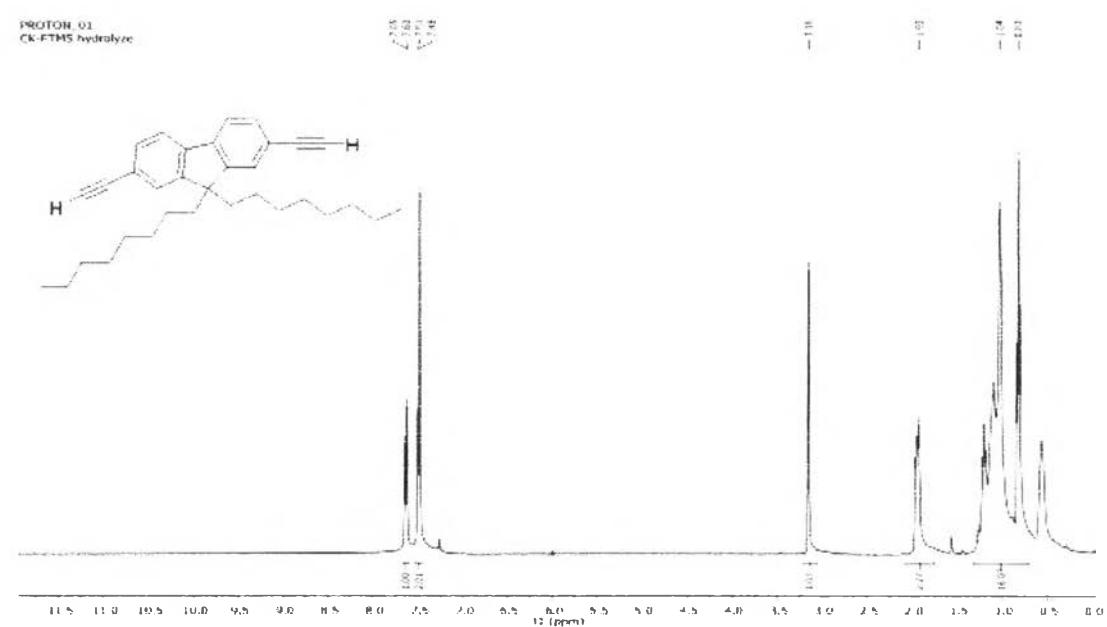


**Figure A.4** <sup>13</sup>C-NMR of F1 in DMSO-d<sub>6</sub>

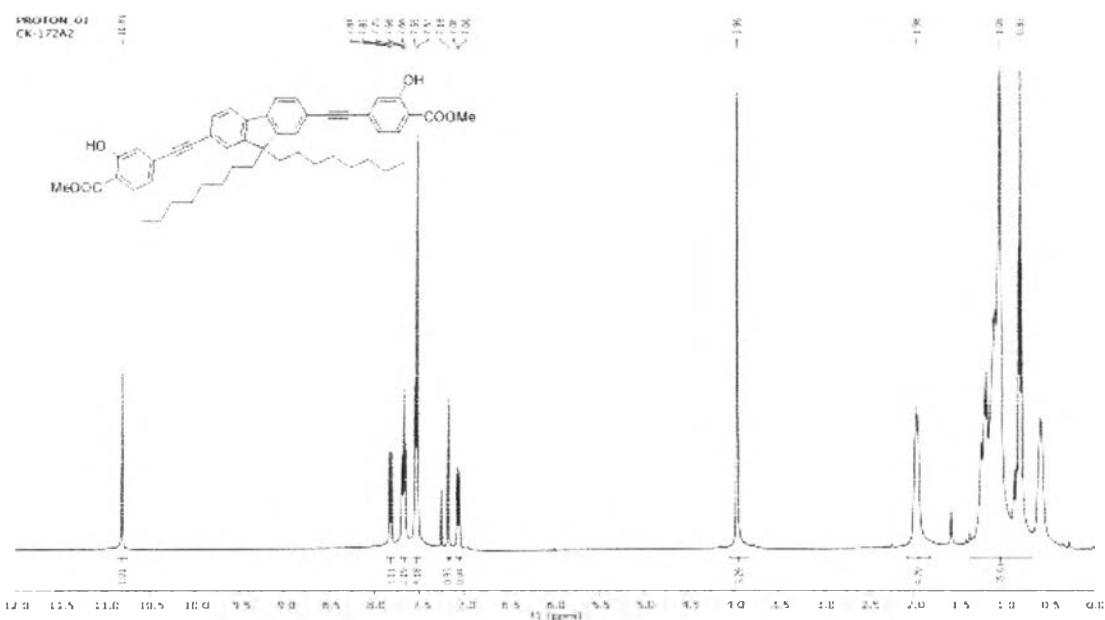


**Figure A.5**  $^1\text{H}$ -NMR of **3** in  $\text{CDCl}_3$

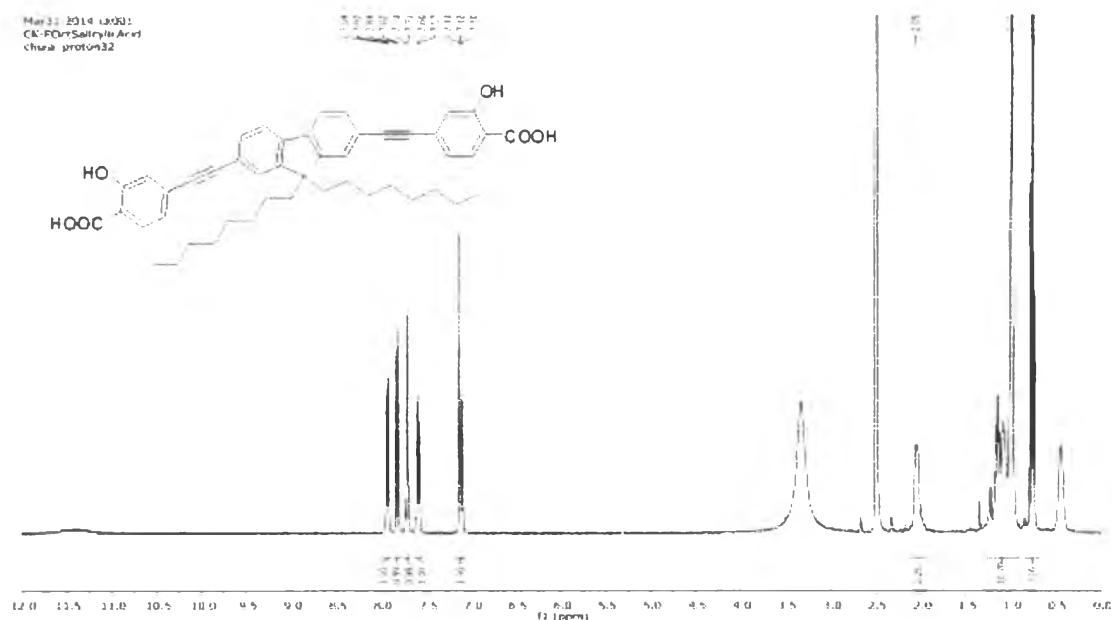
290592020



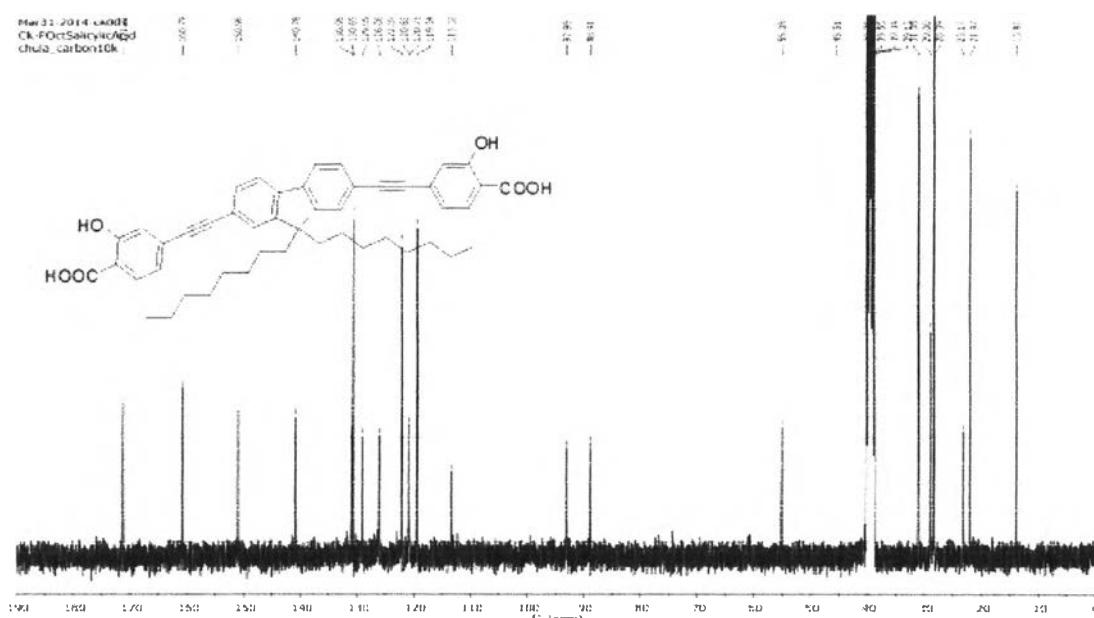
**Figure A.6**  $^1\text{H}$ -NMR of **4** in  $\text{CDCl}_3$



**Figure A.7**  $^1\text{H}$ -NMR of **5** in  $\text{CDCl}_3$

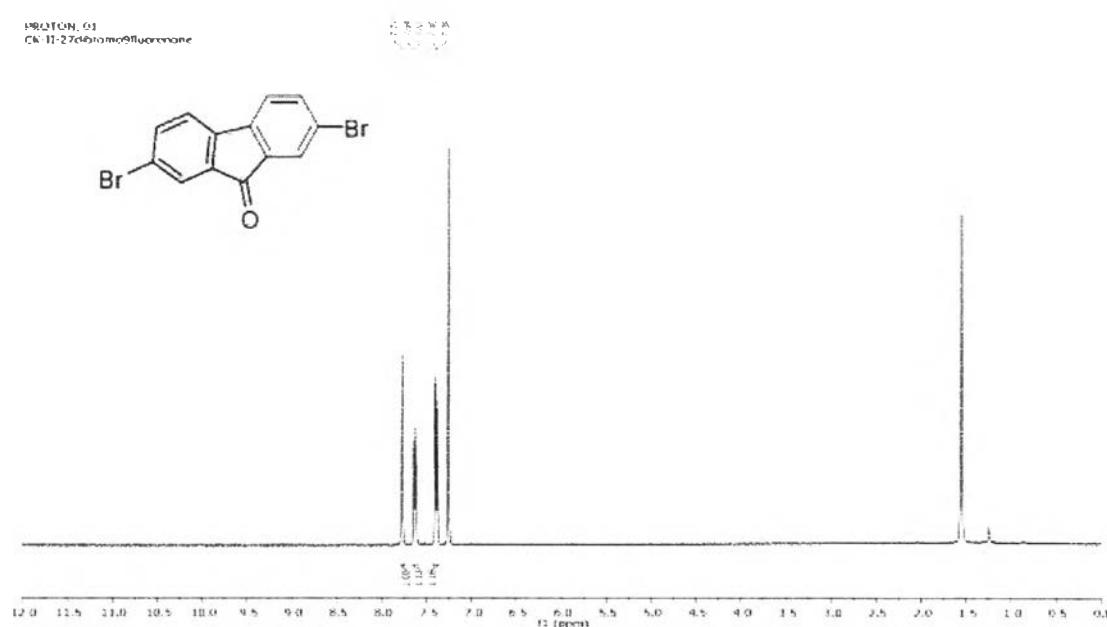


**Figure A.8**  $^1\text{H}$ -NMR of **F2** in  $\text{DMSO}-d_6$

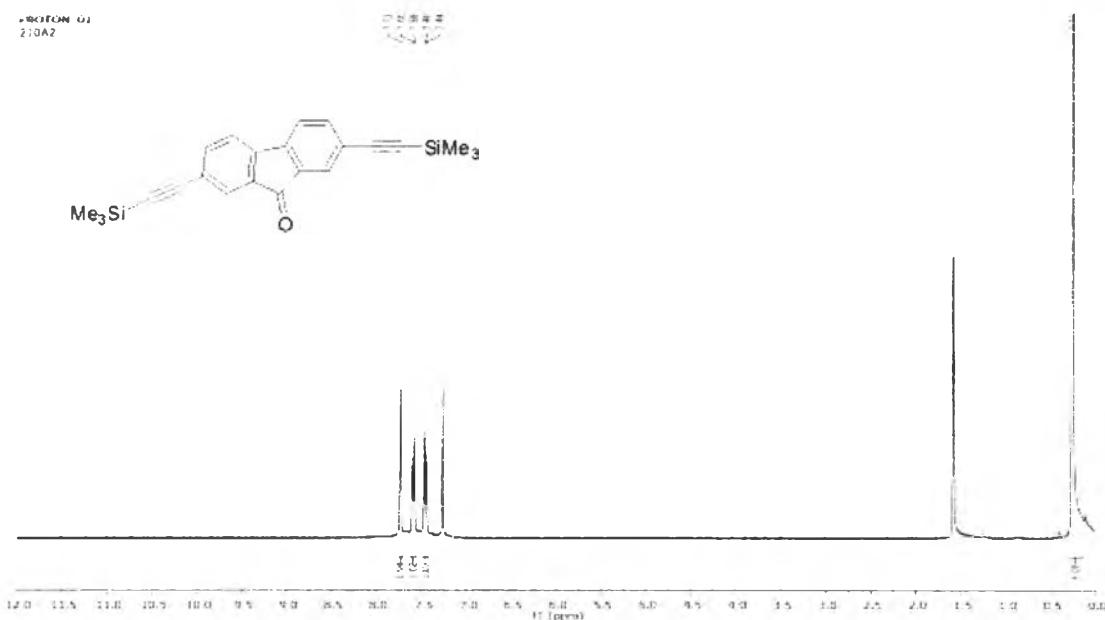


**Figure A.9**  $^{13}\text{C}$ -NMR of **F2** in  $\text{DMSO}-d_6$

2905382020

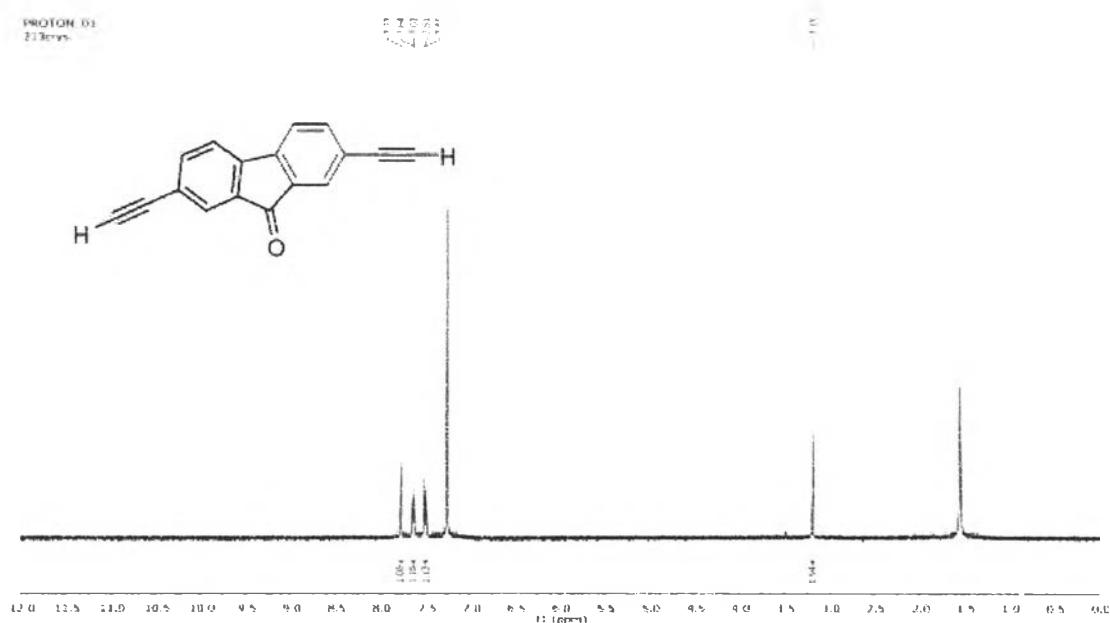


**Figure A.10**  $^1\text{H}$ -NMR of **6** in  $\text{CDCl}_3$

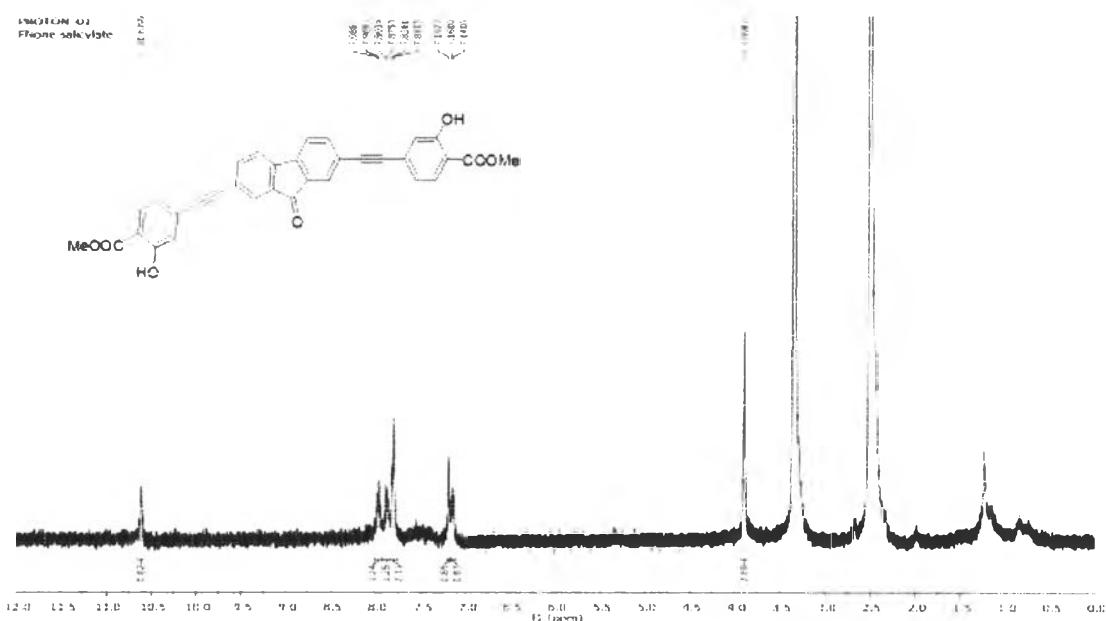


**Figure A.11**  $^1\text{H}$ -NMR of 7 in  $\text{CDCl}_3$

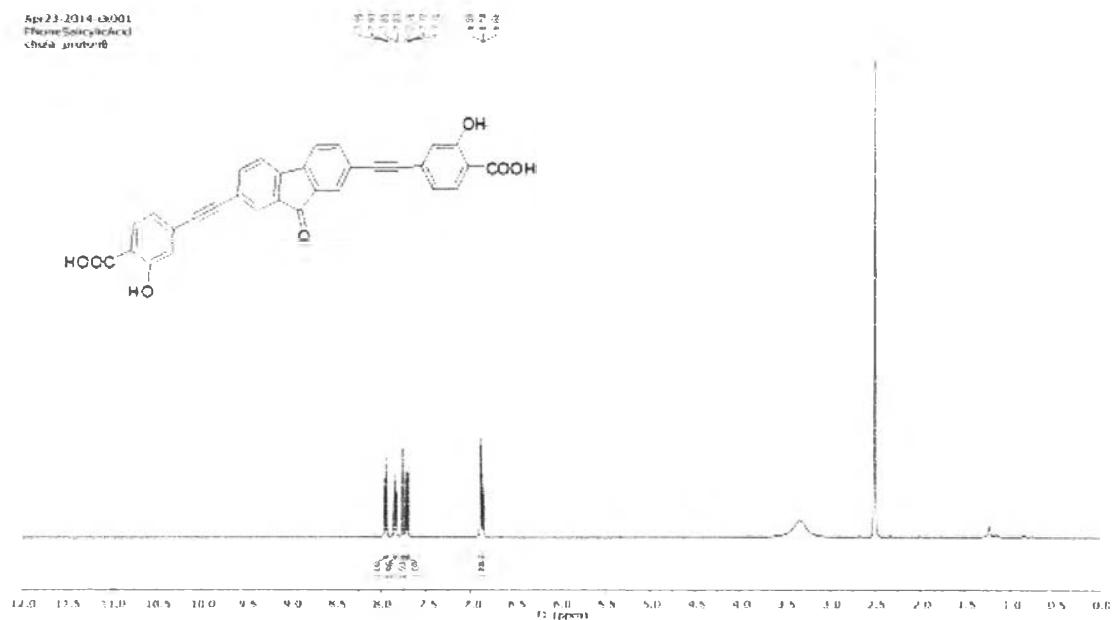
2905392020



**Figure A.12**  $^1\text{H}$ -NMR of 8 in  $\text{CDCl}_3$

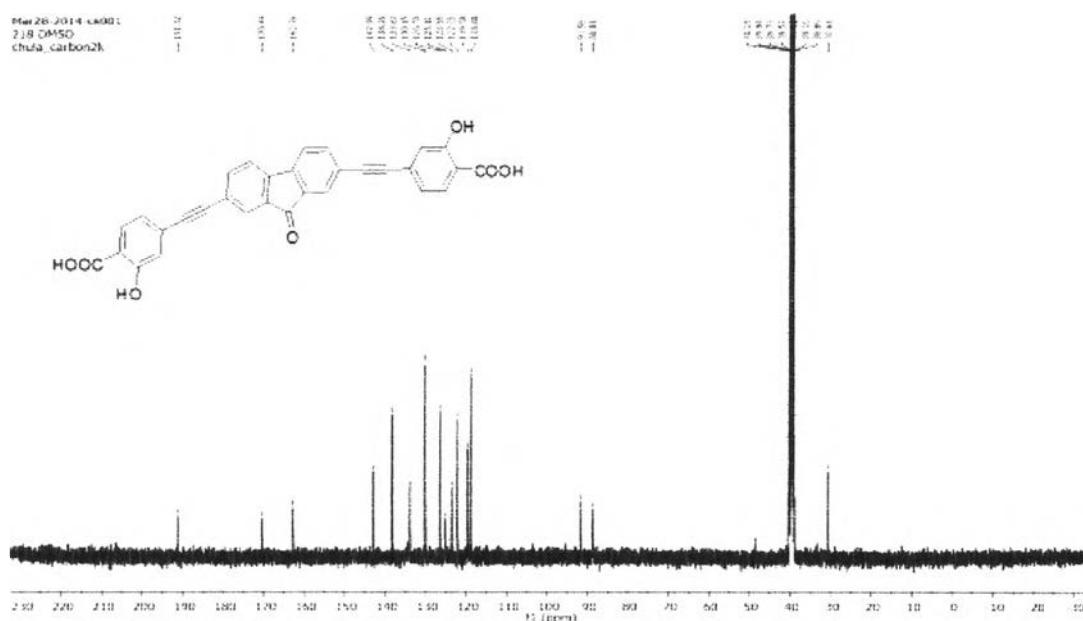


**Figure A.13** <sup>1</sup>H-NMR of **9** in CDCl<sub>3</sub>

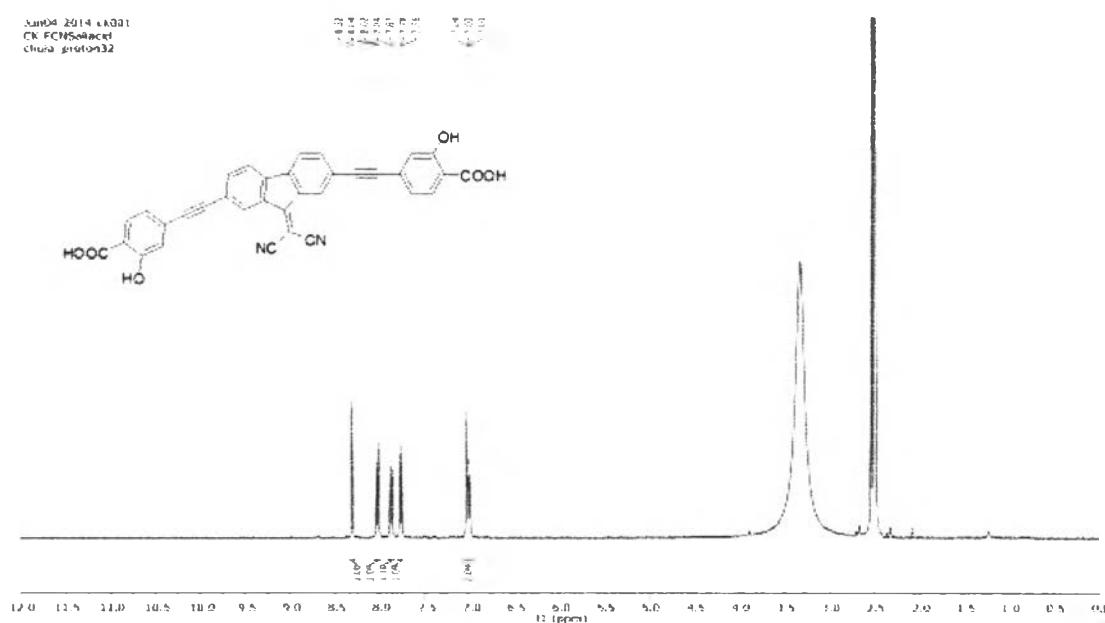


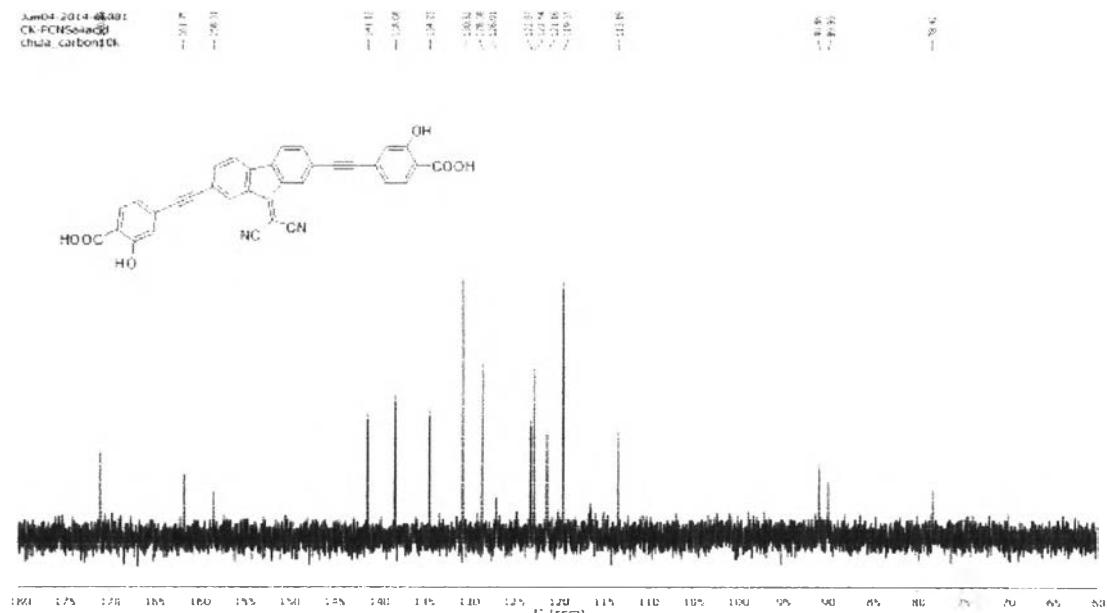
**Figure A.14** <sup>1</sup>H-NMR of **F3** in DMSO-d<sub>6</sub>

2905392020

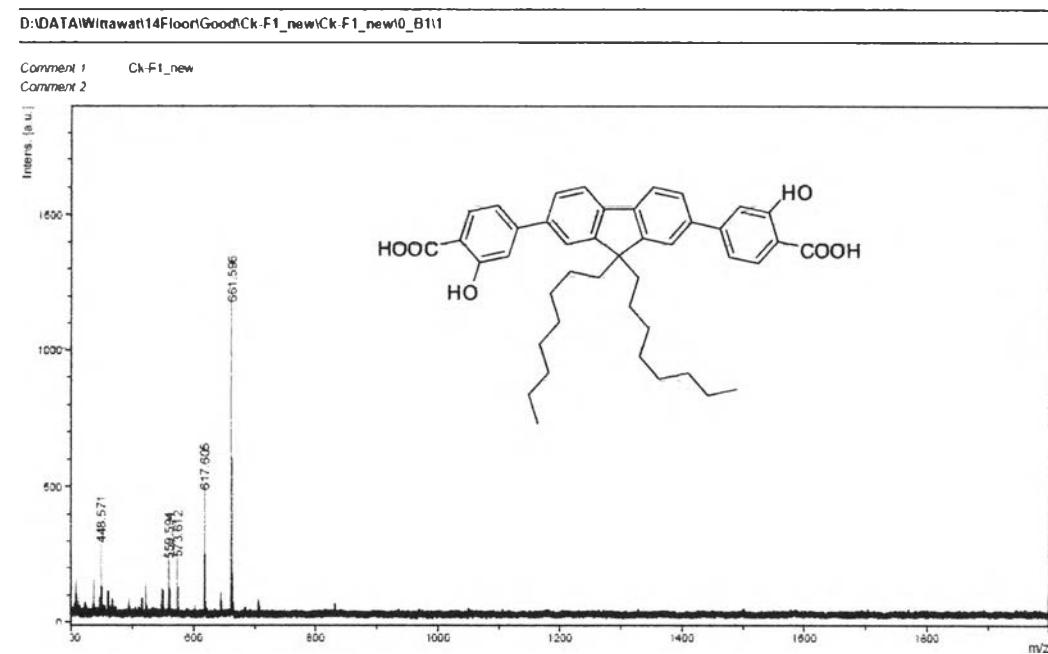
Figure A.15  $^{13}\text{C}$ -NMR of F3 in DMSO- $d_6$ 

29659828  
020

Figure A.16  $^1\text{H}$ -NMR of F4 in DMSO- $d_6$



**Figure A.17**  $^{13}\text{C}$ -NMR of F4 in  $\text{DMSO}-d_6$



**Figure A.18** MALDI-TOF-MS of F1

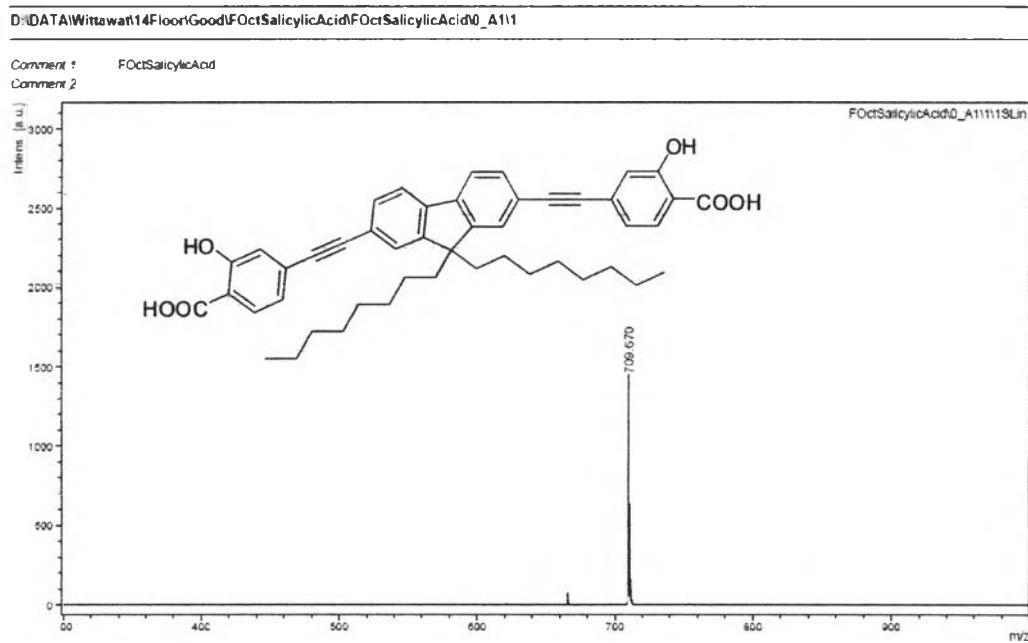


Figure A.19 MALDI-TOF-MS of F2

290539220

**Mass Spectrum List Report****Analysis Info**

Analysis Name D:\Data\Data Service\Year 2014\04\_2014\11042014\Fluorenone salicylic acid\_neg\_11042014.d  
 Method tune\_low\_forfest\_negative2.m  
 Sample Name Fluorenone salicylic acid\_neg\_11042014  
 Comment

Acquisition Date 4/11/2014 2:48:46 PM

Operator NL

Instrument / Ser# micrOTOF-Q II 10335

**Acquisition Parameter**

Source Type	ESI	Ion Polarity	Negative	Set Nebulizer	0.4 Bar
Focus	Not active	Set Capillary	2500 V	Set Dry Heater	180 °C
Scan Begin	50 m/z	Set End Plate Offset	-500 V	Set Dry Gas	4.0 l/min
Scan End	1500 m/z	Set Collision Cell RF	150.0 Vpp	Set Divert Valve	Waste

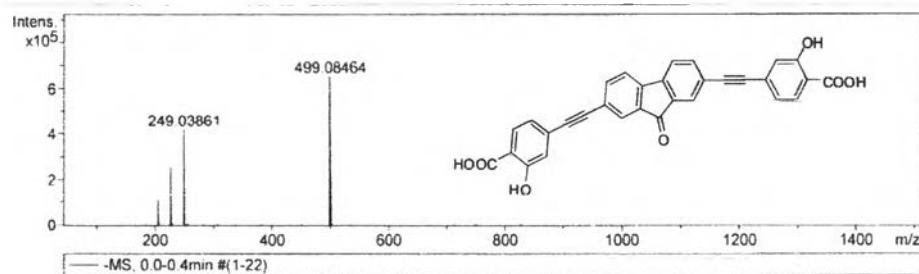


Figure A.20 HRMS of F3

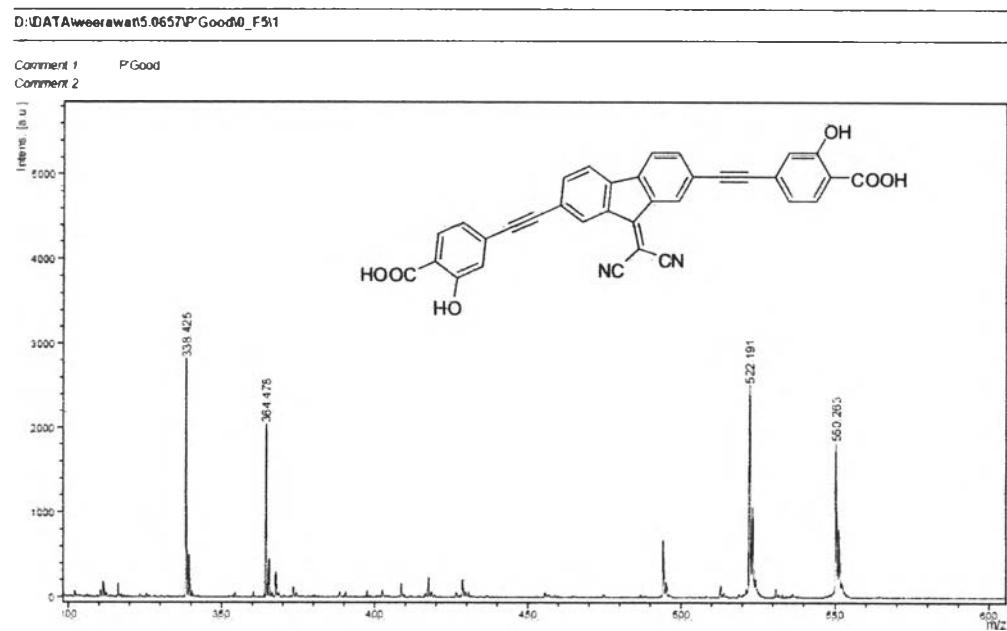
29655928  
020

Figure A.21 MALDI-TOF-MS of F4

**VITA**

Mr.Chenwit Khaokeaw was born on March 12, 1989 in Singburi, Thailand. He graduated with high school degree from Pibulwittayalai School, Lopburi. He graduated with bachelor degree of Science, major of chemistry from Chulalongkorn University. In 2011, he has been a graduate student in Petrochemistry and Polymer Science and become a member of Material Advancement via Proficient Synthesis Group under supervision of Assoc. Prof. Dr. Paitoon Rashatasakhon and he further received a Master Degree in Petrochemistry and Polymer Science from Chulalongkorn University. His present address is 303 Moo. 1 Promburi, Promburi, Singburi, Thailand 16160.

