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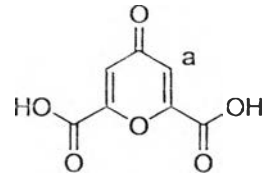
APPENDIX A



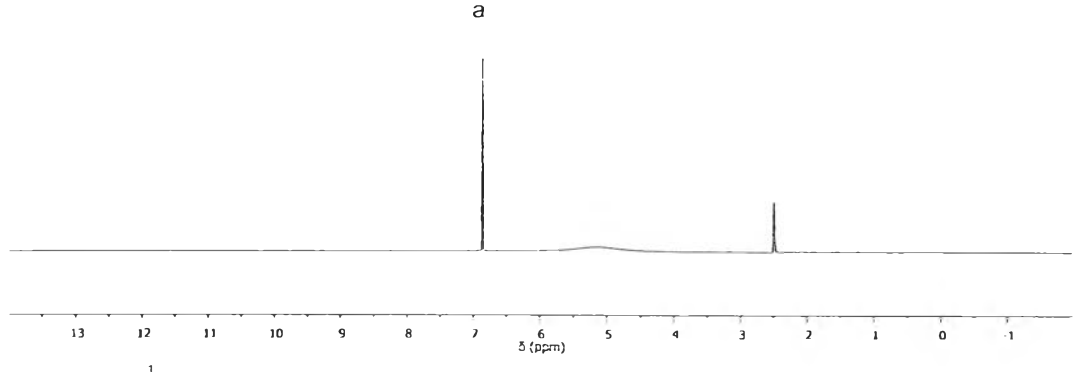
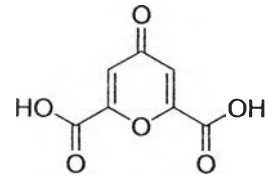


Figure A.1 ^{1}H-NMR spectrum of compound 1



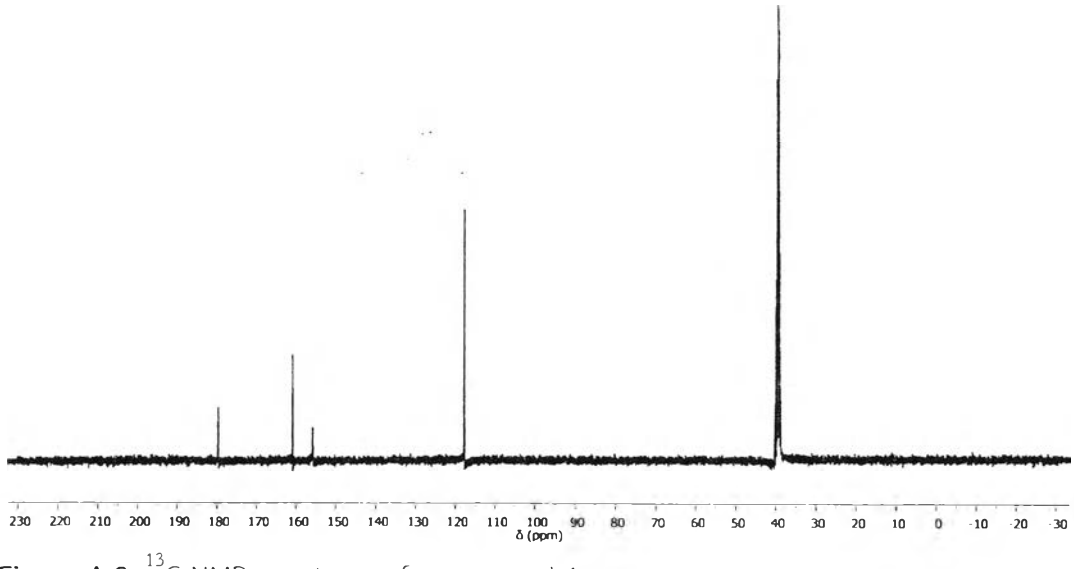
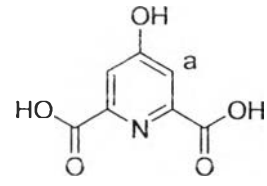


Figure A.2 ^{13}C-NMR spectrum of compound 1



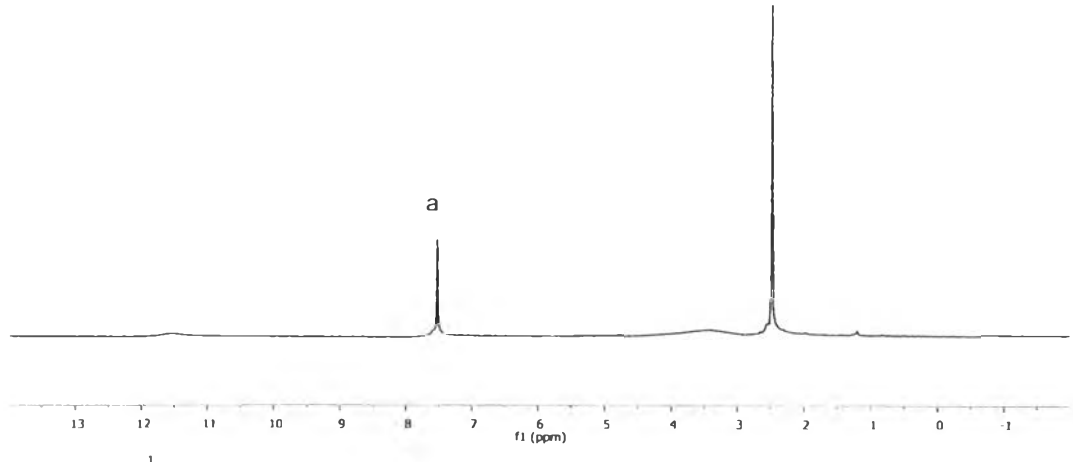
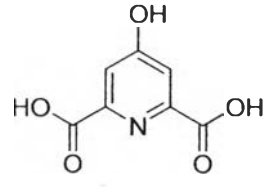


Figure A.3 ^{1}H-NMR spectrum of compound 2



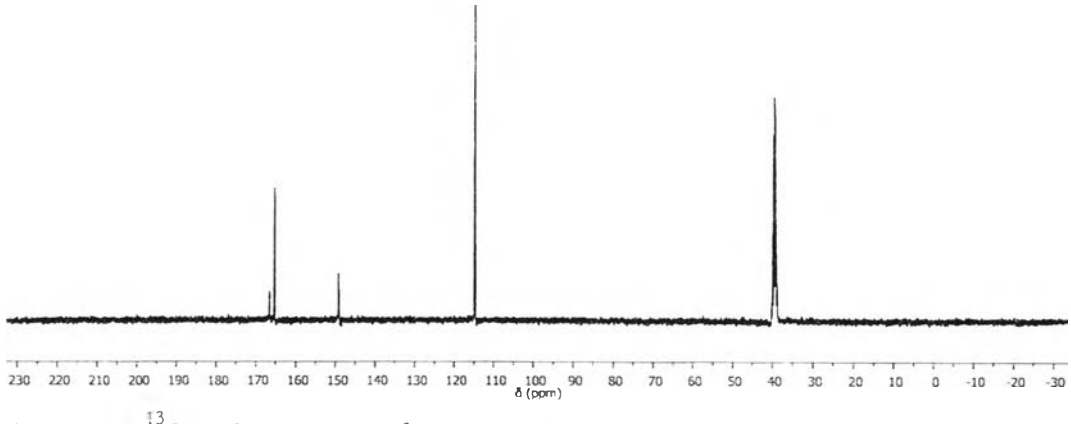


Figure A.4 ^{13}C-NMR spectrum of compound 2

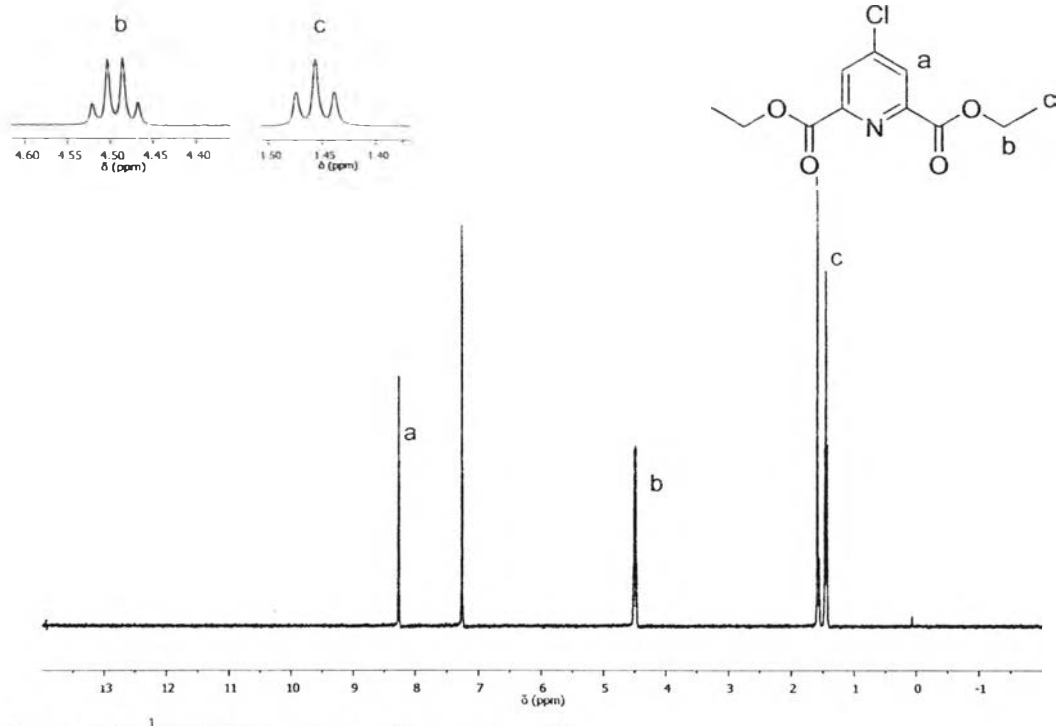


Figure A.5 ^{1}H-NMR spectrum of compound 3

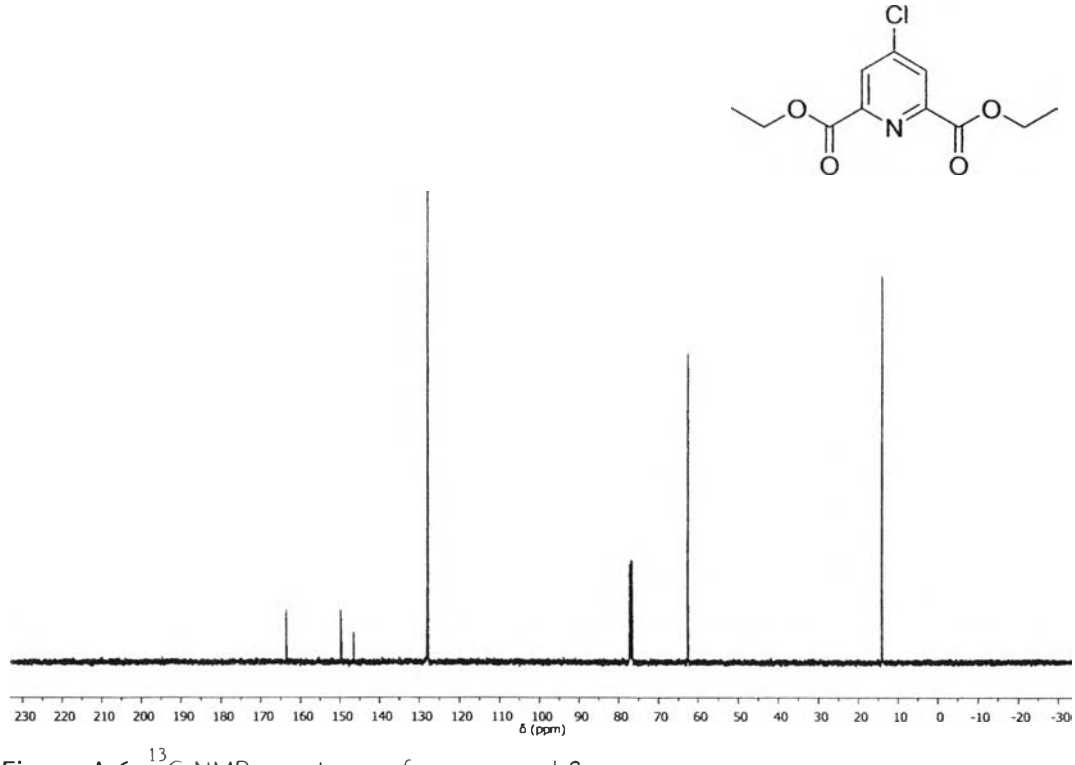


Figure A.6 ^{13}C-NMR spectrum of compound 3

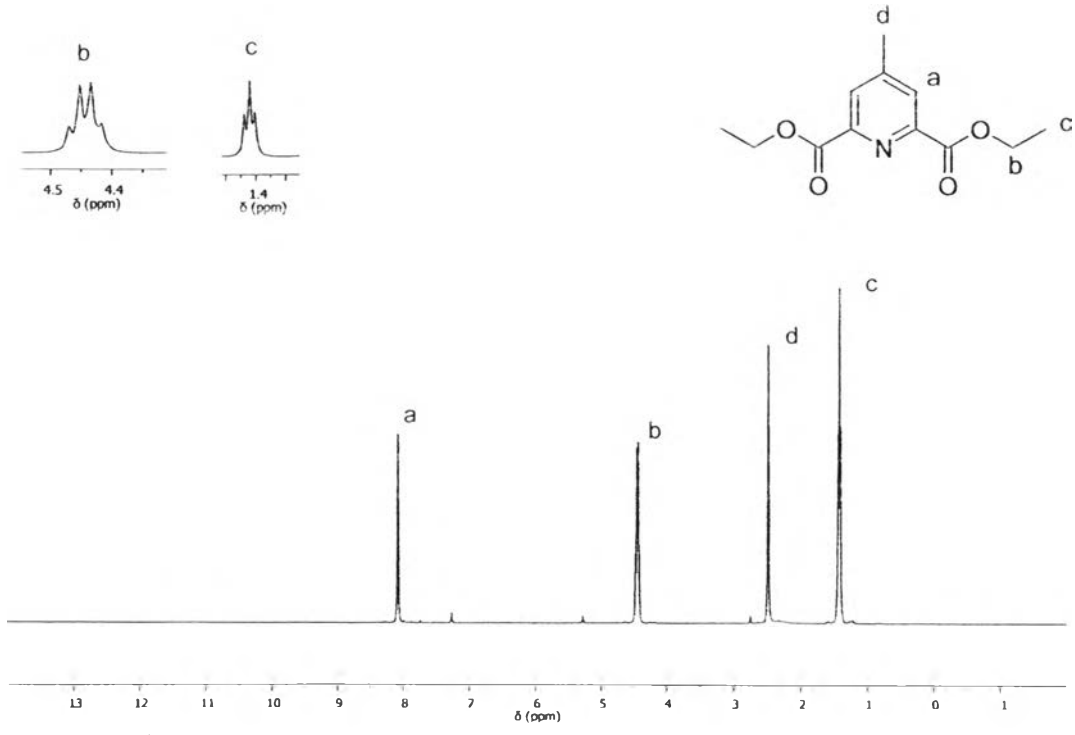


Figure A.7 ^{1}H-NMR spectrum of compound 4

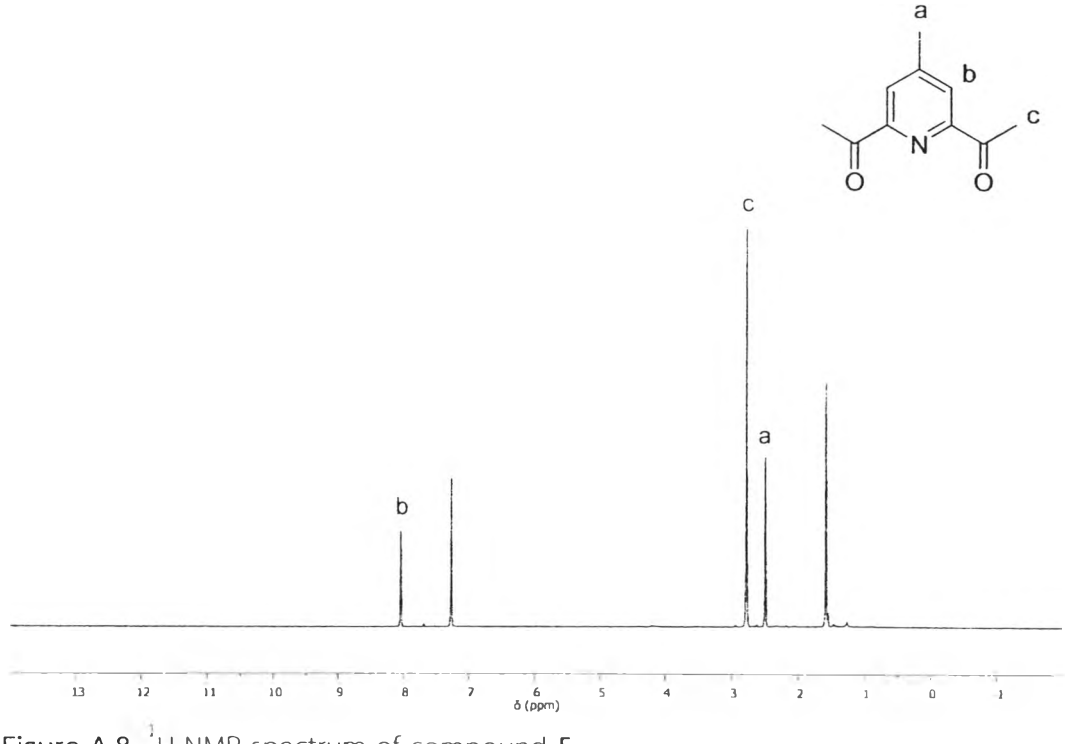


Figure A.8 ^{1}H-NMR spectrum of compound 5

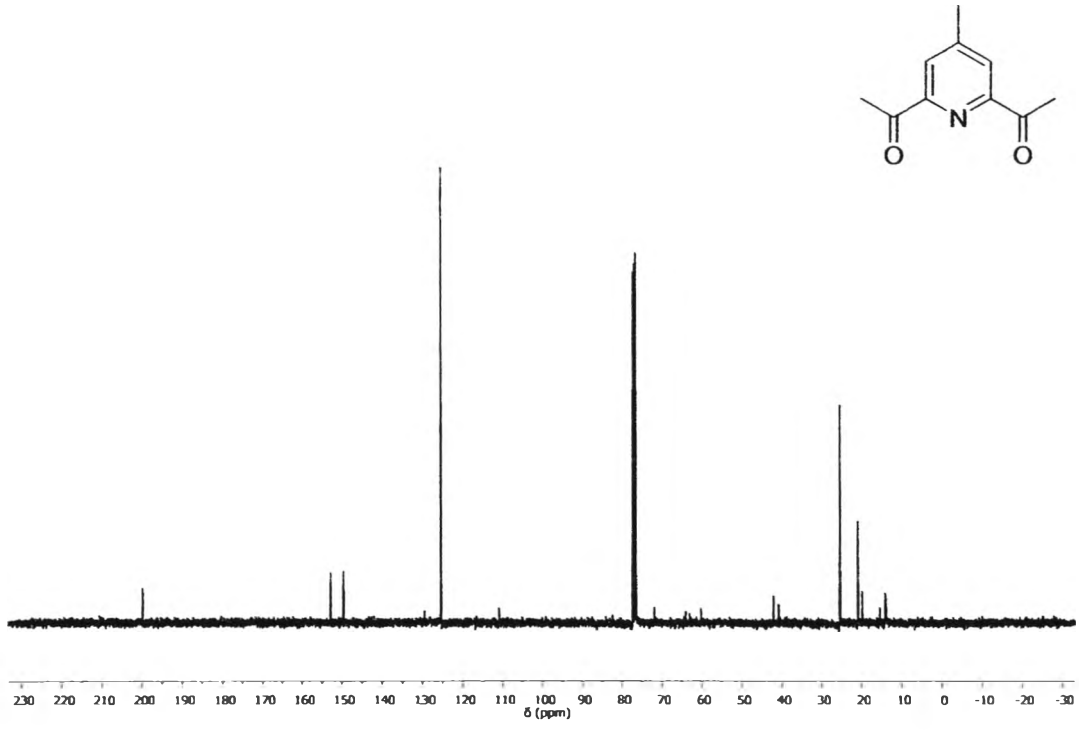


Figure A.9 ^{13}C-NMR spectrum of compound 5

Mass Spectrum List Report

Analysis Info

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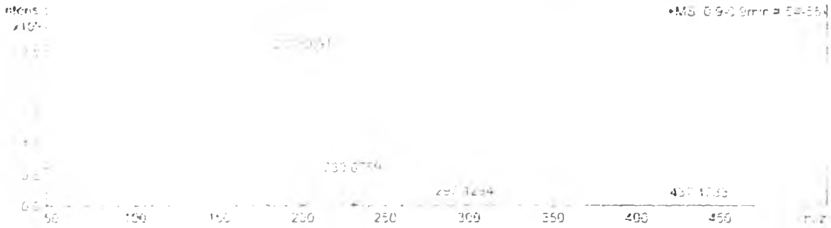
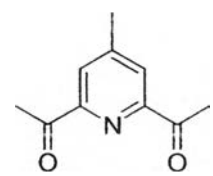
Method	MKE_tune_low_positive_20130204.m	Operator	Administrator
Sample Name	diketone	Instrument	microTOF 72
	Lactone		

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Pulsar Pull	406 V
Scan Range	n/a	Capillary Exit		Set Pulsar Push	388 V
Scan Begin	50 m/z	Hexapole RF		Set Reflector	1300 V
Scan End	3000 m/z	Skimmer 1	45.5 V	Set Flight Tube	9000 V
		Hexapole 1	25.0 V	Set Detector TOF	1910 V



#	m/z	I	I %	S/N	FWHM	Res
	176.0811	43939	1.8	350.2	0.0305	5840
2	178.0962	4647	0.2	36.4	0.0303	5916
3	197.0587	7642	0.3	60.3	0.0332	5941
4	200.0591	2475494	100.0	19433.9	0.0394	5081
5	201.0713	274331	11.1	2152.0	0.0350	5741
6	202.0731	17511	0.7	137.1	0.0336	6019
7	205.0448	10061	0.4	78.5	0.0348	5822
8	230.0759	476935	19.3	3666.4	0.0388	5937
9	231.0791	45173	1.9	355.5	[illegible]	6319
10	232.0912	275455	11.1	2114.5	0.0364	6325
11	233.0941	24367	1.0	155.7	0.0385	6049
12	258.1055	8619	0.3	64.8	0.0413	6244
13	260.0858	10656	0.4	80.1	0.0413	6294
14	262.0956	6700	0.3	50.2	0.0410	6393
15	270.1073	8075	0.3	60.2	0.0405	6664
16	297.1294	100561	4.1	738.2	0.0456	6514
17	298.1331	11955	0.5	87.5	0.0476	6267
18	300.1210	5556	0.2	40.1	0.0450	6671
19	304.2603	5805	0.2	42.5	0.0462	6555
20	314.1354	21334	0.9	154.7	0.0477	6582
21	315.1389	3915	0.2	28.1	0.0497	6343
22	322.0375	5773	0.2	43.6	0.0491	6553
23	322.1385	4145	0.2	29.6	0.0497	6477
24	377.1494	10291	0.4	78.9	0.0612	6157
25	384.1605	6671	0.3	51.3	0.0590	6509
26	407.1613	73373	3.0	508.1	0.0609	6690
27	408.1650	15548	0.6	128.9	0.0597	6834
28	427.3047	4993	0.2	42.3	0.0625	6842
29	437.1733	77365	3.1	591.7	0.0726	6021
30	438.1765	15661	0.6	139.6	0.0720	6083



Bruker Daltonics DataAnalysis 3.3 printed 6/30/2014 12:42:41 PM Page 1 of 1

Figure A.10 High resolution mass spectrum of compound **5**

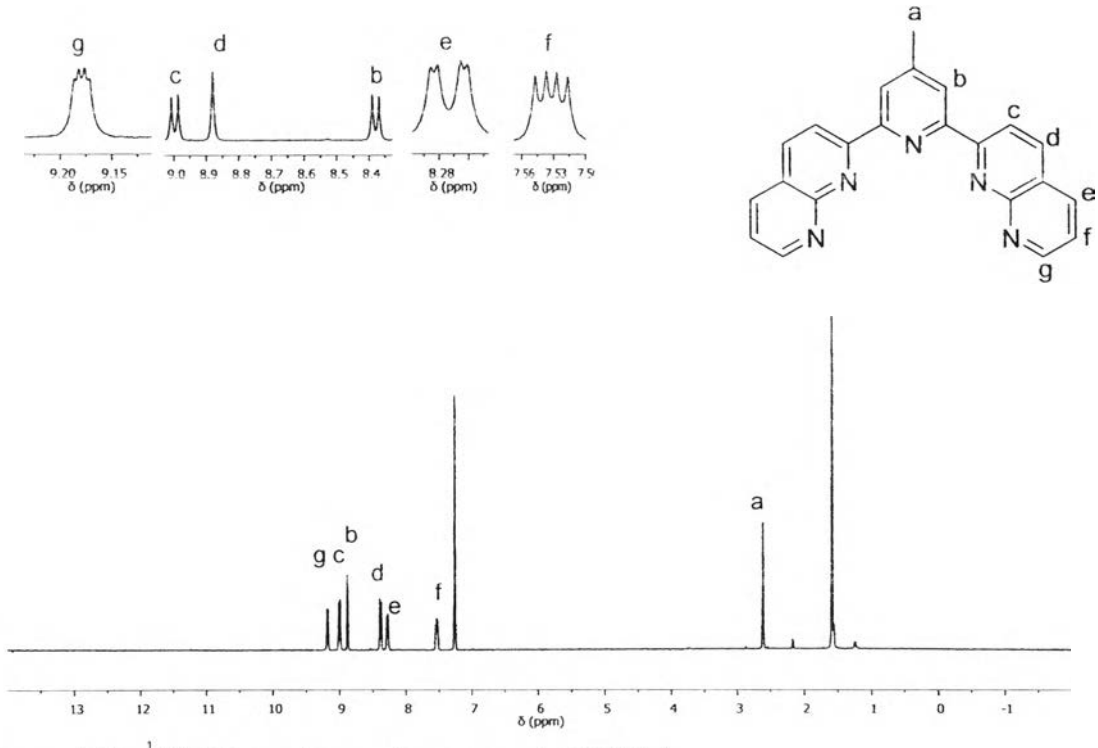


Figure A.11 ^{1}H-NMR spectrum of compound **6** ($CDCl_3$)

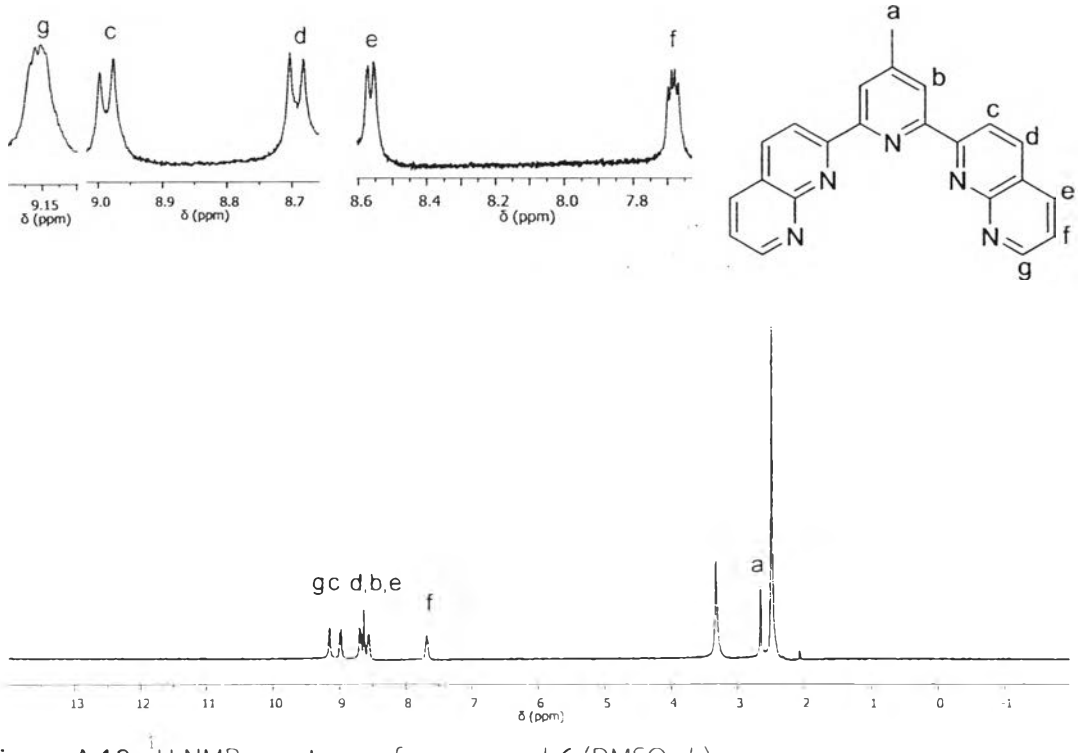


Figure A.12 ^{1}H-NMR spectrum of compound **6** (DMSO-d_6)

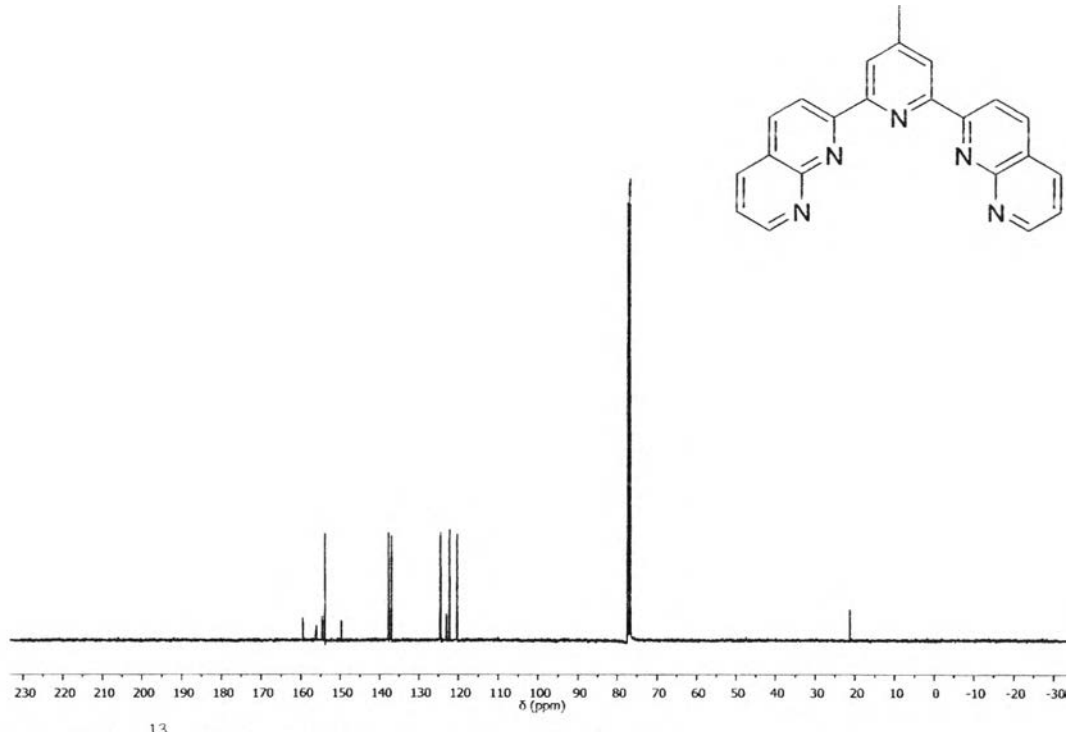


Figure A.13 ^{13}C-NMR spectrum of compound 6 ($CDCl_3$)

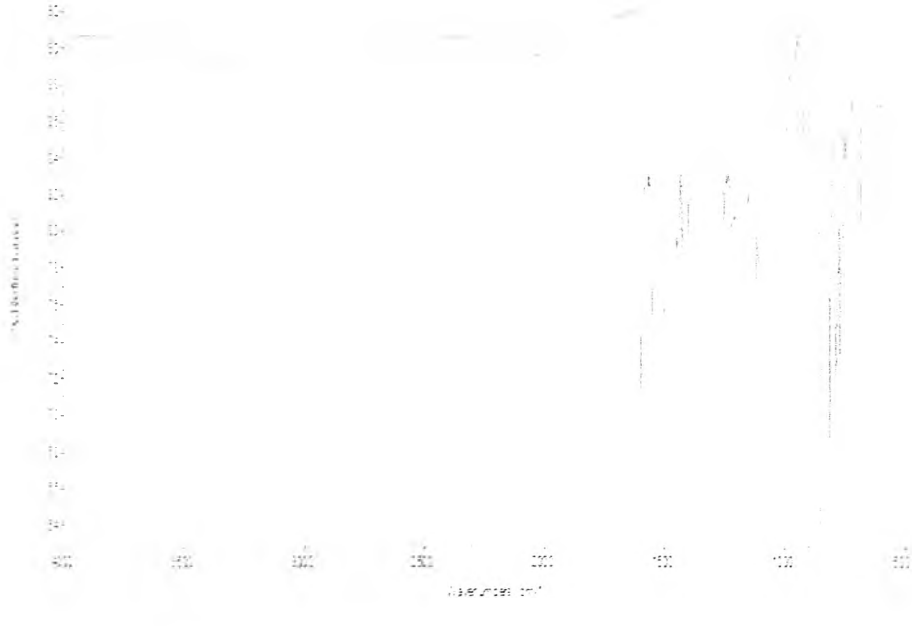


Figure A.14 IR spectra of compound 6

Mass Spectrum List Report

Analysis Info

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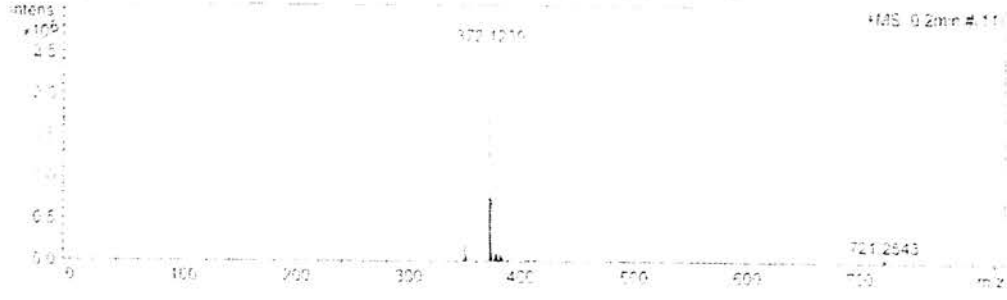
Sample Name	BO1	Instrument	micrOTOF 72
	BO1		

Acquisition Parameter

Source Type	ESI	Ion Polarity	Positive	Set Corrector Fill	75 V
Scan Range	n.a.	Capillary Exit	230.0 V	Set Pulsar Pull	398 V
Scan Begin	50 m/z	Hexapole RF	300.0 V	Set Pulsar Push	282 V
Scan End	3000 m/z	Skimmer 1	45.0 V	Set Reflector	1300 V
		Hexapole 1	25.0 V	Set Flight Tube	9000 V
				Set Detector TOF	1910 V



MS, 0.2min #11

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3	351.1422	66302	2.6	458.7	0.0429	8184
4	372.1239	2580510	100.0	22773.4	0.0540	6891
5	373.1244	748256	29.0	6629.6	0.0455	8203
6	374.1271	80585	3.1	716.4	0.0462	8107
7	376.6016	20027	0.8	179.5	0.0437	8629
8	377.0996	145433	5.6	1308.9	0.0414	9111
9	377.6011	71887	2.8	648.1	0.0432	8739
10	378.1001	89533	3.5	808.9	0.0417	9067
11	378.5010	39728	1.5	359.4	0.0417	9083
12	379.0985	34986	1.4	317.1	0.0439	8644
13	379.5991	17034	0.7	154.5	0.0416	9127
14	381.0966	113277	4.4	1036.2	0.0426	8951
15	381.5982	59318	2.3	543.5	0.0419	9101
16	382.0956	77819	3.0	714.7	0.0422	9060
17	382.5966	42291	1.6	389.0	0.0440	8704
18	383.0951	52842	2.0	487.1	0.0440	8713
19	383.5958	24026	0.9	221.7	0.0426	9002
20	388.0962	57443	2.2	540.8	0.0454	8543
21	389.0991	14822	0.6	139.8	0.0460	8456
22	404.0903	15509	0.6	156.2	0.0491	8232
23	406.0619	12064	0.5	122.5	0.0502	8085
24	407.0665	12722	0.5	129.8	0.0504	8075
25	412.0547	27938	1.1	292.5	0.0483	8530
26	414.0524	15727	0.6	166.0	0.0489	8459
27	440.0367	16169	0.6	194.8	0.0518	8495
28	442.0357	10443	0.4	126.9	0.0534	8285
29	721.2543	75551	2.9	1974.5	0.0807	8942
30	722.2574	37867	1.5	988.9	0.0794	9099

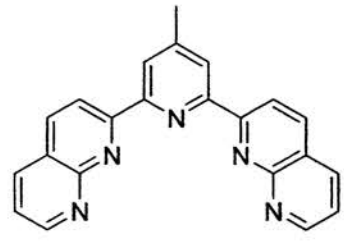

Figure A.15 High resolution mass spectrum of compound **6**

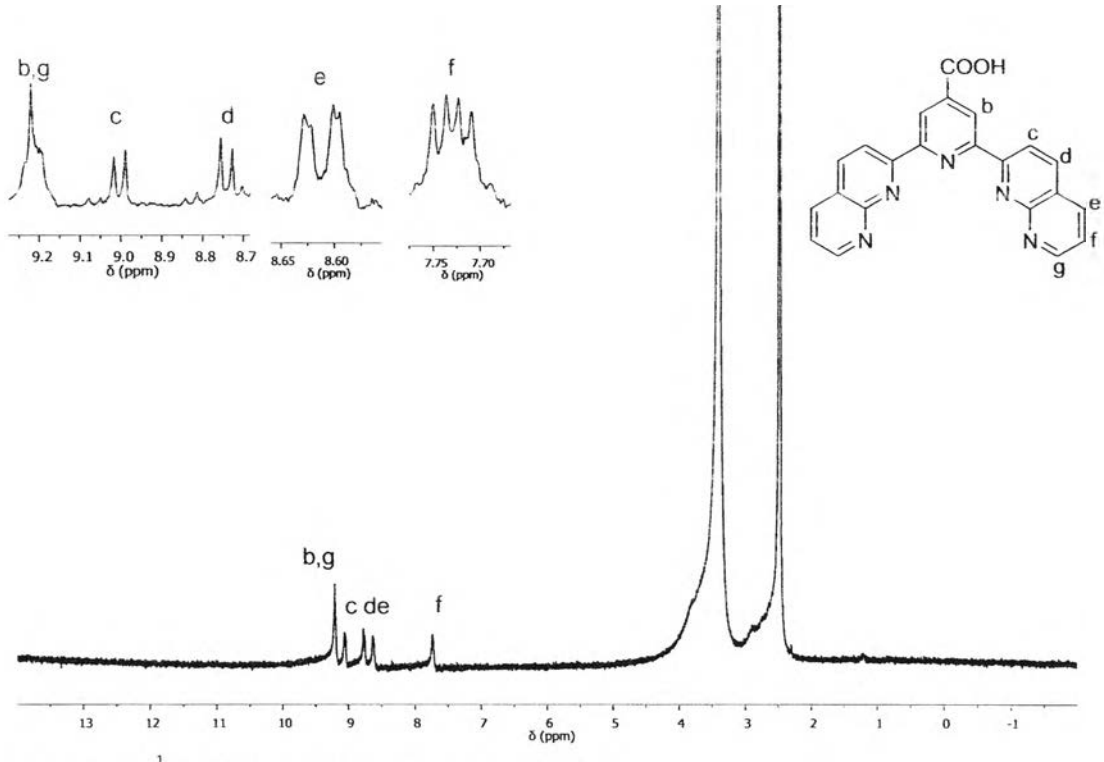

Figure A.16 ^{1}H-NMR spectrum of compound 7

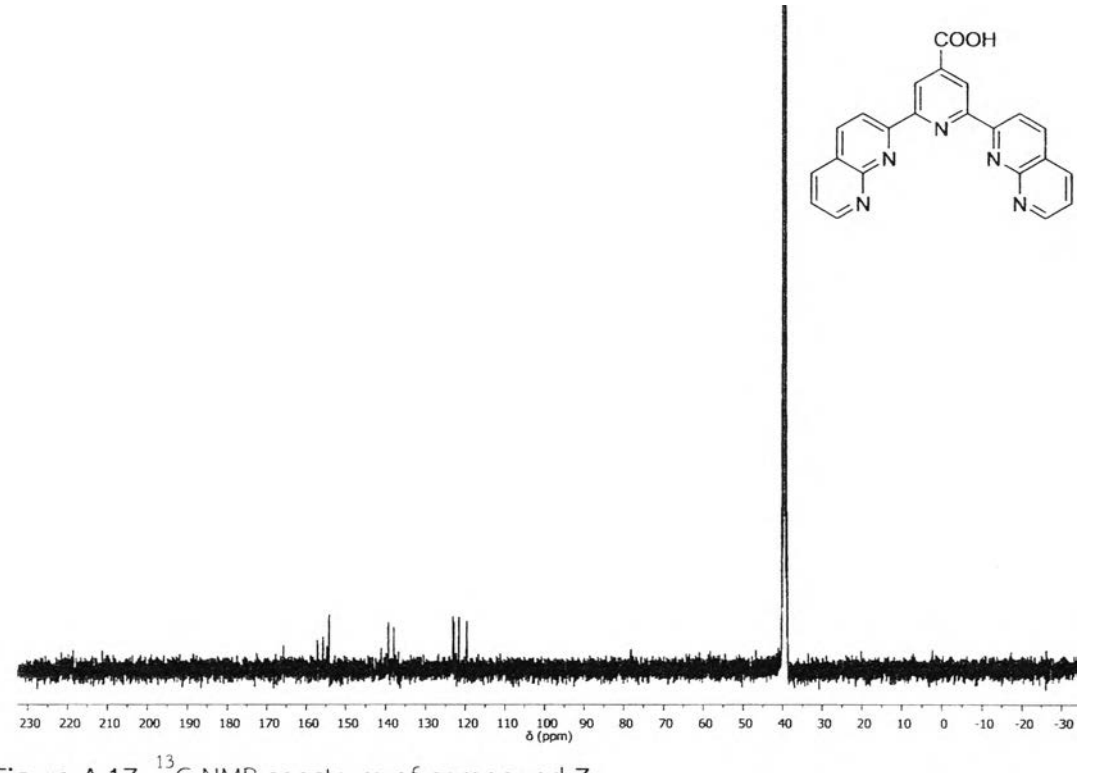

Figure A.17 ^{13}C-NMR spectrum of compound 7

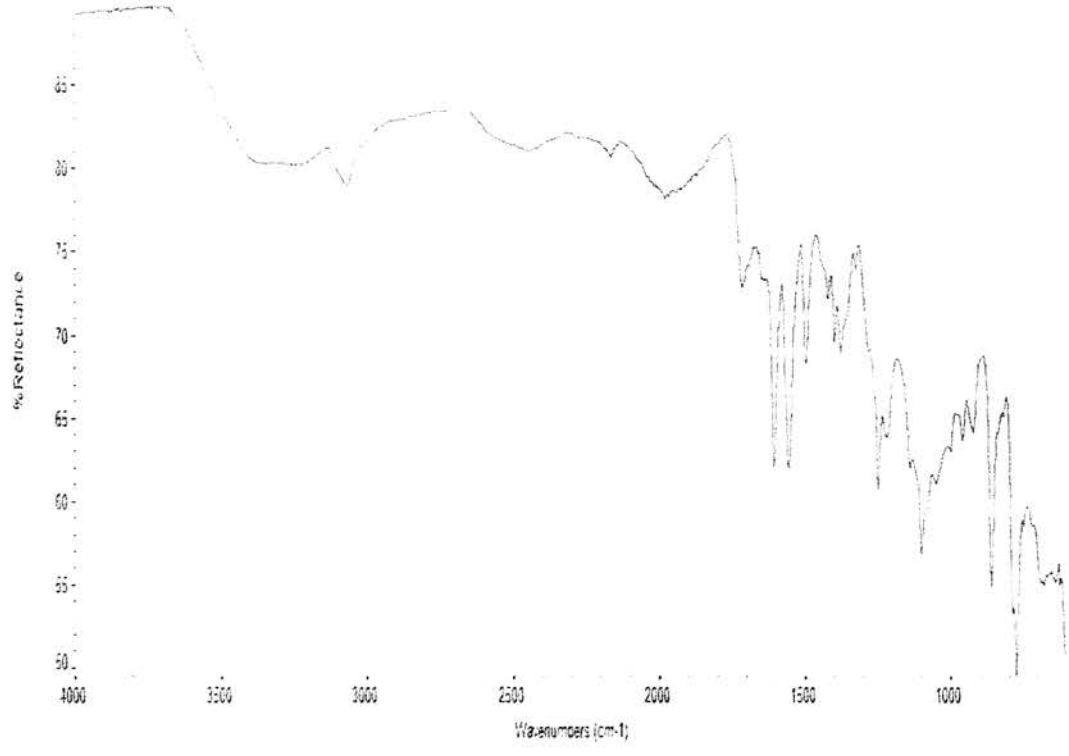

Figure A.18 IR spectra of compound **7**

Mass Spectrum List Report

Analysis Info

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Method	MKF_tune_wide_20130204.m	Operator	Administrator
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	target2 (N)		

Acquisition Parameter

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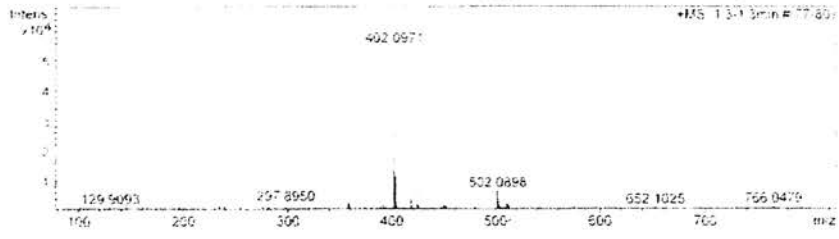
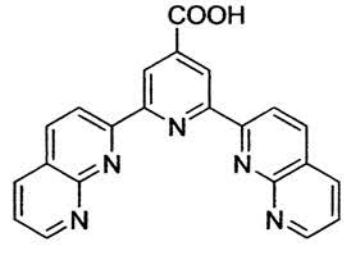
Scan Range	n/a	Capillary Exit	150.0 V	Set Pulsar Pull	406 V
Scan Begin	50 m/z	Hexapole RF	400.0 V	Set Pulsar Push	388 V
Scan End	3000 m/z	Skimmer 1	45.0 V	Set Reflector	1300 V
		Hexapole 1	25.0 V	Set Flight Tube	9000 V
				Set Detector TOF	1910 V



#	m/z	I	I%	S/N	FWHM	Res.
1	58.6426	1721	3.1	20.5	0.0085	6899
2	66.3363	1443	2.6	17.1	0.0064	10441
3	281.3303	1551	2.8	19.3	0.0140	20113
4	297.8950	2202	4.0	27.5	0.0141	21091
5	358.1076	10229	18.5	138.5	0.0499	7173
6	359.1118	2386	4.3	29.8	0.0503	7134
7	374.0994	1612	2.9	19.6	0.0560	6455
8	380.1171	2647	4.8	32.5	0.0508	7476
9	389.2525	1828	3.3	22.2	0.0505	7699
10	392.0677	1874	3.4	22.8	0.0536	7316
11	402.0971	55086	100.0	671.7	0.0521	7723
12	403.0986	11698	21.2	142.3	0.0541	7453
13	404.1021	1564	2.8	18.8	0.0557	7255
14	418.0723	4202	7.6	50.4	0.0576	7261
15	424.0777	7806	14.2	93.5	0.0561	7565
16	425.0801	1996	3.6	23.6	0.0570	7457
17	450.0750	2117	3.8	24.6	0.0561	8019
18	451.0754	1532	2.8	17.7	0.0558	8083
19	502.0898	6678	12.1	75.7	0.0640	7850
20	503.0922	1627	3.0	20.4	0.0672	7482
21	511.0644	2214	4.0	24.7	0.0640	7988
22	511.5658	1379	2.5	15.2	0.0663	7716
23	512.0645	1880	3.4	20.9	0.0617	8298
24	534.5069	1479	2.7	16.1	0.0225	23773
25	766.0479	1379	2.5	20.6	0.0258	29736
26	1875.0828	1490	2.7	26.7	0.0339	55276
27	2107.3972	1360	2.5	23.4	0.0332	63443
28	2352.5842	2015	3.7	36.0	0.0312	75528
29	2353.2469	3599	6.5	64.4	0.0319	73820
30	2403.9379	1439	2.6	25.7	0.0369	65089



Bruker Daltonics DataAnalysis 3.3 printed: 6/30/2014 12:43:19 PM Page 1 of 1

Figure A.19 High resolution mass spectrum of compound **7**

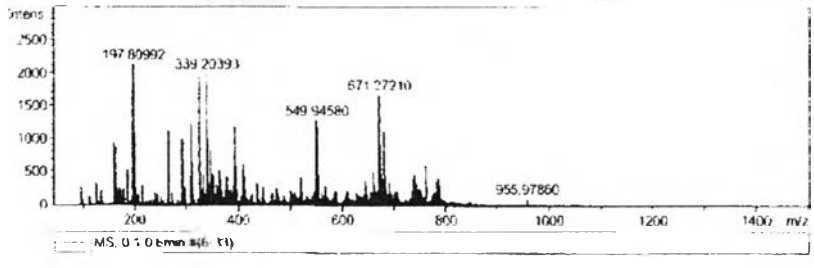
Mass Spectrum List Report

Analysis Info

Analysis Name	D:\Data\Data Service\target final_neg_22052014.d	Acquisition Date	5/22/2014 11:57:46 AM
Method	tune_low_forest_negative2.m	Operator	NL
Sample Name	target final_neg_22052014	Instrument / Ser#	micrOTOF-Q II 10335
Comment			

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



#	m/z	Res.	S/N	I	FWHM
1	160.84317	6248	410.5	966	0.02574
2	162.84035	6178	269.1	668	0.02636
3	188.11543	6620	180.9	547	0.02841
4	195.61284	6480	542.1	1731	0.03022
5	197.80992	6641	660.3	3135	0.02979
6	199.80857	6589	342.9	1114	0.03032
7	265.15067	7606	276.0	1136	0.03486
8	293.18143	7902	218.4	1018	0.03710
9	311.17182	8112	229.7	1230	0.03836
10	325.18582	8029	329.8	1941	0.04051
11	339.20392	8125	311.2	2060	0.04175
12	340.20729	7858	76.9	513	0.04324
13	348.23168	8183	122.9	836	0.04256
14	364.22763	7976	71.7	535	0.04567
15	392.21437	7895	59.4	495	0.04968
16	394.22958	7966	144.5	1195	0.04949
17	395.23346	6764	59.4	497	0.05844
18	406.20486	8751	62.1	537	0.04585
19	410.22364	8063	74.9	652	0.05088
20	547.94840	9721	42.3	503	0.05637
21	548.94598	9796	70.2	829	0.05604
22	549.94580	9583	108.8	1294	0.05739
23	550.94668	9500	57.7	685	0.05800
24	551.94495	9526	100.4	1191	0.05794
25	659.48096	9630	31.6	517	0.06848
26	671.27210	10534	161.4	1673	0.06385
27	672.27634	10462	38.4	645	0.06426
28	673.27929	10505	38.2	644	0.06409
29	681.50140	11102	68.9	1131	0.06136
30	761.66307	11860	46.2	820	0.06422

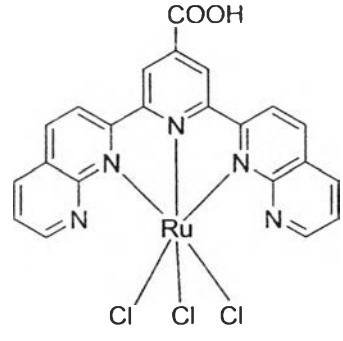


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Figure A.20 High resolution mass spectrum of compound 8

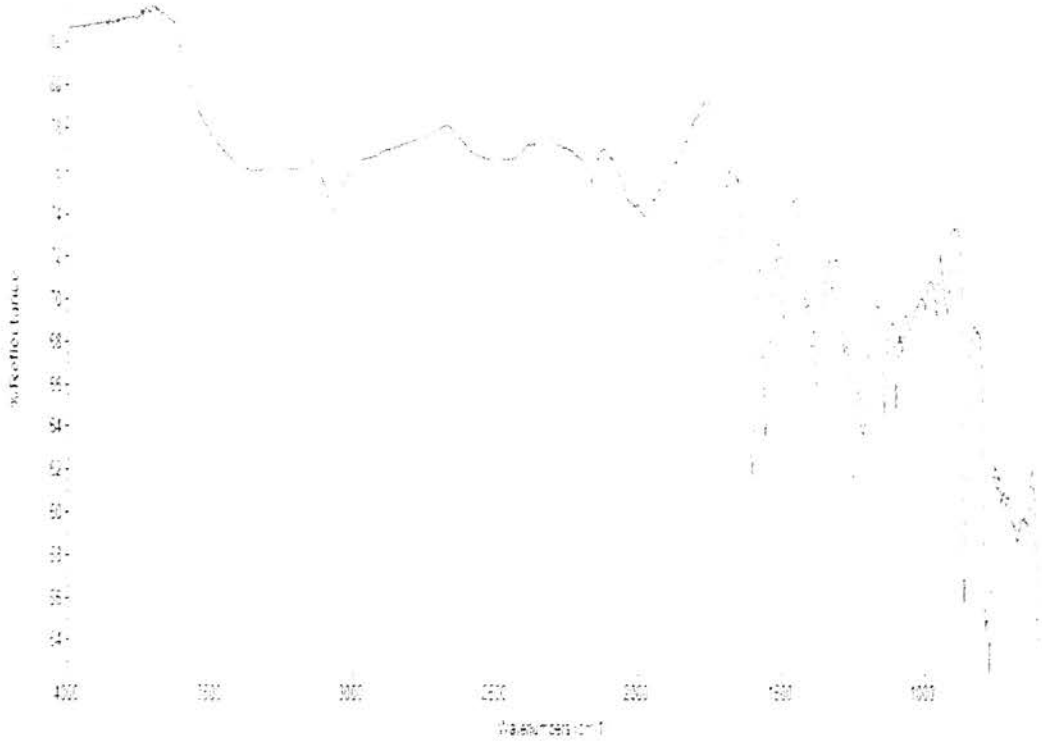

Figure A.21 IR spectra of compound **8**

APPENDIX B

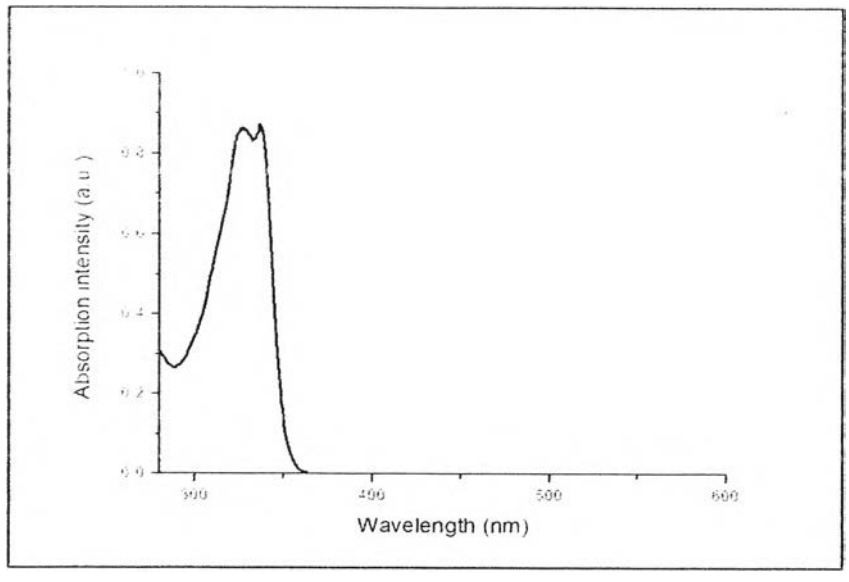

Figure B.1 Absorption spectrum of compound **6** in DMSO

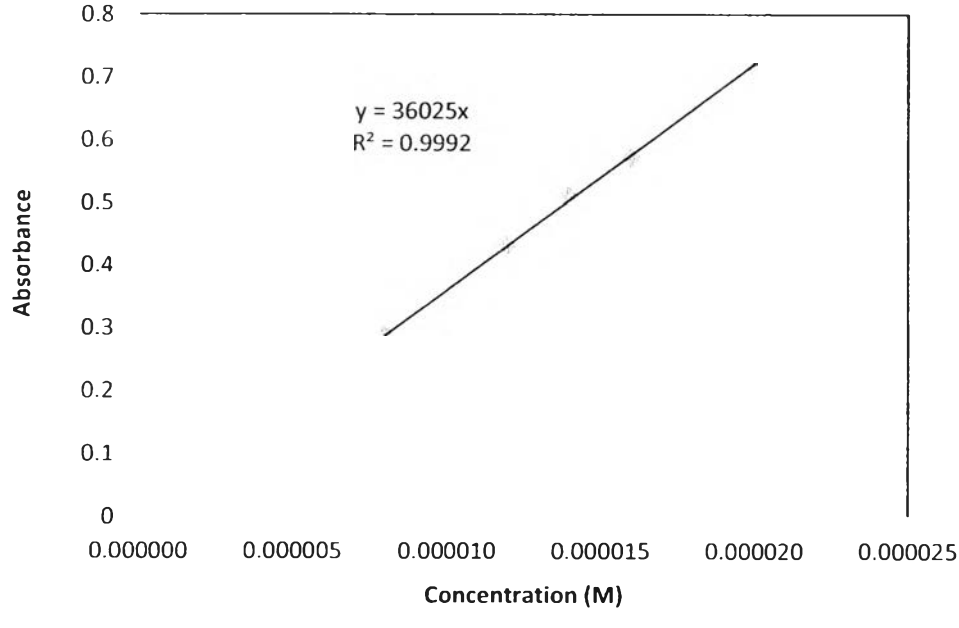

Figure B.2 Calibration curve for the quantitative determination of compound **6** in DMSO (λ_{abs} = 337 nm)

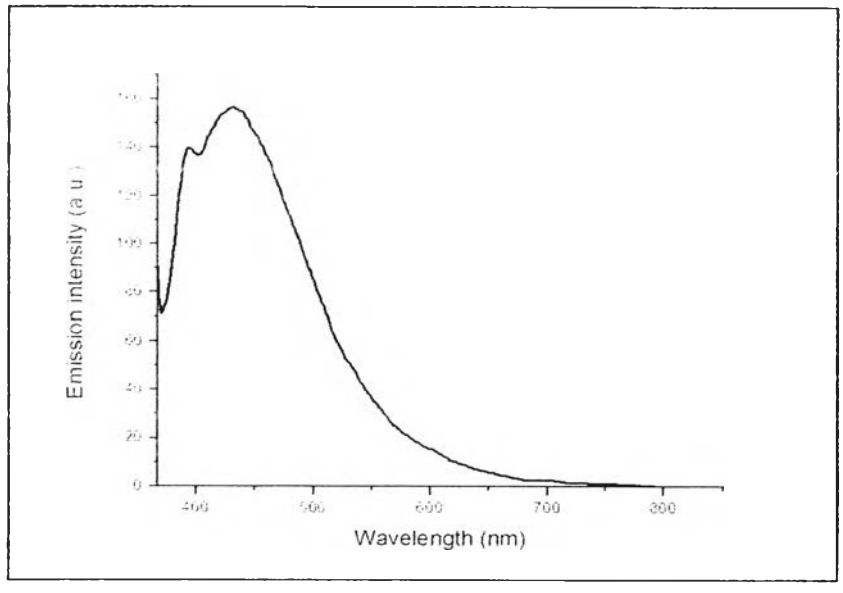

Figure B.3 Emission spectrum of compound **6** in DMSO (λ_{ex} = 350 nm)

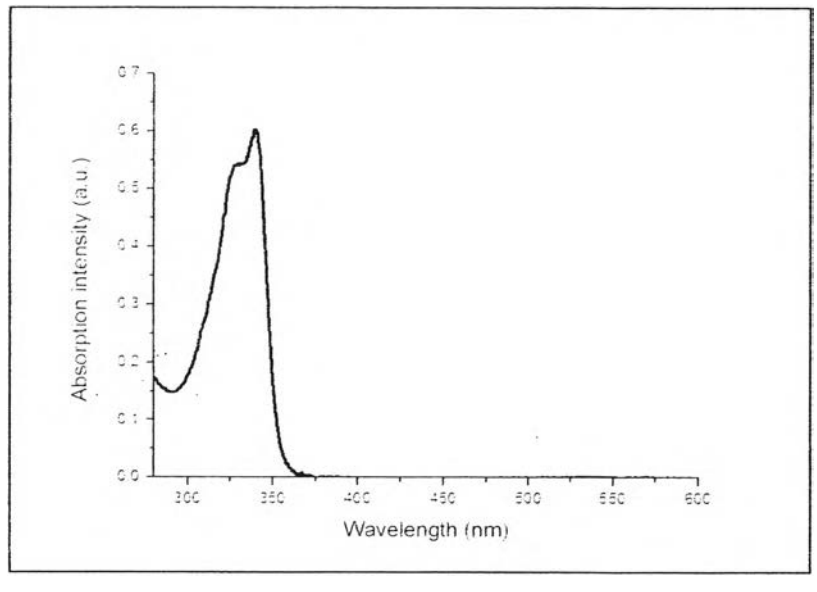

Figure B.4 Absorption spectrum of compound **7** in DMSO (λ_{abs} = 340 nm)

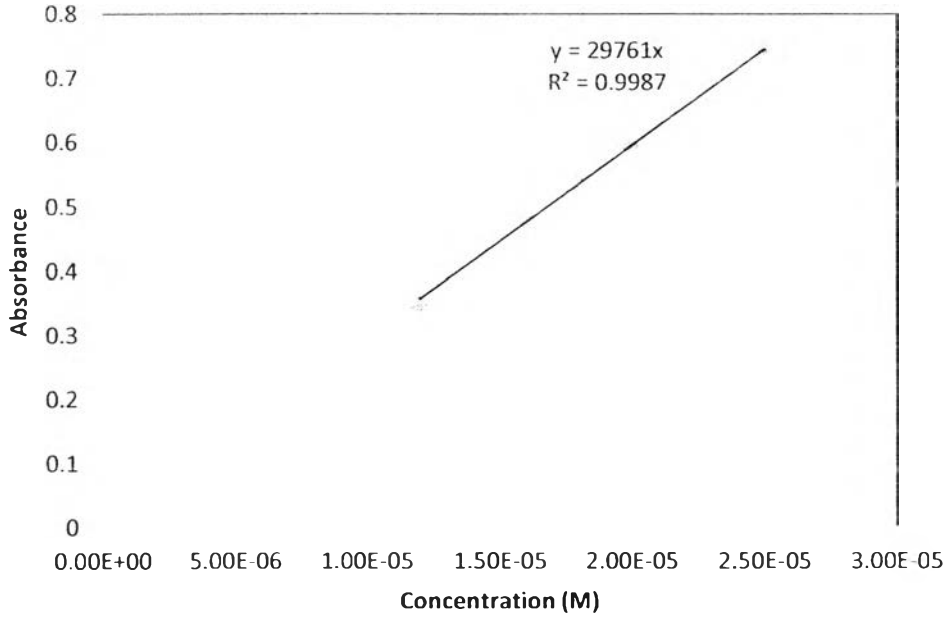

Figure B.5 Calibration curve for the quantitative determination of compound 7 in DMSO (λ_{abs} = 340 nm)

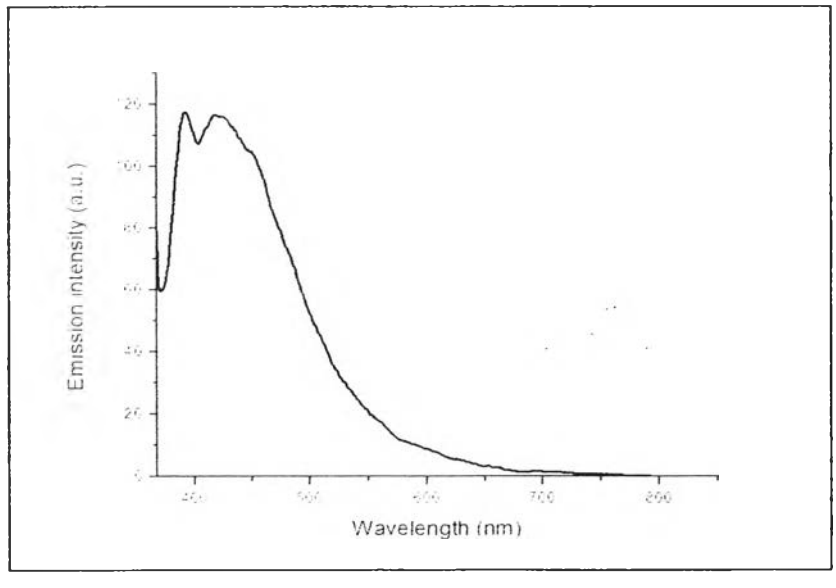

Figure B.6 Emission spectrum of compound 7 in DMSO (λ_{ex} = 350 nm)

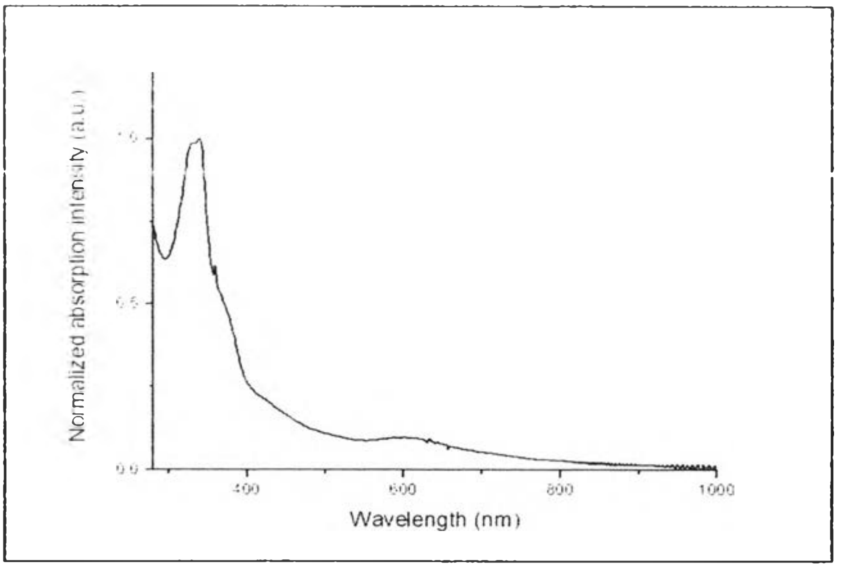

Figure B.7 Absorption spectrum of compound **8** in DMSO (λ_{abs} = 340 nm)

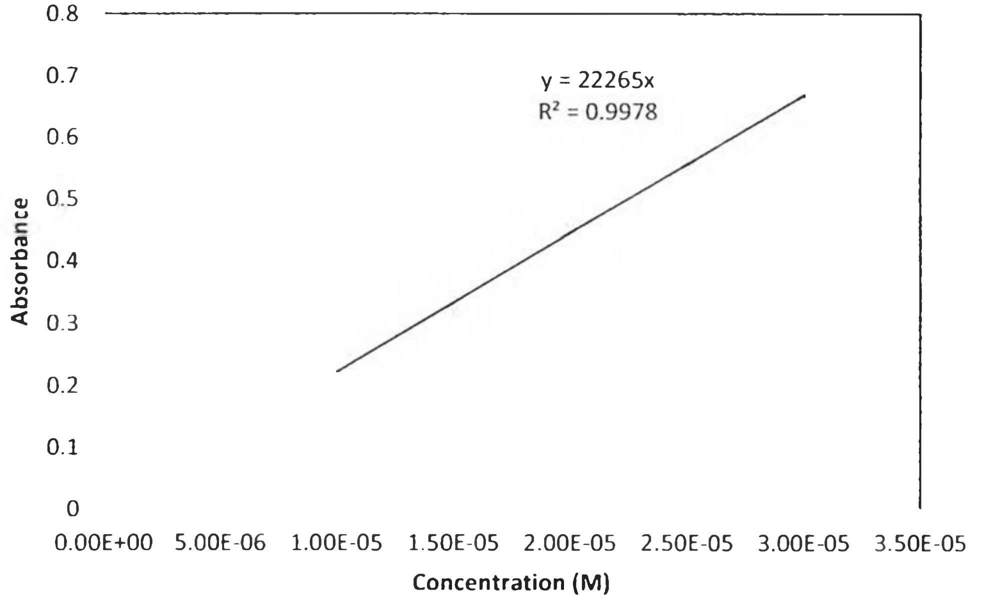

Figure B.8 Calibration curve for the quantitative determination of compound **8** in DMSO (λ_{abs} = 340 nm)

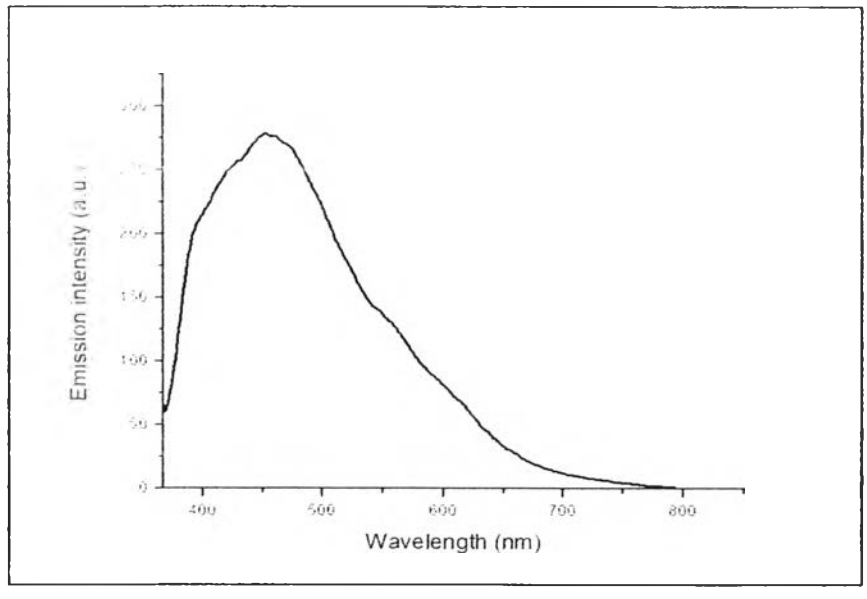

Figure B.9 Emission spectrum of compound 8 in DMSO (λ_{ex} = 350 nm)

VITA

Miss Kobkun Sae-pang was born on July 30, 1987 in Phetchabun, Thailand. She got a Bachelor Degree of Petrochemical and Polymer engineering from Faculty of Engineering at Silpakorn University, Nakornprathom in 2008. Then, she was admitted into a Master Degree in the major Petrochemical and Polymer science, Faculty of Science, Chulalongkorn University, Bangkok in 2009 and completed the program in 2013.