Electronic Supplementary Information

Magnetically Retrievable Copper Ionic Liquid Nanocatalyst for Cyclooxidative Synthesis of 2-Phenylquinazolin-4(3*H*)-ones

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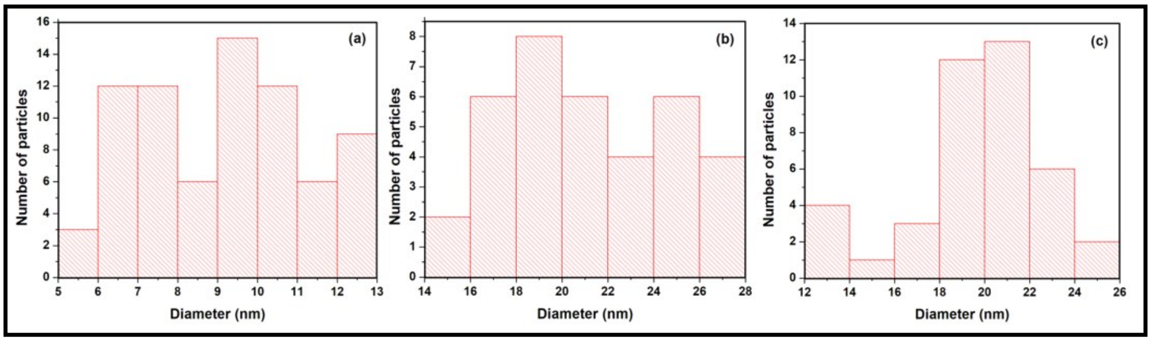


Fig. S1. Size distribution histograms of (a) MNPs, (b) SMNPs and (c) CuIL@SMNPs.

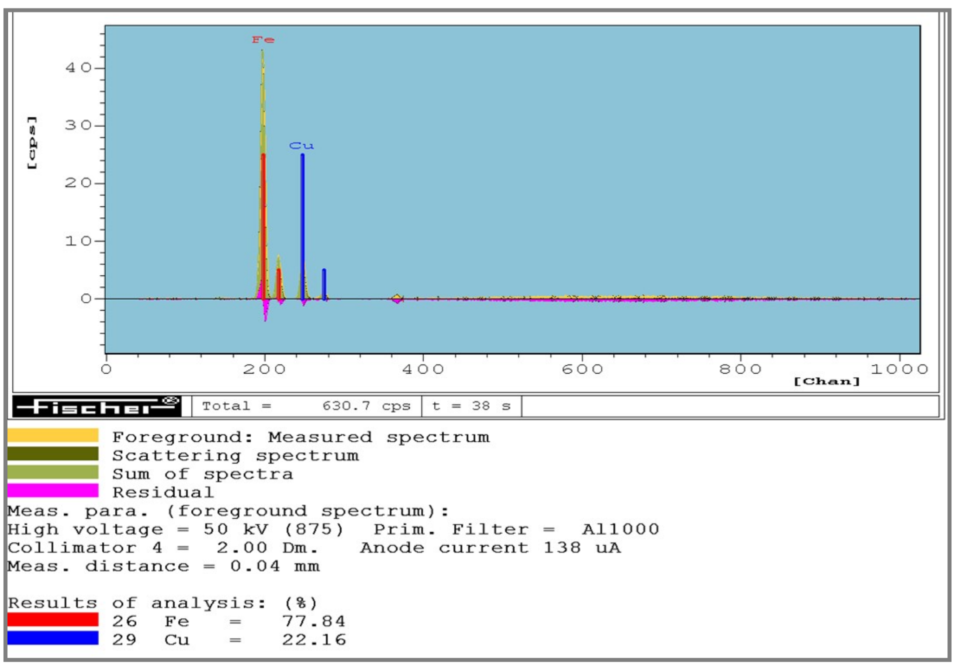


Fig. S2. Detection and quantification of copper in CuIL@SMNPs using EDXRF.

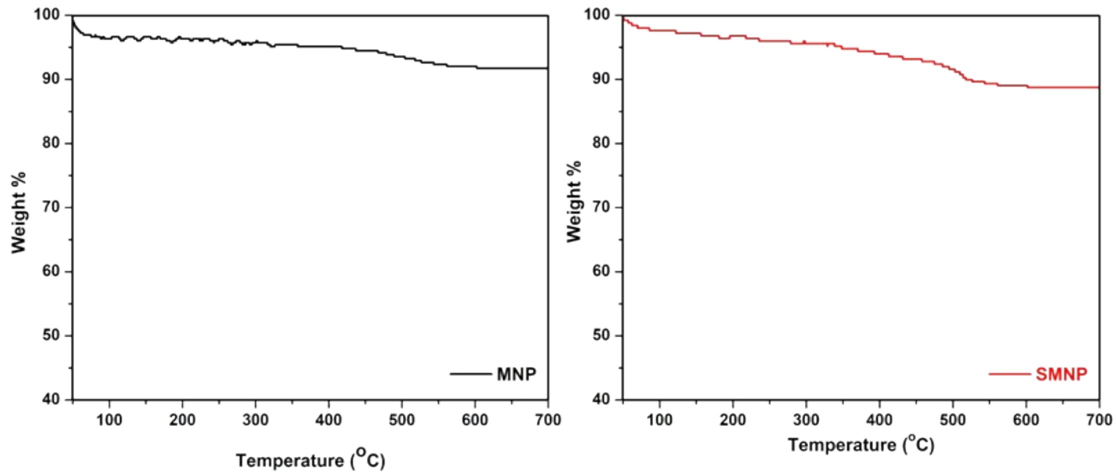


Fig. S3 TGA curves of MNP and SMNP.

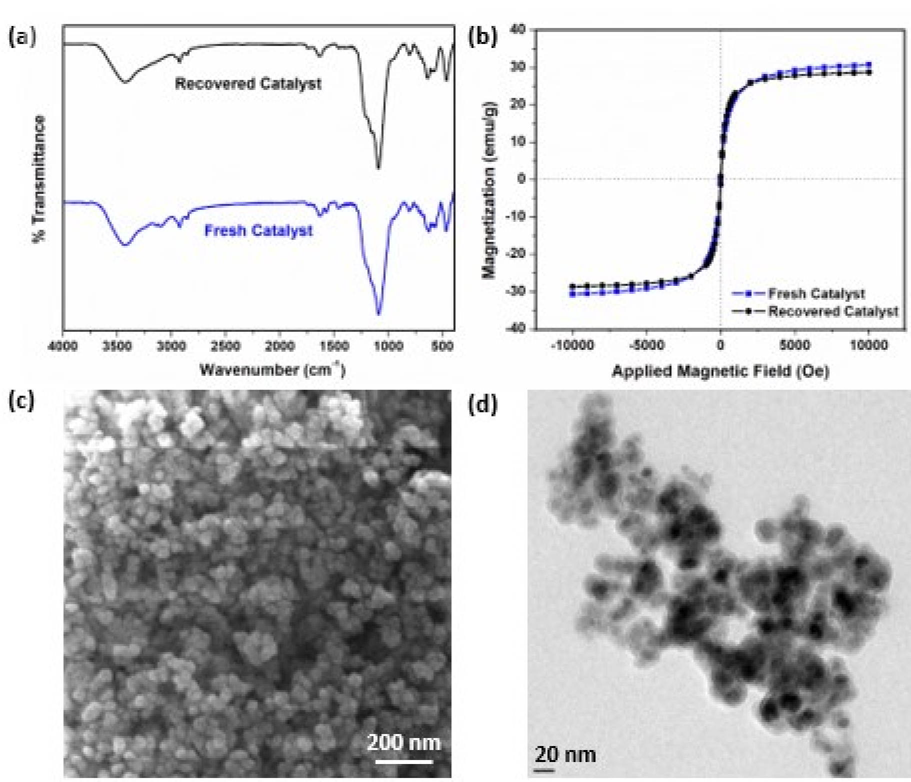


Fig. S4 (a) FT-IR, (b) VSM, (c) FE-SEM and (d) TEM analysis of the recovered catalyst after sixth run.

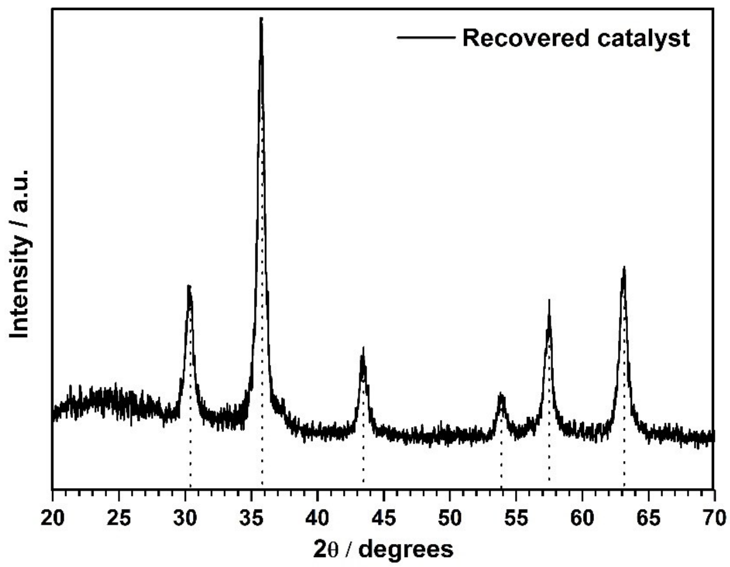
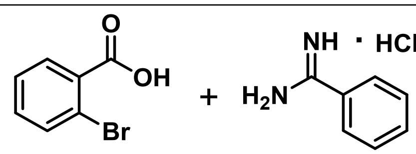
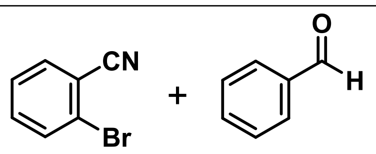
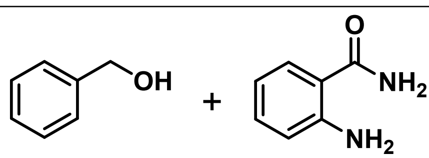
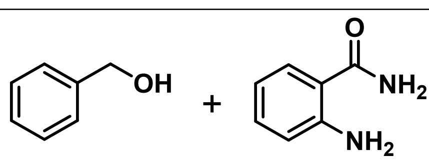
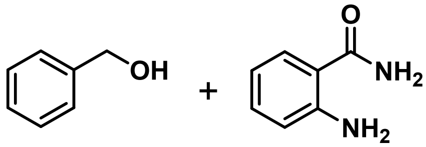
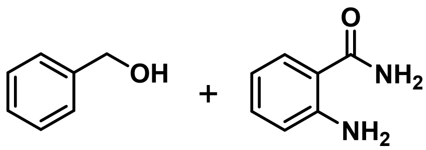
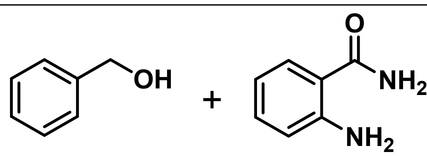
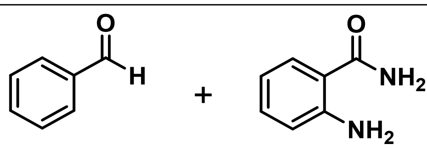
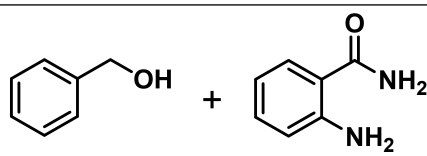
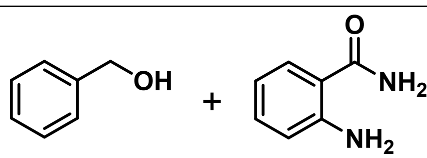
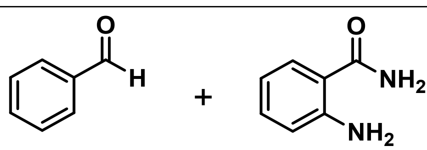
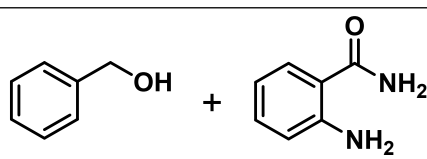
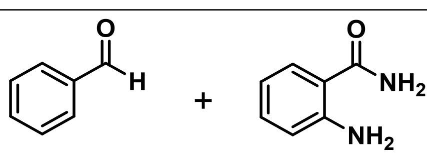
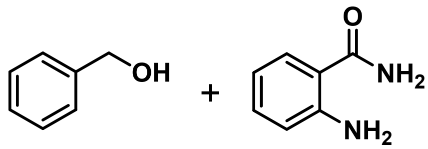
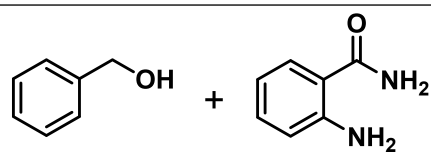
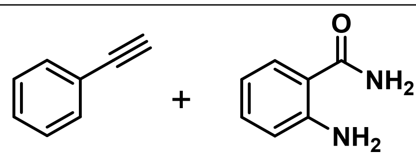
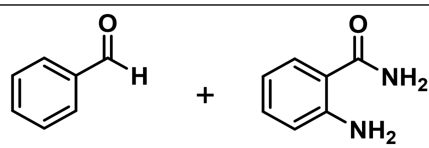
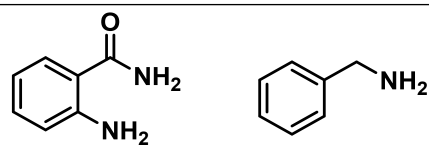
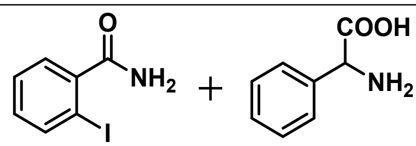
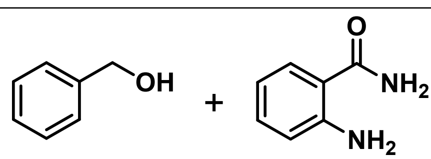
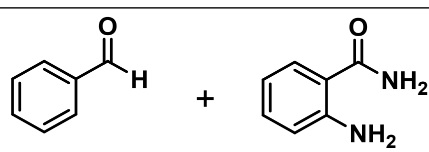


Fig. S5 XRD spectrum of recovered catalyst after 6th run.

Table S1 Comparison of the catalytic efficiency of CuIL@SMNP nanocatalyst with other previously reported catalysts for the synthesis of 2-phenylquinazolin-4(3*H*)-one.

S. No.	Reactants	Catalyst	Reaction Conditions	Yield & Reusable Cycles	Ref.
1.		Dicopper(I) complex	Cs_2CO_3, DMF, 70 °C, 6 h, N_2	99; -	1
2.	 $NH_3.H_2O$	$CuCl_2$	L-Proline, Cs_2CO_3, H_2O, 100 °C, 12 h	75; -	2
3.		$[Cp^*IrCl_2]_2$	Xylene, 139 °C, 36 h, N_2	93; -	3
4.		$Ru(PPh_3)_3(CO)(H)_2$/ Xantphos	Cronotonitrile, NH_4Cl, toluene, reflux, 24 h, N_2	72; -	4

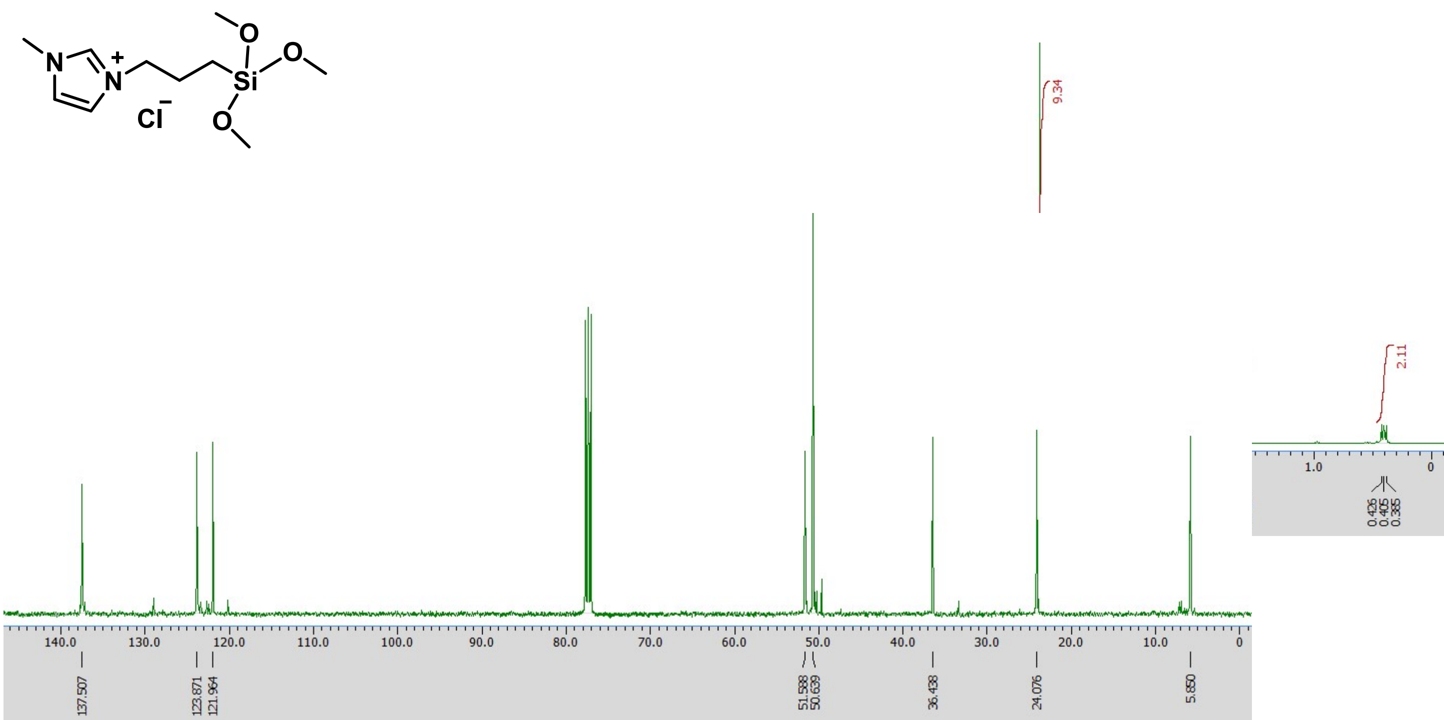
5.		$Pd(OAc)_2$/TPPMS	H_2O, 100 °C, 16 h, sealed tube, air	93; -	[5]
6.		[Ni(MeTAA)]	Na^{t}OBu, xylene, 100 °C, 36 h	86; -	[6]
7.		Cu(II) complex	NaOH, Toluene, 90 °C, 36 h	95; -	[7]
8.		$CuCl_2$	EtOH, 70 °C, 6 h	88; -	[8]
9.		$FeCl_3$	TBHP, DMSO, 60 °C, 7 h	93; -	[9]
10.		ZnI_2	TBHP, DMSO, 110 °C, 16 h	90; -	[10]
11.		$VO(acac)_2$	DCE, 80 °C, 6 h, O_2 atmosphere	89; -	[11]
12.		α-MnO_2	TBHP, chlorobenzene, 80 °C, 16 h	91; 4	[12]
13.		Gd_2MoO_6-ZnO	Toluene, 110 °C, 8 h	90; 4	[13]

14.		Pt supported HBEA zeolite	Mesitylene, 165 °C, 24 h	95; -	[14]
15.		Fe-PPOP	CH_3CN, TBHP, 60 °C, 24 h	68; 3	[15]
16.		I_2	O_2 balloon, DMSO, H_2O, 110 °C, 12 h	70; -	[16]
17.		Bi-SO_3H functionalized IL	EtOH, 80 °C, 2 h	98; 4	[17]
18.		[BMIm]BF_4	120 °C, 10 h	96;	[18]
19.		Graphene oxide/Fe_3O_4-CuI	DMSO/ethylene glycol, Cs_2CO_3, 120 °C, 12 h	61;	[19]
20.		Fe_3O_4-carbon dot nanocomposite	TBHP, H_2O, 90 °C, 16 h	94; 5	[20]
21.		**CuIL@SMNP**	**EtOH, reflux, 4 h**	**97; 6**	**This work**

NMR Data

Silyl-functionalized Ionic Liquid (FIL)

Colorless viscous liquid; ^{1}H NMR (400 MHz, $CDCl_3$) δ 10.20 (s, 1H), 7.59 (t, J = 1.6 Hz, 1H), 7.30 (t, J = 1.7 Hz, 1H), 4.11 (t, J = 7.2 Hz, 2H), 3.91 (s, 3H), 3.34 (s, 9H), 1.86-1.69 (m, 2H), 0.41 (t, J = 8.2 Hz, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 137.5, 123.9, 122.0, 51.6, 50.6, 36.4, 24.1, 5.8

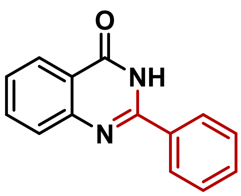


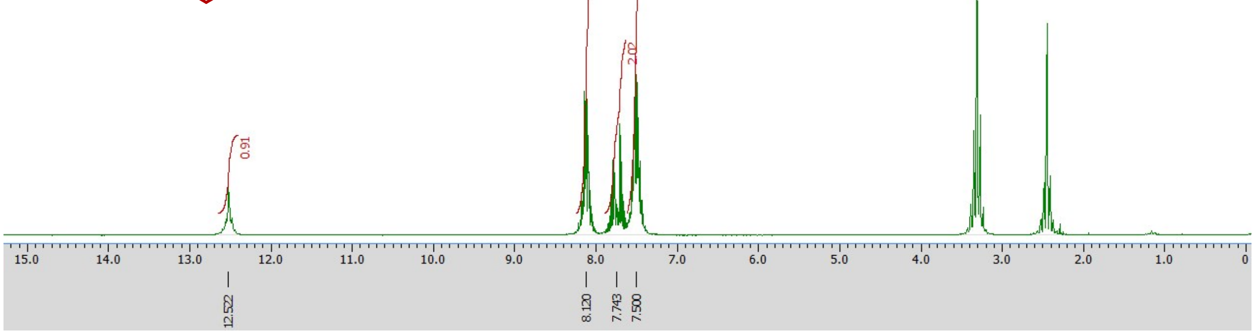
NMR data of selected organic compounds:

Note: Peaks at δ 3.4 and δ 2.5 ppm in ^{1}H NMR spectra are attributed to the presence of water and DMSO-d_6, respectively. Also, the peak at δ 39.5 ppm in ^{13}C NMR is due to DMSO-d_6. Besides, wherever $CDCl_3$ is used, peak at δ 7.26 ppm in ^{1}H and δ 77.26 ppm in ^{13}C NMR is due to $CDCl_3$.

Fig. 9, 2a

White solid, m.p. 230-232 °C;[20] ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.52 (1H), 8.12 (3H), 7.74 (2H), 7.50 (4H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 162.8, 152.8, 149.2, 135.2, 133.2, 131.9, 129.1, 128.3, 128.0, 127.1, 126.4, 121.5





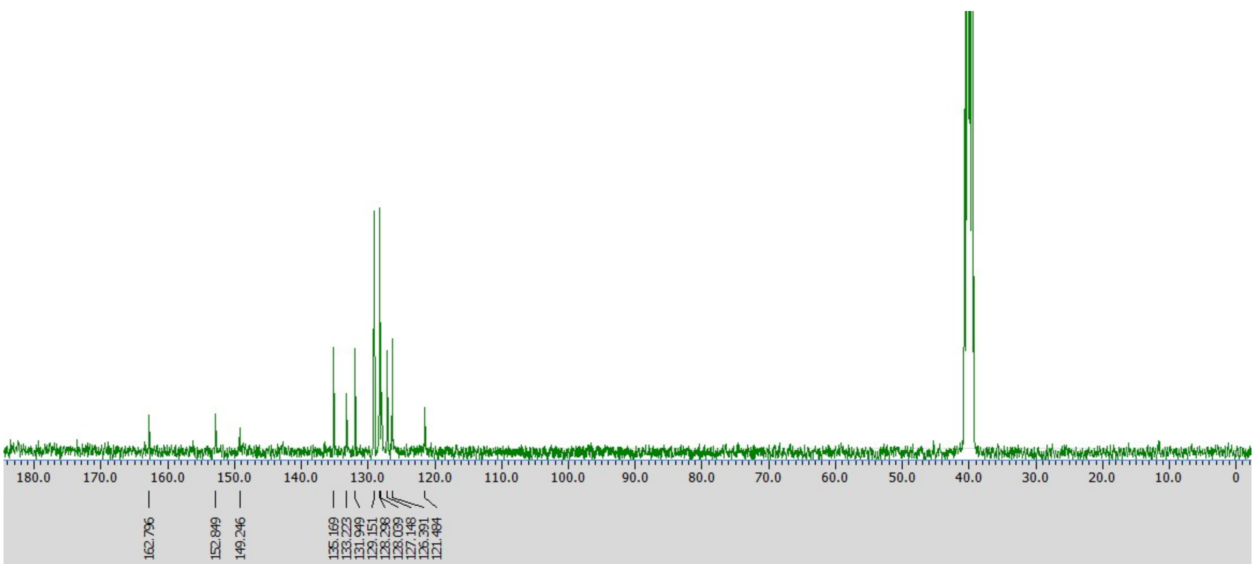
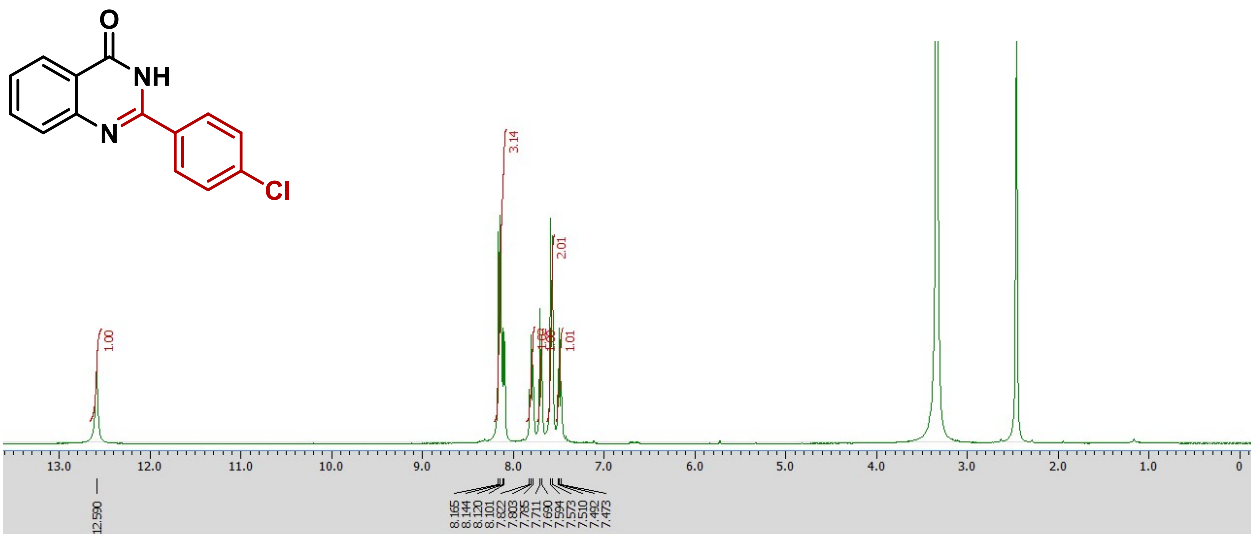


Fig. 9, 2b

White solid, m.p. 298-300 °C;[21] ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.59 (s, 1H), 8.17-8.10 (m, 3H), 7.80 (t, J = 7.4 Hz, 1H), 7.70 (d, J = 8.1 Hz, 1H), 7.58 (d, J = 8.4 Hz, 2H), 7.49 (t, J = 7.4 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 162.7, 151.9, 149.1, 136.8, 135.2, 132.0, 130.2, 129.2, 128.1, 127.4, 126.4, 121.5



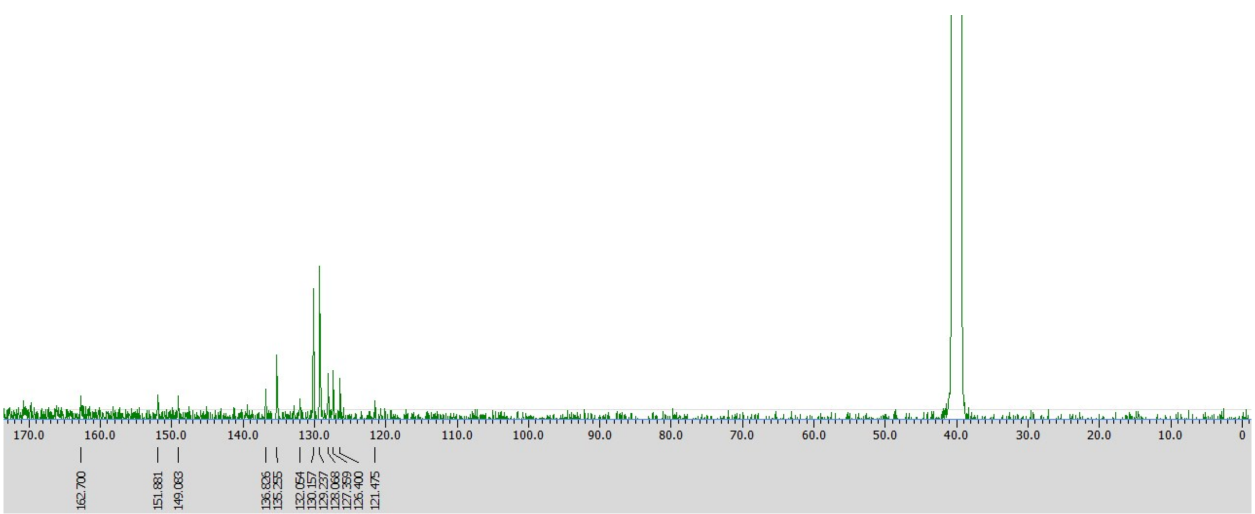
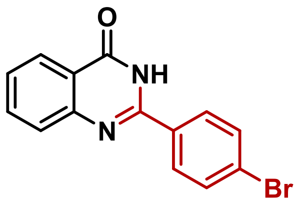
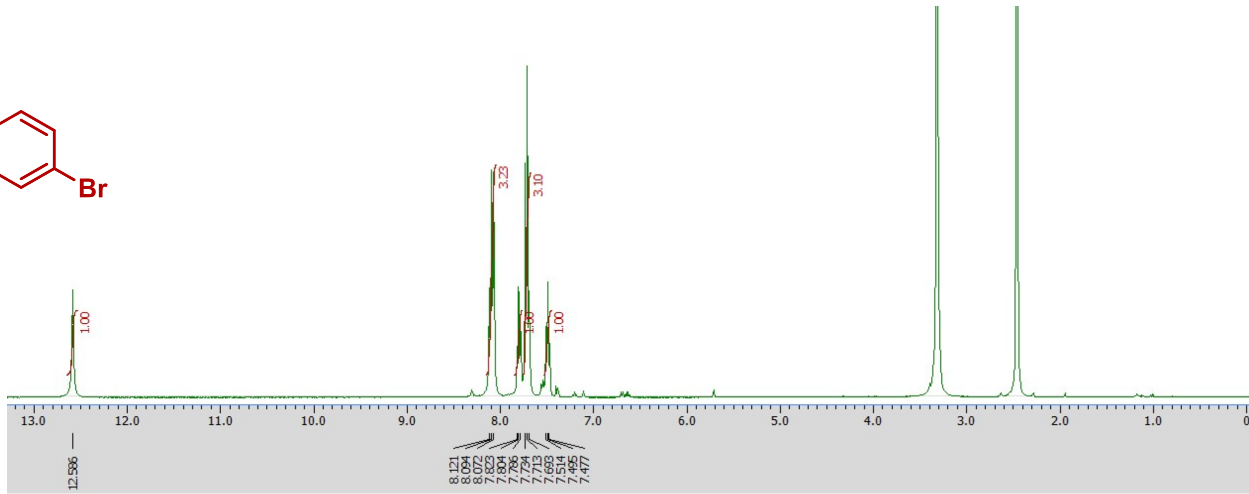


Fig. 9, 2c

White solid, m.p. 292-294 °C;[21] ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.59 (s, 1H), 8.12-8.07 (m, 3H), 7.80 (t, *J* = 7.4 Hz, 1H), 7.71 (t, *J* = 8.2 Hz, 3H), 7.50 (t, *J* = 7.4 Hz, 1H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 162.7, 152.0, 149.1, 135.2, 132.2, 130.3, 128.0, 127.3, 126.4, 125.8, 121.5





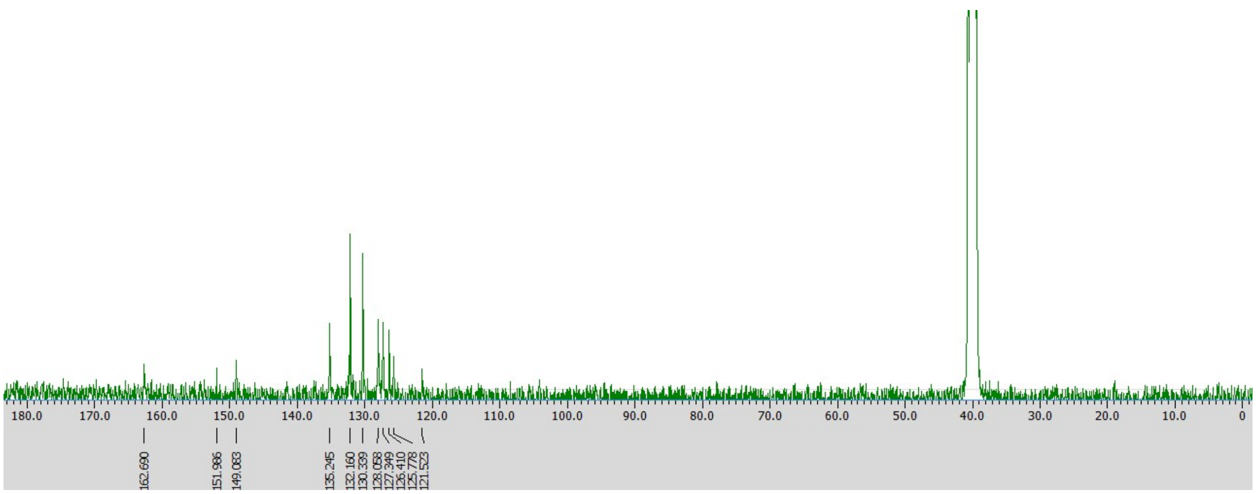
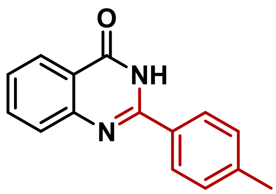
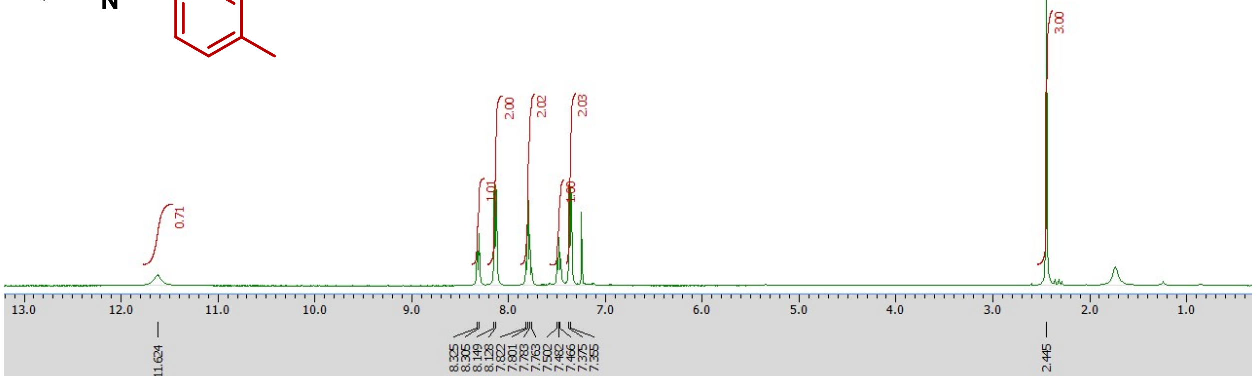


Fig. 9, 2e

White solid, m.p. 232-234 °C;[20] ^{1}H NMR (400 MHz, $CDCl_3$) δ 11.62 (s, 1H), 8.32 (d, J = 8.0 Hz, 1H), 8.14 (d, J = 8.1 Hz, 2H), 7.79 (dd, J = 15.4, 8.1 Hz, 2H), 7.50-7.47 (m, 1H), 7.37 (d, J = 8.0 Hz, 2H), 2.45 (s, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 164.0, 151.9, 149.7, 142.3, 134.9, 130.0, 129.8, 128.0, 127.4, 126.6, 126.4, 21.7





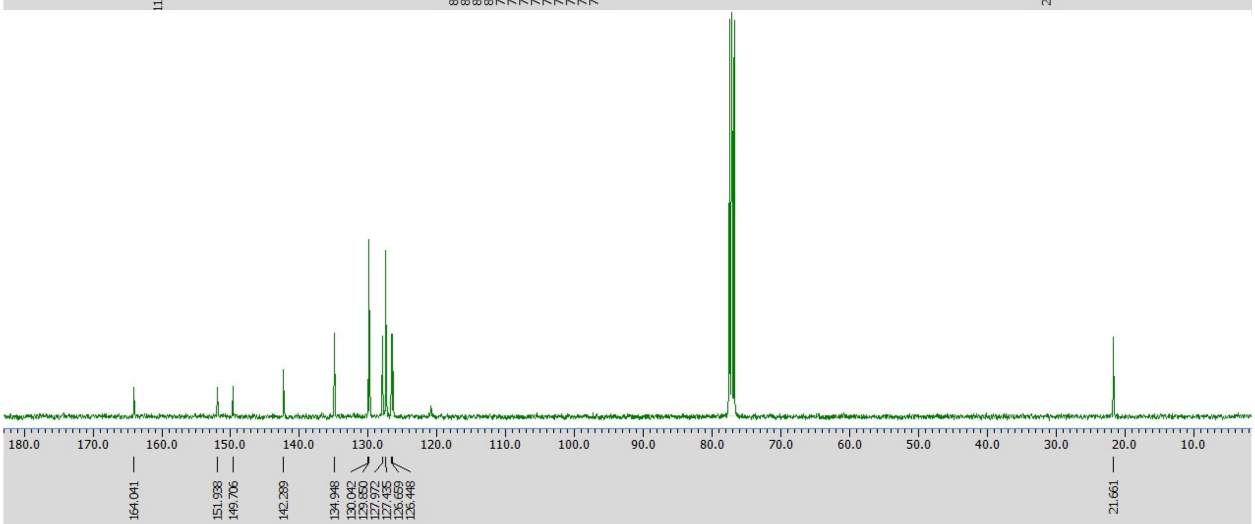
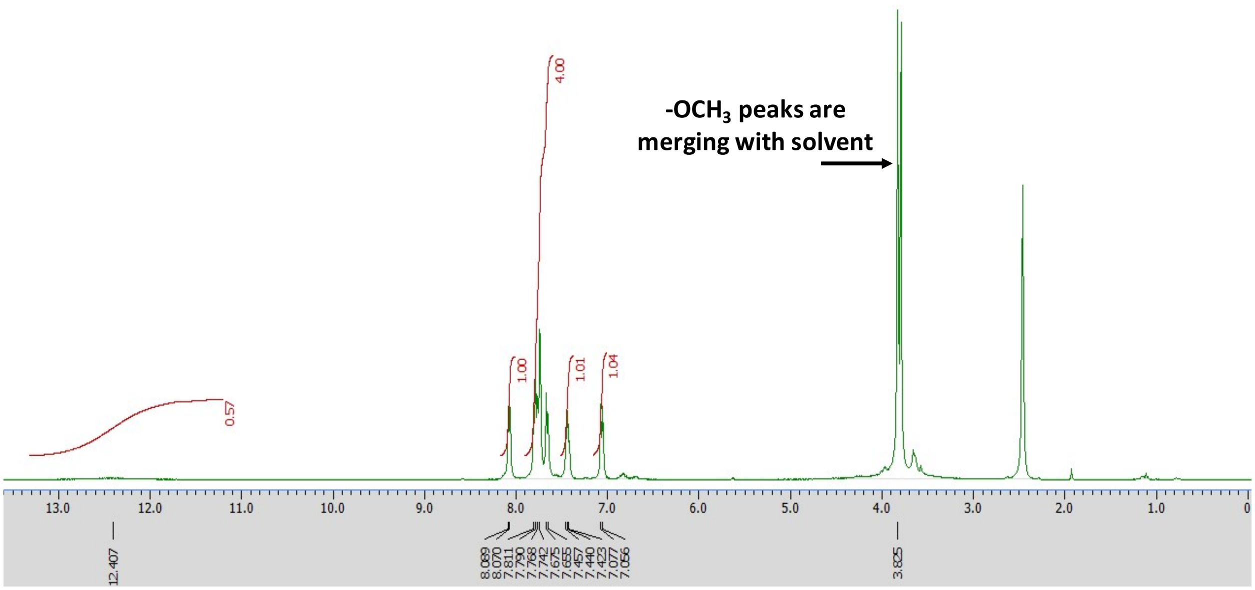


Fig. 9, 2g

Yellow solid, m.p. 222-224 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.41 (bs, 1H), 8.08 (d, J = 7.4 Hz, 1H), 7.81-7.65 (m, 4H), 7.44 (t, J = 6.9 Hz, 1H), 7.07 (d, J = 8.2 Hz, 1H);^{13}C NMR (100 MHz, DMSO-d_6) δ 162.8, 152.3, 152.0, 149.4, 149.0, 135.1, 127.8, 126.7, 126.4, 121.6, 121.2, 111.9, 111.0, 56.2



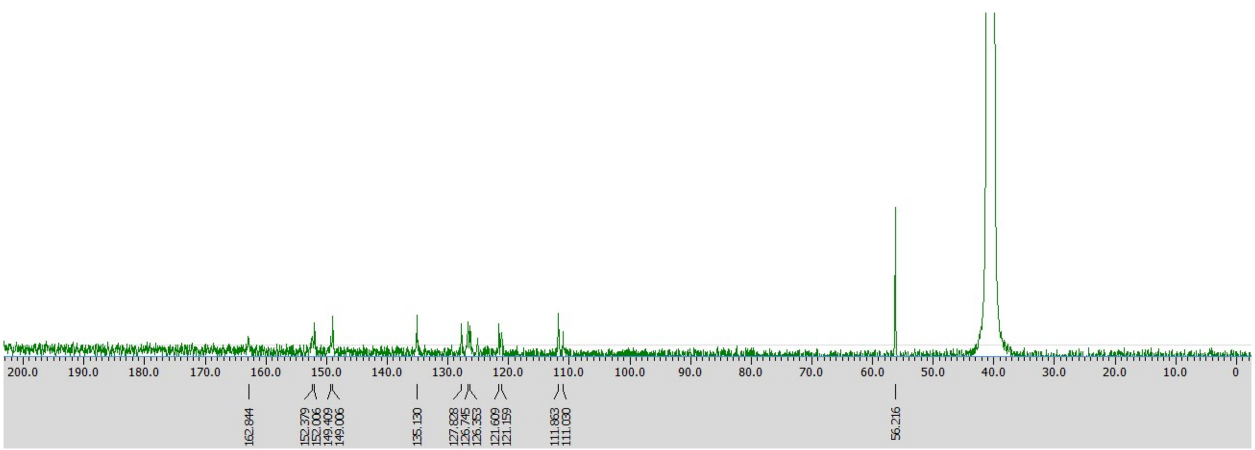
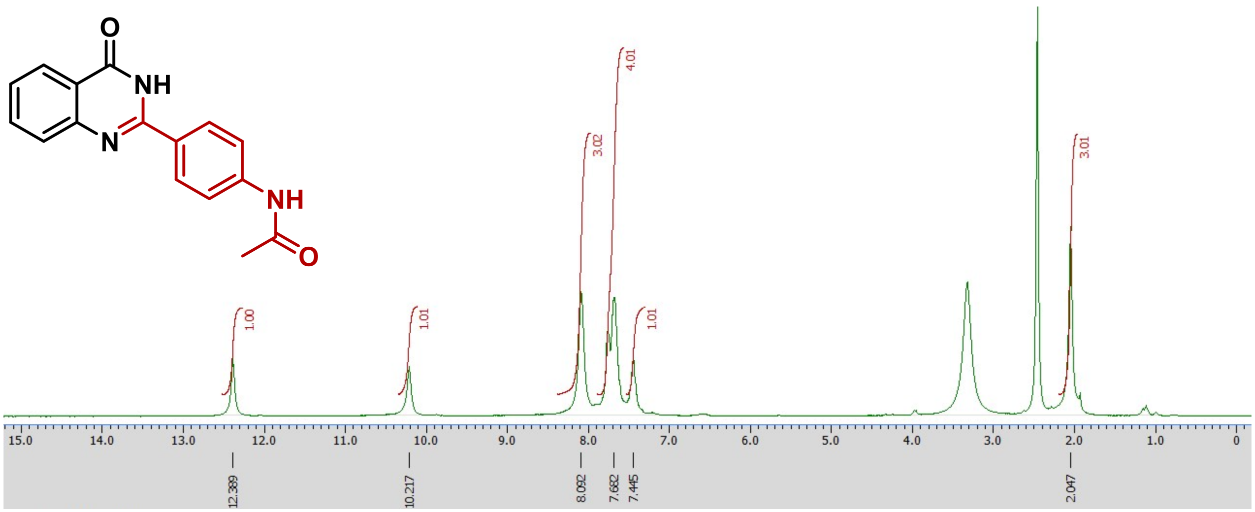
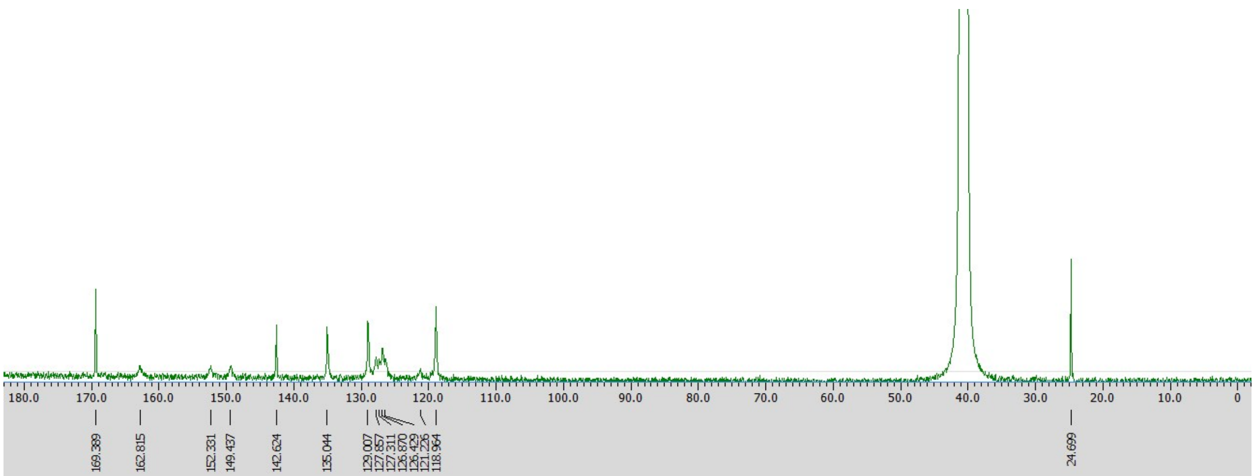


Fig. 9, 2j

Yellow solid, m.p. 324-327 °C; ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.40 (1H), 10.22 (1H), 8.09 (3H), 7.68 (4H), 7.44 (1H), 2.05 (3H); ^{13}C NMR (100 MHz, DMSO-d_6) δ 169.4, 162.8, 152.3, 149.4, 142.6, 135.0, 129.0, 127.8, 127.3, 126.9, 126.4, 121.2, 119.0, 24.7





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