Supporting Information

Selective sulfonylation and diazotization of indoles

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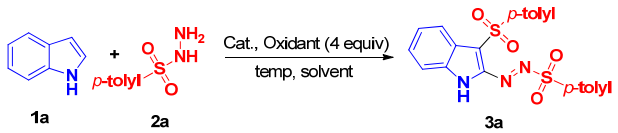
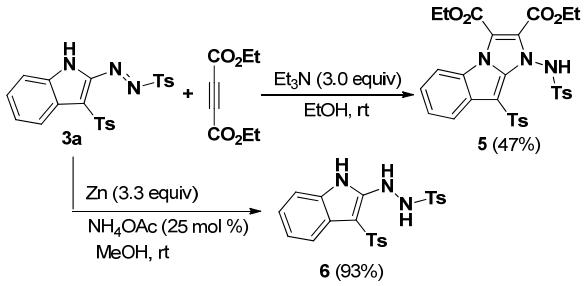
Table 1 Optimization conditions for the synthesis of **3a**



Entry	Oxidant	Cat. (mol %)	Solvent	*t* (°C)	Yield (%)[a]
1	TBHP	TBAI (30)	CH_3CN	rt	81
2	TBHP	TBAI (30)	DMSO	rt	*ND*[b]
3	TBHP	TBAI (30)	EtOH	rt	37
4	TBHP	TBAI (30)	MeOH	rt	58
5	TBHP	TBAI (30)	DCE	rt	64
6	TBHP	TBAI (30)	toluene	rt	57
7	TBHP	TBAI (30)	CH_3CN	40	87
8	TBHP	TBAI (30)	CH_3CN	60	46
9	TBHP	TBAI (50)	CH_3CN	40	86
10	TBHP	TBAI (10)	CH_3CN	40	65
11	TBHP	I_2 (30)	CH_3CN	40	84
12	TBHP	CuI (30)	CH_3CN	40	*ND*[b]
13	TBHP	CuBr (30)	CH_3CN	40	*ND*[b]
14	TBHP	-	CH_3CN	40	*ND*[b]
15	BPO	TBAI (30)	CH_3CN	40	60
16	TBPB	TBAI (30)	CH_3CN	40	42
17	H_2O_2	TBAI (30)	CH_3CN	40	80
18	DTBP	TBAI (30)	CH_3CN	40	67
19	m-CPBA	TBAI (30)	CH_3CN	40	47

[a] Isolated yield. [b] Not detected (ND).



Scheme 4 The application of 3-sulfonyl-2-sulfonyldiazenyl-1*H*-indoles **3a**

Experimental

General information

Melting points were determined in open capillaries. IR spectra were taken on a FT-IR-Tensor 27 spectrometer. ^{1}H NMR spectra were measured on a Bruker DPX 400 MHz spectrometer. HRMS (ESI) was determined by using microTOF-Q HRMS/MS instrument Ⅱ (BRUKER).

General Procedure for the Synthesis of 3a-3u

Typical Procedure for the Preparation of 3a:

The substrate indole (**1a**, 1 mmol, 0.117 g), *p*-toluenesulfonyl hydrazide (**2a**, 2.2 mmol, 0.409 g), TBAI (0.3 mmol, 0.111 g, 30 mol%), and acetonitrile (2 ml) were added to a 10 mL Schlenk tube, followed by addition of TBHP (70% aq, 4 equiv, 4 mmol). The mixture was stirred at 40 ^{o}C as monitored by TLC, cooled to room temperature. The solution was then extracted with EtOAc, the combined organic layers were dried over Na_2SO_4, filtered, and evaporated under vacuum. The residue was purified by column chromatography on silica gel (the eluent, petroleum ether/ethyl acetate) to afford the desired product **3a**.

General Procedure for the Synthesis of 4a-4e

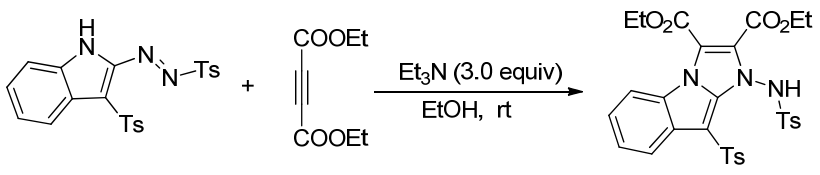
Typical Procedure for the Preparation of 4a:

The substrate 3-methylindole (**1l**, 1 mmol, 0.117 g), *p*-toluenesulfonyl hydrazide (**2a**, 2.2 mmol, 0.109 g), TBAI (0.3 mmol, 0.111 g, 30 mol%), and acetonitrile (2 ml) were added to a 10 mL Schlenk tube, followed by addition of TBHP (70% aq, 4 equiv, 4 mmol). The mixture was stirred at 40 ^{o}C as monitored by TLC, cooled to room temperature. The solution was then extracted with EtOAc, the combined organic layers were dried over Na_2SO_4, filtered, and evaporated under vaccum. The residue was purified by column chromatography on silica gel (the eluent, petroleum ether/ethyl acetate) to afford the desired product **4a**.

General Procedure for the Synthesis of 1o[1]

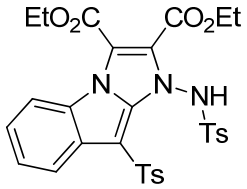
The substrate indole (1 mmol, 0.117 g), 4-bromobenzene-1-sulfonyl chloride (1.2 mmol, 0.3066 g), CuI (0.05 mmol, 0.0095 g, 5 mol%), and acetonitrile (2 ml) were added to a 10 mL Schlenk tube. The mixture was stirred and heated to reflux monitored by TLC, cooled to room temperature. The solution was then extracted with EtOAc, the combined organic layers were dried over Na_2SO_4, filtered, and evaporated under vacuum. The residue was purified by column chromatography on silica gel (the eluent, petroleum ether/ethyl acetate) to afford the desired product **1o**.

General Procedure for the Synthesis of 5



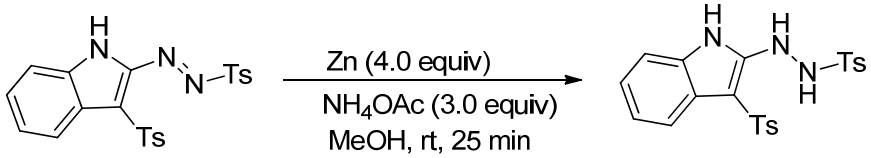
The substrate 3-tosyl-2-(tosyldiazenyl)-1*H*-indole (**3a**, 1.0 mmol, 454 mg), Diethyl acetylenedicarboxylate (2.0 mmol, 340 mg) and ethanol (2 ml) were added to a 10 mL Schlenk tube, followed by addition of triethylamine (3.0 mmol, 304 mg). The mixture was stirred at room temperature as monitored by TLC, cooled to room temperature, and the solution was then quenched by diluted hydrochloric acid and extracted with EtOAc, the combined organic layers were dried over Na_2SO_4, filtered, and evaporated under vacuum. The residue was purified by column chromatography on silica gel, eluting with petroleum ether/ethyl acetate, to afford the desired product.

Diethyl 1-(4-methylphenylsulfonamido)-9-tosyl-1H-imidazo[1,2-*a*]indole-2,3-dicarboxylate



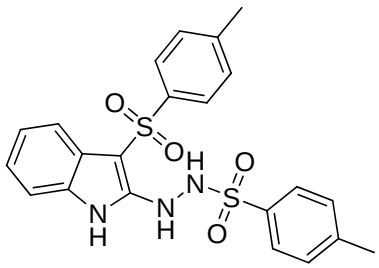
Red solid, mp: 185-186 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3134, 2987, 1620, 1727, 1613, 1572, 1455, 1380, 1351, 1294, 1214, 1163, 1084, 1036, 1016, 950, 890, 844, 815.
^{1}H NMR (400 MHz, DMSO-d_6) δ 12.05 (s, 1H), 8.01–7.88 (m, 4H), 7.60 (d, J = 8.4 Hz, 2H), 7.40–7.37 (m, 3H), 7.31 (d, J = 8.4 Hz, 2H), 7.27–7.23 (m, 1H), 4.45–4.39 (m, 2H), 3.89–3.68 (m, 2H), 2.38 (s, 3H), 2.32 (s, 3H), 1.29 (t, J = 7.2 Hz, 3H), 1.15 (t, J = 7.2 Hz, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 158.6, 156.7, 143.2, 141.7, 140.4, 130.3, 129.9, 129.8, 128.3, 126.9, 125.6, 124.9, 121.5, 119.5, 114.2, 90.3, 63.4, 62.8, 21.5, 21.4, 14.1, 13.8
HRMS (ESI) *m/z*: calcd for $C_{30}H_{29}N_3O_8S_2Na$: 646.1288 $[M+Na]^+$; found: 646.1299.

General Procedure for the Synthesis of 6[2]



The substrate 3-tosyl-2-(tosyldiazenyl)-1*H*-indole (3a, 1.0 mmol, 454 mg), ammonium acetate (3.0 mmol, 231 mg) and methyl alcohol (2 ml) were added to a 10 mL Schlenk tube, followed by addition of Zn (4.0 mmol, 262 mg). The mixture was stirred at room temperature for 25 min as monitored by TLC. The solution was then evaporated under vacuum. The residue was purified by column chromatography on silica gel, eluting with petroleum ether/ethyl acetate, to afford the desired product.

4-Methyl-N'-(6-methyl-3-tosyl-1H-indol-2-yl)benzenesulfonohydrazide



Red solid, mp: 195-196 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3340, 3254, 1715, 1620, 1579, 1502, 1475, 1461, 1375, 1343, 1276, 1242, 1166, 1134, 1091, 1063, 1015, 813.
^{1}H NMR (400 MHz, DMSO-d_6) δ 11.75 (s, 1H), 9.99 (s, 1H), 7.94 (s, 1H), 7.81 (d, *J* = 8.4 Hz, 2H), 7.70 (d, *J* = 8.0 Hz, 2H), 7.55 (d, *J* = 8.0 Hz, 2H), 7.45 (d, *J* = 7.6 Hz, 1H), 7.37 (d, *J* = 8.0 Hz, 2H), 7.31 – 7.26 (m, 1H), 7.06–6.97 (m, 2H), 2.45 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 148.7, 144.9, 143.4, 141.6, 134.4, 132.5, 130.4, 130.1, 128.4, 125.7, 125.1, 121.7, 121.2, 116.6, 111.8, 90.2, 21.6, 21.4
HRMS (ESI) *m/z*: calcd for $C_{22}H_{21}N_3NaO_4S_2Na$: 478.0865 $[M+Na]^+$; found: 478.0884.

Reference

1. M. Rahman, M. Ghosh, A. Hajra and A. Majee, *J. Sulfur Chem.* 2013, **34**, 342.
2. (a) L. Hu, X. Cao, L. Chen, J. Zheng, J. Lu, X. Sun and H. Gu, *Chem. Commun.* 2012, **48**, 3445. (b) N. L. Dunn, M. Ha and A. T. Radosevich, *J. Am. Chem. Soc.* 2012, **134**, 11330. (c) W. M. Koppes, J. S. Moran, J. C. Oxley and J. L. Smith, *Tetrahedron Lett.* 2008, **49**, 3234. (d) F. A. Khan, J. Dash, C. Sudheer and R. K. Gupta, *Tetrahedron Lett.* 2003, **44**, 7783.

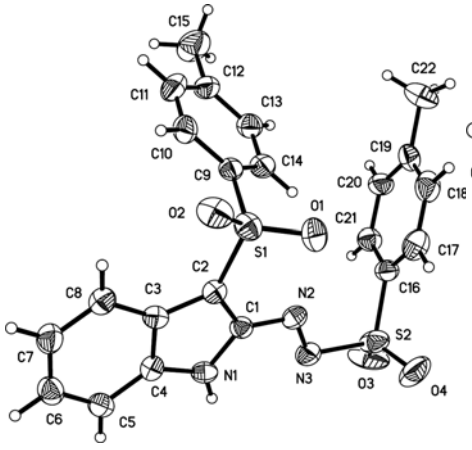


Fig 1, X-ray Structure of **3a**

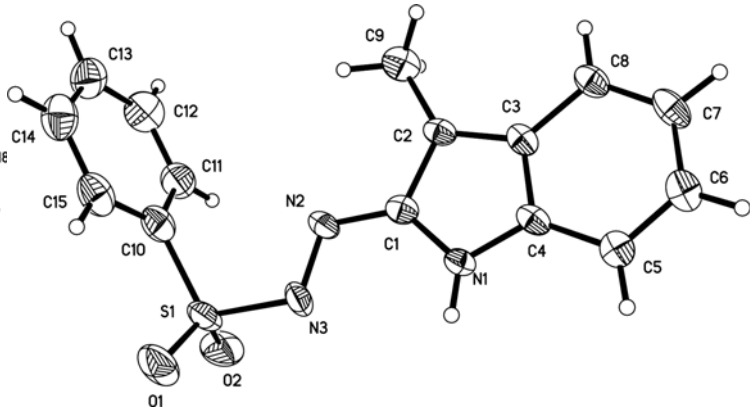
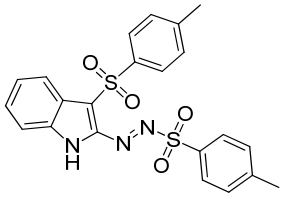


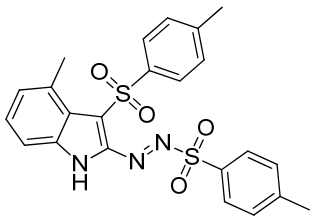
Fig 2, X-ray Structure of **4b**

3-Tosyl-2-(tosyldiazenyl)-1*H*-indole (3a)



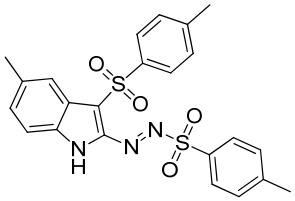
Red solid, mp: 176-177 °C.
IR (KBr, *v*, cm^{-1}): 3277, 2360, 1595, 1504, 1455, 1426, 1390, 1337, 1215, 1186, 1163, 1082, 944, 891, 818.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.34 (s, 1H), 8.24 (d, *J* = 8.4 Hz, 1H), 7.90 (d, *J* = 8.4 Hz, 2H), 7.67 (d, *J* = 8.0 Hz, 2H), 7.48–7.55 (m, 2H), 7.42–7.34 (m, 3H), 7.27 (d, *J* = 8.0 Hz, 2H), 2.50 (s, 3H), 2.33 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.1, 144.7, 141.1, 139.9, 136.5, 130.9, 130.8, 130.5, 130.4, 129.5, 127.2, 125.4, 124.5, 123.8, 121.9, 114.6, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{19}N_3O_4S_2$: 452.0733 $[M-H]^-$; found: 452.0725.

4-Methyl-3-tosyl-2-(tosyldiazenyl)-1H-indole (3b)



Red solid, mp: 170-171 °C.
IR (KBr, *v*, cm^{-1}): 3266, 2924, 2359, 1595, 1490, 1426, 1366, 1323, 1209, 1188, 1157, 1083, 931, 872, 814.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.32 (s, 1H), 7.88 (d, *J* = 8.4 Hz, 2H), 7.59 (d, *J* = 8.0 Hz, 2H), 7.44 (d, *J* = 8.0 Hz, 2H), 7.36–7.35 (m, 2H), 7.29 (d, *J* = 8.4 Hz, 2H), 7.07 (t, *J* = 7.2 Hz, 1H), 2.73 (s, 3H), 2.42 (s, 3H), 2.35 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 146.9, 144.3, 142.9, 140.3, 137.1, 133.0, 130.8, 130.7, 130.3, 129.9, 129.8, 127.6, 126.5, 124.5, 124.3, 112.4, 23.4, 21.7, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_4S_2$: 466.0890 $[M-H]^-$; found: 466.0902.

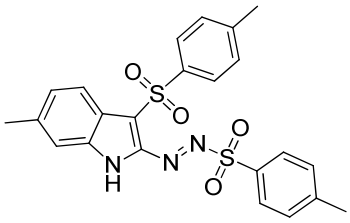
5-Methyl-3-tosyl-2-(tosyldiazenyl)-1*H*-indole (3c)



Red solid, mp: 187-188 °C.
IR (KBr, *v*, cm^{-1}): 3272, 2359, 1595, 1507, 1462, 1420, 1376, 1334, 1291, 1209, 1185, 1157, 1082, 899, 819, 806.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.26 (s, 1H), 8.02 (s, 1H), 7.89 (d, *J* = 8.4 Hz, 2H), 7.66 (d, *J* = 8.0 Hz, 2H), 7.41–7.37 (m, 4H), 7.27 (d, *J* = 7.2 Hz, 2H), 2.50 (s, 3H), 2.44 (s, 3H), 2.33 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.0, 144.6, 141.0, 140.0, 135.1, 134.0, 132.8, 130.9, 130.7,

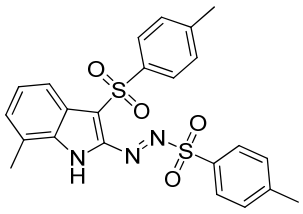
130.3, 129.7, 127.2, 125.7, 123.2, 120.6, 114.3, 21.9, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_4S_2$: 466.0890 $[M-H]^-$; found: 466.0910.

6-Methyl-3-tosyl-2-(tosyldiazenyl)-1H-indole (3d)



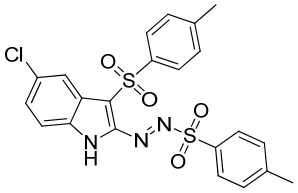
Red solid, mp: 180-181 ^oC.
IR (KBr, *v*, cm^{-1}): 3312, 2359, 1597, 1492, 1454, 1372, 1345, 1300, 1211, 1187, 1159, 1083, 932, 854, 805.
^1H NMR (400 MHz, DMSO-d_6) δ 13.20 (s, 1H), 8.12 (d, *J* = 8.8 Hz, 1H), 7.88 (d, *J* = 8.4 Hz, 2H), 7.66 (d, *J* = 8.0 Hz, 2H), 7.39 (d, *J* = 8.0 Hz, 2H), 7.27–7.20 (m, 4H), 2.49 (s, 3H), 2.42 (s, 3H), 2.33 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 146.9, 144.7, 141.5, 140.8, 139.9, 137.2, 130.8, 130.7, 130.4, 129.9, 127.3, 126.9, 124.4, 123.8, 121.6, 113.5, 22.3, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_4S_2$: 466.0890 $[M-H]^-$; found: 466.0892.

7-Methyl-3-tosyl-2-(tosyldiazenyl)-1*H*-indole (3e)



Red solid, mp: 172-173 ^oC.
IR (KBr, *v*, cm^{-1}): 3267, 2359, 1595, 1490, 1426, 1366, 1323, 1188, 1158, 1083, 932, 872, 814.
^1H NMR (400 MHz, DMSO-d_6) δ 13.32 (s, 1H), 7.88 (d, *J* = 8.0 Hz, 2H), 7.59 (d, *J* = 8.4 Hz, 2H), 7.44 (d, *J* = 8.4 Hz, 2H), 7.36 (d, *J* = 4.4 Hz, 2H), 7.30 (d, *J* = 8.4 Hz, 2H), 7.08–7.06 (m, 1H), 2.73 (s, 3H), 2.43 (s, 3H), 2.36 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 146.9, 144.3, 142.9, 140.3, 137.1, 132.9, 130.8, 130.7, 130.3, 129.9, 129.8, 127.6, 126.5, 124.5, 124.3, 112.4, 23.3, 21.7, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_4S_2$: 466.0890 $[M-H]^-$; found: 466.0892.

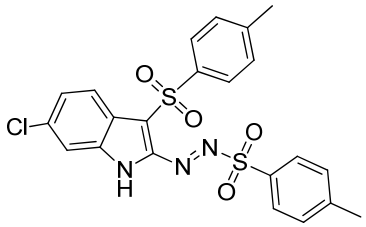
5-Chloro-3-tosyl-2-(tosyldiazenyl)-1*H*-indole (3f)



Red solid, mp: 192 -193 ^oC.
IR (KBr, *v*, cm^{-1}): 3255, 2361, 1595, 1505, 1454, 1380, 1336, 1269, 1186, 1160, 1082, 966, 896, 838, 811.

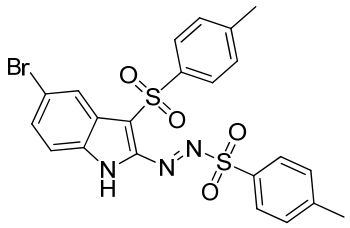
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.57 (s, 1H), 8.21–8.20 (m, 1H), 7.89 (d, J = 8.4 Hz, 2H), 7.68 (d, J = 8.0 Hz, 2H), 7.53 (d, J = 1.6 Hz, 2H), 7.41 (d, J = 8.4 Hz, 2H), 7.28 (d, J = 8.0 Hz, 2H), 2.50 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.3, 144.9, 141.9, 139.6, 134.7, 130.9(3), 130.8(8), 130.4, 129.2, 129.2, 129.0, 127.4, 125.9, 122.7, 120.6, 116.7, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{18}ClN_3O_4S_2$: 486.0343 $[M-H]^-$; found: 486.0345.

6-Chloro-3-tosyl-2-(tosyldiazenyl)-1*H*-indole (3g)



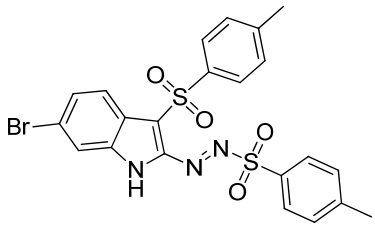
Orange solid, mp: 184 -185 °C.
IR (KBr, *v*, cm^{-1}): 3303, 2359, 1612, 1596, 1494, 1418, 1376, 1351, 1296, 1186, 1162, 1084, 917, 847, 809.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.48 (s, 1H), 8.24 (d, J = 8.8 Hz, 1H), 7.89 (d, J = 8.4 Hz, 2H), 7.67 (d, J = 8.4 Hz, 2H), 7.50 (d, J = 2.0Hz, 1H), 7.41–7.38 (m, 3H), 7.28 (d, J = 8.0 Hz, 2H), 2.50 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.2, 145.0, 141.6, 139.6, 136.7, 134.6, 130.9(3), 130.8(6), 130.4, 129.3, 127.3, 125.2, 124.0, 123.9, 123.7, 113.9, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{18}ClN_3O_4S_2$: 486.0343 $[M-H]^-$; found: 486.0343.

5-Bromo-3-tosyl-2-(tosyldiazenyl)-1H-indole (3h)



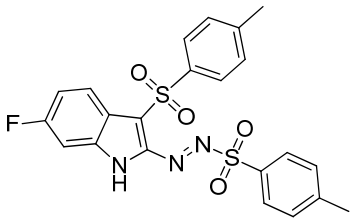
Orange solid, mp: 187-188 °C.
IR (KBr, *v*, cm^{-1}): 3279, 2360, 1595, 1504, 1452, 1423, 1370, 1341, 1266, 1186, 1161, 1084, 957, 893, 835, 805.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.57 (s, 1H), 8.37 (d, J = 1.6 Hz, 1H), 7.89 (d, J = 8.0 Hz, 2H), 7.69–7.63 (m, 3H), 7.47 (d, J = 9.2 Hz, 1H), 7.40 (d, J = 8.4 Hz, 2H), 7.28 (d, J = 8.4 Hz, 2H), 2.51 (s, 3H), 2.35 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.3, 144.9, 141.7, 139.6, 134.9, 132.9, 130.9(4), 130.8(8), 130.4, 129.2, 127.3, 126.4, 123.6, 122.5, 117.2, 116.9, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{18}BrN_3O_4S_2$: 531.9819 $[M-H]^-$; found: 531.9820.

6-Bromo-3-tosyl-2-(tosyldiazenyl)-1H-indole (3i)



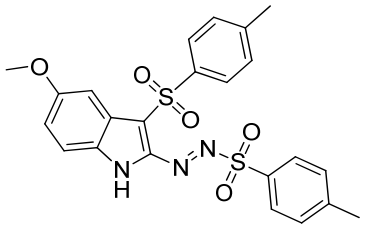
Yellow solid, mp: 187-188 °C.
IR (KBr, *v*, cm^{-1}): 3303, 2922, 2360, 1596, 1494, 1446, 1420, 1390, 1377, 1350, 1295, 1185, 1161, 1084, 908, 843, 811.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.47 (s, 1H), 8.18 (d, *J* = 8.8 Hz, 1H), 7.89 (d, *J* = 8.4 Hz, 2H), 7.69–7.65 (m, 3H), 7.53–7.51 (m, 1H), 7.38 (d, *J* = 8.0 Hz, 2H), 7.28 (d, *J* = 8.0 Hz, 2H), 2.50 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.2, 145.0, 141.4, 139.6, 136.9, 130.9(2), 130.8(6), 130.4, 129.3, 127.7, 127.3, 124.2, 123.9, 123.8, 123.1, 116.9, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{18}BrN_3O_4S_2$: 531.9819 $[M-H]^-$; found: 531.9830.

6-Fluoro-3-tosyl-2-(tosyldiazenyl)-1H-indole (3j)



Orange solid, mp: 189-190 °C.
IR (KBr, *v*, cm^{-1}): 3265, 2360, 1625, 1595, 1508, 1450, 1422, 1390, 1397, 1332, 1302, 1231, 1187, 1163, 1120, 1082, 934, 856, 818.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.46 (s, 1H), 7.30–8.27 (m, 1H), 7.89 (d, *J* = 8.4 Hz, 2H), 7.67 (d, *J* = 8.0 Hz, 2H), 7.40 (d, *J* = 8.4 Hz, 2H), 7.30–7.20 (m, 4H), 2.50 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 164.5, 147.1, 144.9, 141.7, 139.6, 137.2, 130.9, 130.8, 130.4, 129.5, 127.3, 124.5, 124.3, 122.3, 114.7, 100.1, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{22}H_{18}FN_3O_4S_2$: 470.0639 $[M-H]^-$; found: 470.0645.

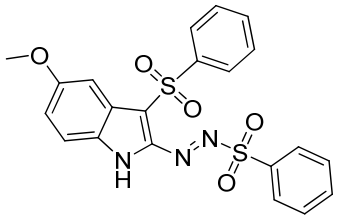
5-Methoxy-3-tosyl-2-(tosyldiazenyl)-1H-indole (3k)



Black solid, mp: 185-186 °C.
IR (KBr, *v*, cm^{-1}): 3288, 2360, 1619, 1595, 1572, 1506, 1465, 1331, 1280, 1154, 1027, 981, 899, 840.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.32 (s, 1H), 7.88 (d, *J* = 8.0 Hz, 2H), 7.66 (d, *J* = 8.4 Hz, 2H), 7.58 (d, *J* = 2.4 Hz, 1H), 7.44–7.39 (m, 3H), 7.27 (d, *J* = 8.0 Hz, 2H), 7.21–7.18 (m, 1H), 3.88 (s, 3H), 2.50 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 156.8, 146.9, 144.6, 141.0, 140.1, 132.3, 130.8, 130.7, 130.3,

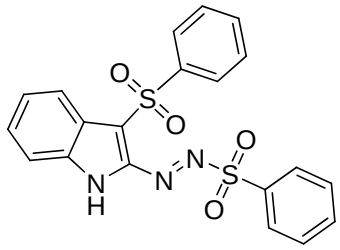
129.9, 127.2, 126.5, 123.4, 122.8, 116.0, 100.4, 56.0, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_5S_2$: 482.0838 $[M-H]^-$; found: 482.0856.

5-Methoxy-3-(phenylsulfonyl)-2-((phenylsulfonyl)diazenyl)-1H-indole (3l)



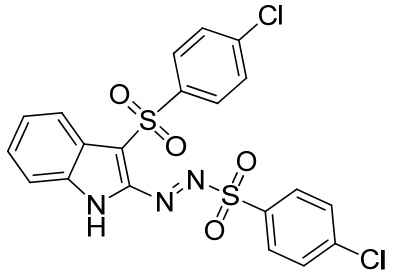
Black solid, mp: 181-182 °C.
IR (KBr, *v*, cm^{-1}): 3273, 2360, 1572, 1504, 1447, 1332, 1278, 1208, 1158, 1082, 897, 839, 814.
^1H NMR (400 MHz, DMSO-d_6) δ 13.40 (s, 1H), 8.02–7.95 (m, 3H), 7.87–7.83 (m, 2H), 7.63–7.58 (m, 2H), 7.54–7.46 (m, 4H), 7.42 (d, *J* = 8.8 Hz, 1H), 7.21 (dd, *J* = 2.4, 2.4 Hz, 1H), 3.88 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 156.9, 142.8, 141.0, 136.0, 133.9, 132.9, 132.4, 130.7, 130.4, 129.9, 127.1, 126.7, 123.5, 122.4, 116.1, 100.3, 56.0
HRMS (ESI) *m/z*: calcd for $C_{21}H_{17}N_3O_5S_2$: 456.0465 $[M-H]^-$; found: 456.0457.

3-(Phenylsulfonyl)-2-((phenylsulfonyl)diazenyl)-1H-indole (3m)



Red solid, mp: 179-181 °C.
IR (KBr, *v*, cm^{-1}): 3273, 2359, 1614, 1583, 1506, 1455, 1448, 1431, 1331, 1216, 1159, 1101, 1082, 999,944, 892, 837.
^1H NMR (400 MHz, DMSO-d_6) δ 13.42 (s, 1H), 8.25 (d, *J* = 8.4 Hz, 1H), 8.04–8.02 (m, 2H), 8.00–7.96 (m, 1H), 7.88–7.85 (m, 2H), 7.62–7.59 (m, 1H), 7.52–7.46 (m, 6H), 7.39–7.35 (m, 1H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 142.6, 141.2, 136.5, 136.1, 134.0, 132.6, 130.8, 130.5, 130.4, 130.0, 127.2, 125.5, 124.6, 123.5, 121.8, 114.7
HRMS (ESI) *m/z*: calcd for $C_{20}H_{15}N_3O_4S_2$: 424.0420 $[M-H]^-$; found: 424.0416.

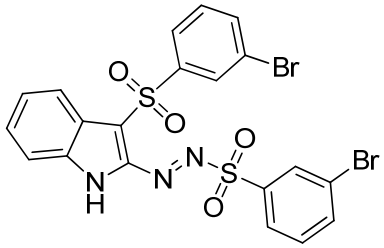
3-((4-Chlorophenyl)sulfonyl)-2-(((4-chlorophenyl)sulfonyl)diazenyl)-1H-indole (3n)



Orange solid, mp: 182-183 °C.
IR (KBr, *v*, cm^{-1}): 3197, 2360, 1595, 1581, 1507, 1476, 1430, 1393, 1351, 1312, 1281, 1151, 1091, 1014, 945, 893, 835.

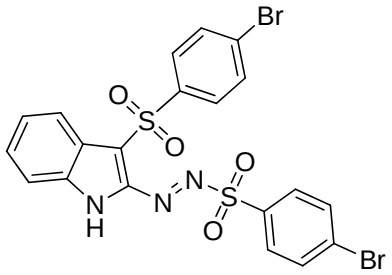
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.52 (s, 1H), 8.21 (d, J = 8.4 Hz, 1H), 8.03–8.00 (m, 2H), 7.96–7.94 (m, 2H), 7.60 (d, J = 8.8 Hz, 2H), 7.55–7.50 (m, 4H), 7.41–7.37 (m, 1H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 141.5, 141.4, 141.2, 139.2, 136.7, 132.8, 131.3, 130.7, 130.6, 130.1, 129.0, 125.6, 124.8, 122.8, 121.8, 114.8
HRMS (ESI) *m/z*: calcd for $C_{20}H_{13}Cl_2N_3O_4S_2$: 491.9640 $[M-H]^-$; found: 491.9658.

3-((3-Bromophenyl)sulfonyl)-2-(((3-bromophenyl)sulfonyl)diazenyl)-1H-indole (3o)



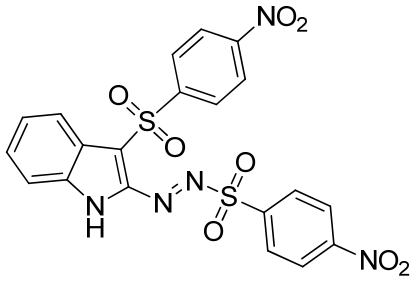
Yellow solid, mp: 173-174 °C.
IR (KBr, *v*, cm^{-1}): 3200, 2362, 1619, 1568, 1508, 1459, 1435, 1392, 1344, 1221, 1148, 1069, 996, 945, 894, 838.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.55 (s, 1H), 8.22 (d, J = 8.4 Hz, 1H), 8.17–8.14 (m, 2H), 8.04 (d, J = 7.6 Hz, 1H), 7.88–7.84 (m, 2H), 7.78 (t, J = 8.0 Hz, 1H), 7.59–7.47 (m, 4H), 7.41–7.38 (m, 1H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 144.5, 141.3, 139.0, 137.1, 136.8, 134.7, 132.8, 132.5, 132.3, 130.8, 129.7, 129.4, 126.2, 125.6, 124.9, 123.3, 122.9, 122.7, 121.8, 114.8
HRMS (ESI) *m/z*: calcd for $C_{20}H_{13}Br_2N_3O_4S_2$: 581.8610 $[M-H]^-$; found: 581.8616.

3-((4-Bromophenyl)sulfonyl)-2-(((4-bromophenyl)sulfonyl)diazenyl)-1H-indole (3p)



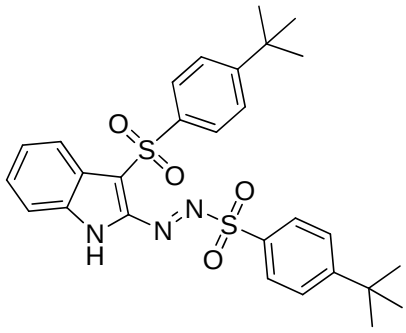
Red solid, mp: 169-170 °C.
IR (KBr, *v*, cm^{-1}): 3198, 2360, 1614, 1572, 1505, 1431, 1391, 1351, 1310, 1216, 1149, 1097, 1069, 1009, 943, 892, 827.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.52 (s, 1H), 8.21 (d, J = 8.4 Hz, 1H), 8.09–8.07 (m, 2H), 7.93 (d, J = 8.8 Hz, 2H), 7.74–7.71 (m, 2H), 7.55–7.51 (m, 2H), 7.44–7.36 (m, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 141.8, 141.2, 136.7, 133.5, 133.1, 132.7, 131.7, 130.7, 129.0, 128.3, 125.6, 124.8, 122.8, 121.8, 114.8
HRMS (ESI) *m/z*: calcd for $C_{20}H_{13}Br_2N_3O_4S_2$: 581.8610 $[M-H]^-$; found: 581.8619.

3-((4-Nitrophenyl)sulfonyl)-2-(((4-nitrophenyl)sulfonyl)diazenyl)-1H-indole (3q)



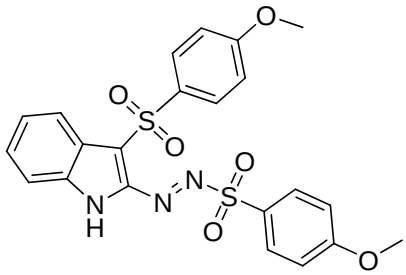
Yellow solid, mp: 176-177 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3214, 2360, 1733, 1607, 1539, 1459, 1439, 1391, 1309, 1219, 1143, 1081, 1013, 945, 894, 852,834.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.71 (s, 1H), 8.59 (d, J = 8.8 Hz, 2H), 8.34–8.30 (m, 4H), 8.20 (d, J = 8.4 Hz, 1H), 7.83 (d, J = 8.8 Hz, 2H), 7.60–7.53 (m, 2H), 7.40 – 7.43 (m, 1H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 152.0, 150.6, 147.4, 141.5, 138.3, 136.9, 132.7, 131.1, 128.6, 125.8, 125.4, 125.3, 125.2, 121.8, 121.7, 114.9
HRMS (ESI) *m/z*: calcd for $C_{20}H_{13}N_5O_8S_2$: 514.0121 [M-H]$^{-}$; found: 514.0111.

3-((4-(*tert*-Butyl)phenyl)sulfonyl)-2-(((4-(tert-butyl)phenyl)sulfonyl)diazenyl)-1H-indole (3r)



Yellow solid, mp: 193-194 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3266, 2964, 2359, 1593, 1435, 1426, 1388, 1332, 1314, 1205, 1172, 1109, 1083, 892, 833.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.37 (s, 1H), 8.23 (d, J = 8.4 Hz, 1H), 7.99–7.96 (m, 2H), 7.89–7.87 (m, 2H), 7.54–7.41 (m, 6H), 7.38–7.34 (m, 1H), 1.30 (s, 9H), 1.21 (s, 9H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 159.4, 157.1, 141.1, 139.8, 136.5, 130.8, 130.5, 129.5, 127.4, 127.2, 126.8, 125.3, 124.5, 123.9, 121.8, 114.6, 35.7, 35.4, 31.1
HRMS (ESI) *m/z*: calcd for $C_{28}H_{31}N_3O_4S_2$: 536.1672 [M-H]$^{-}$; found: 536.1661.

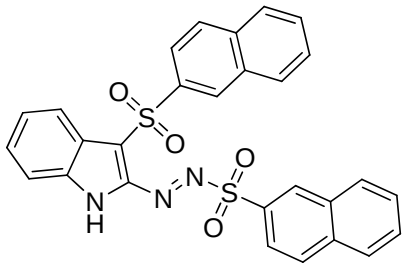
3-((4-Methoxyphenyl)sulfonyl)-2-(((4-methoxyphenyl)sulfonyl)diazenyl)-1H-indole (3s)



Red solid, mp: 181-183 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3265, 2360, 1593, 1497, 1459, 1425, 1392, 1315, 1266, 1183, 1158, 1085, 1022, 945, 891, 837, 802.

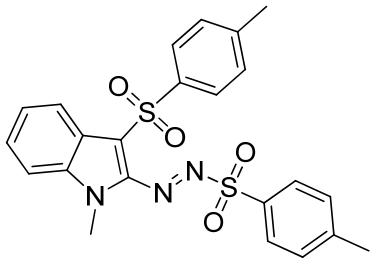
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.29 (s, 1H), 8.23 (d, J = 8.4 Hz, 1H), 7.95 (d, J = 9.2 Hz, 2H), 7.54–7.48 (m, 4H), 7.39–7.33 (m, 3H), 6.98 (d, J = 9.2 Hz, 2H), 3.92 (s, 3H), 3.81 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 165.3, 163.5, 141.0, 136.4, 134.3, 133.2, 130.3, 129.6, 125.2, 124.4, 124.2, 123.4, 121.9, 115.8, 115.1, 114.5, 56.6, 56.2
HRMS (ESI) *m/z*: calcd for $C_{22}H_{19}N_3O_6S_2$: 484.0631 [M-H]$^-$; found: 484.0641.

3-(Naphthalen-2-ylsulfonyl)-2-((naphthalen-2-ylsulfonyl)diazenyl)-1H-indole (3t)



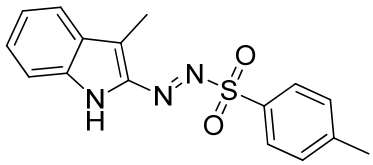
Orange solid, mp: 181-1823 ^{o}C.
IR (KBr, *v*, cm^{-1}): 3331, 3053, 2359, 1621, 1589, 1508, 1460, 1392, 1330 1242, 1206, 1150, 1097, 1069, 1019, 948, 893, 858, 828.
^{1}H NMR (400 MHz, DMSO-d_6) δ 13.42 (s, 1H), 8.84 (s, 1H), 8.41 (s, 1H), 8.35–8.29 (m, 3H), 8.18 (d, J = 8.0 Hz, 1H), 7.97–7.94 (m, 1H), 7.91–7.88 (m, 2H), 7.85–7.77 (m, 2H), 7.69–7.65 (m, 1H), 7.62–7.58 (m, 2H), 7.54–7.47 (m, 2H), 7.40–7.35 (m, 1H), 7.24–7.21 (m, 1H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 141.4, 139.5, 136.6, 136.0, 134.8, 133.2, 132.4, 132.0, 130.8, 130.3, 129.9, 129.8(4), 129.8(1), 128.5(9) 128.5(5), 128.2(2), 128.1(9), 125.5, 124.6, 124.5(7), 123.6, 122.1, 121.9, 114.7
HRMS (ESI) *m/z*: calcd for $C_{28}H_{19}N_3O_4S_2$: 524.0733 [M-H]$^-$; found: 524.0736.

1-Methyl-3-tosyl-2-(tosyldiazenyl)-1H-indole (3u)



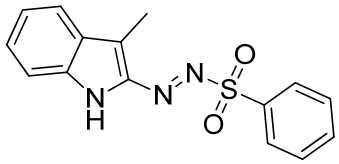
Orange solid, mp: 177-178 ^{o}C.
IR (KBr, *v*, cm^{-1}): 2360, 1595, 1471, 1455, 1411, 1345, 1317, 1185, 1164, 1083, 966, 917, 872, 816.
^{1}H NMR (400 MHz, DMSO-d_6) δ 8.37 (d, J = 8.4 Hz, 1H), 7.89 (d, J = 8.4 Hz, 2H), 7.77 (d, J = 8.4 Hz, 1H), 7.62–7.56 (m, 5H), 7.47–7.43 (m, 1H), 7.29 (d, J = 8.4 Hz, 2H), 3.87 (s, 3H), 2.48 (s, 3H), 2.34 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 147.0, 144.6, 139.6, 139.5, 138.4, 130.8, 130.7, 130.1, 129.7, 129.4, 127.5, 125.1, 124.7, 122.2, 118.0, 113.1, 33.4, 21.8, 21.5
HRMS (ESI) *m/z*: calcd for $C_{23}H_{21}N_3O_4S_2$: 466.0890 [M-H]$^-$; found: 466.0890.

3-Methyl-2-(tosyldiazenyl)-1H-indole (4a)



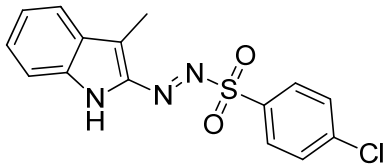
Red solid, mp: 167-168 °C.
IR (KBr, *v*, cm^{-1}): 3378, 2360, 1620, 1595, 1536, 1468, 1391, 1319, 1212, 1181, 1152, 1081, 925, 888, 807.
^{1}H NMR (400 MHz, DMSO-d_6) δ 11.96 (s, 1H), 7.83 (d, J = 8.0 Hz, 2H), 7.74 (d, J = 8.0 Hz, 1H), 7.52 (d, J = 8.0 Hz, 2H), 7.46–7.42 (m, 1H), 7.32 (d, J = 8.4 Hz, 1H), 7.12–7.08 (m, 1H), 2.46 (s, 3H), 2.44 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 145.8, 143.0, 140.0, 132.0, 131.5, 130.5, 129.8, 128.0, 122.8, 121.2, 113.6, 21.7, 9.3
HRMS (ESI) *m/z*: calcd for $C_{16}H_{15}N_3O_2S$: 336.0777 $[M+Na]^+$; found: 336.0775.

3-Methyl-2-((phenylsulfonyl)diazenyl)-1H-indole (4b)



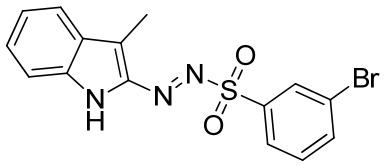
Red solid, mp: 165-166 °C.
IR (KBr, *v*, cm^{-1}): 3389, 3065, 2359, 1620, 1536, 1467, 1441, 1365, 1321, 1210, 1153, 1080, 925, 887, 809.
^{1}H NMR (400 MHz, DMSO-d_6) δ 11.99 (s, 1H), 7.94–7.92 (m, 2H), 7.85–7.81 (m, 1H), 7.74–7.70 (m, 3H), 7.46–7.42 (m, 1H), 7.32 (d, J = 8.4 Hz, 1H), 7.11–7.01 (m, 1H), 2.44 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 143.0, 140.1, 135.0, 134.9(5), 131.6, 130.0, 129.8, 128.1, 122.8, 121.2, 113.6, 9.3
HRMS (ESI) *m/z*: calcd for $C_{15}H_{13}N_3O_2S$: 322.0621 $[M+Na]^+$; found: 322.0602.

2-(((4-Chlorophenyl)sulfonyl)diazenyl)-3-methyl-1H-indole (4c)



Red solid, mp: 172-173 °C.
IR (KBr, *v*, cm^{-1}): 3374, 2361, 1618, 1580, 1529, 1471, 1434, 1391, 1329, 1153, 1079, 1012, 926, 887, 808, 754, 710, 625, 586, 563.
^{1}H NMR (400 MHz, DMSO-d_6) δ 12.02 (s, 1H), 7.97–7.94 (m, 2H), 7.81–7.79 (m, 2H), 7.75 (d, J = 8.0 Hz, 1H), 7.48–7.44 (m, 1H), 7.33 (d, J = 8.4 Hz, 1H), 7.12–7.09 (m, 1H), 2.46 (s, 3H).
^{13}C NMR (100 MHz, DMSO-d_6) δ 143.1, 140.3, 140.1, 133.9, 131.9, 131.7, 130.2, 128.1, 122.9, 121.3, 113.7, 9.4
HRMS (ESI) *m/z*: calcd for $C_{15}H_{12}ClN_3O_2S$: 356.0231 $[M+Na]^+$; found: 356.0232.

2-(((3-Bromophenyl)sulfonyl)diazenyl)-3-methyl-1H-indole (4d)



Yellow solid, mp: 173-174 °C.

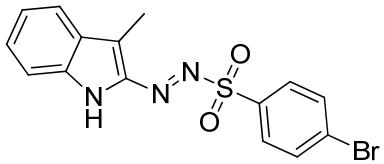
IR (KBr, *v*, cm^{-1}): 3353, 3085, 2360, 1620, 1570, 1534, 1462, 1391, 1323, 1214, 1155, 924, 887, 813.

^1H NMR (400 MHz, DMSO-d_6) δ 12.03 (s, 1H), 8.05 (d, *J* = 7.6 Hz, 2H), 7.96 (d, *J* = 8.0 Hz, 1H), 7.76 (d, *J* = 7.2 Hz, 1H), 7.70–7.66 (m, 1H), 7.48–7.44 (m, 1H), 7.33 (d, *J* = 8.4 Hz, 1H), 7.12–7.09 (m, 1H), 2.46 (s, 3H).

^{13}C NMR (100 MHz, DMSO-d_6) δ 143.1, 140.5, 137.8, 137.1, 132.2, 132.1, 131.9, 128.9, 128.1, 123.0, 122.8, 121.4, 113.7, 9.4

HRMS (ESI) *m/z*: calcd for $C_{15}H_{12}BrN_3O_2S$: 401.9706 $[M+Na]^+$; found:401.9699.

2-(((4-Bromophenyl)sulfonyl)diazenyl)-3-methyl-1H-indole (4e)



Red solid, mp: 174-175 °C.

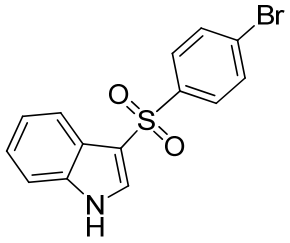
IR (KBr, *v*, cm^{-1}): 3374, 2361, 1620, 1571, 1527, 1469, 1432, 1388, 1295, 1150, 1079, 1008, 926, 887, 808.

^1H NMR (400 MHz, DMSO-d_6) δ 12.02 (s, 1H), 7.94 (d, *J* = 8.8 Hz, 2H), 7.89–7.85 (m, 2H), 7.75 (d, *J* = 8.0 Hz, 1H), 7.47–7.44 (m, 1H), 7.32 (d, *J* = 8.4 Hz, 1H), 7.12–7.08 (m, 1H), 2.46 (s, 3H).

^{13}C NMR (100 MHz, DMSO-d_6) δ 143.1, 140.4, 134.3, 133.1, 132.0, 131.7, 129.3, 128.1, 122.9, 121.3, 113.7, 9.4

HRMS (ESI) *m/z*: calcd for $C_{15}H_{12}BrN_3O_2S$: 401.9706 $[M+Na]^+$; found: 401.9690.

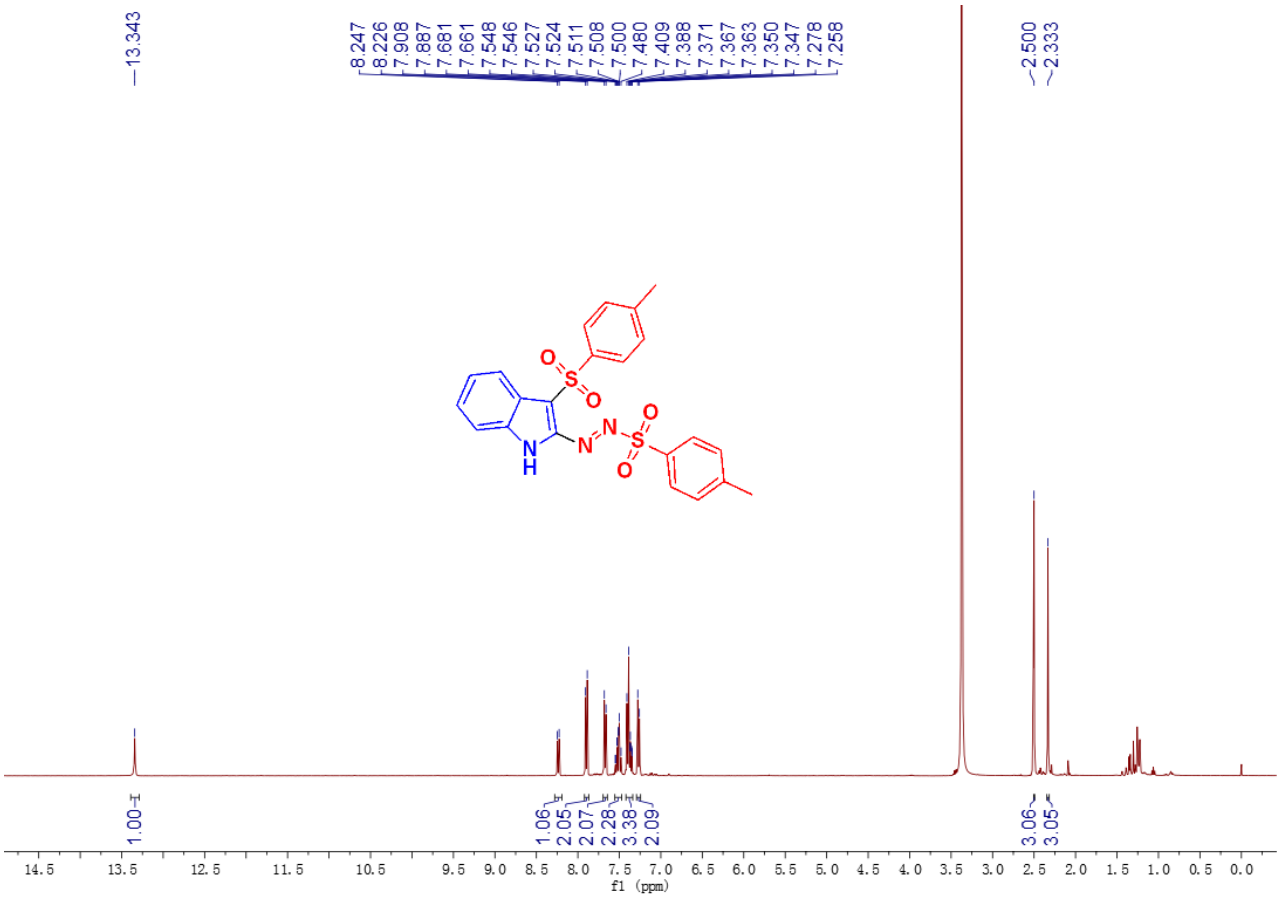
3-((4-Bromophenyl)sulfonyl)-1H-indole (1o)



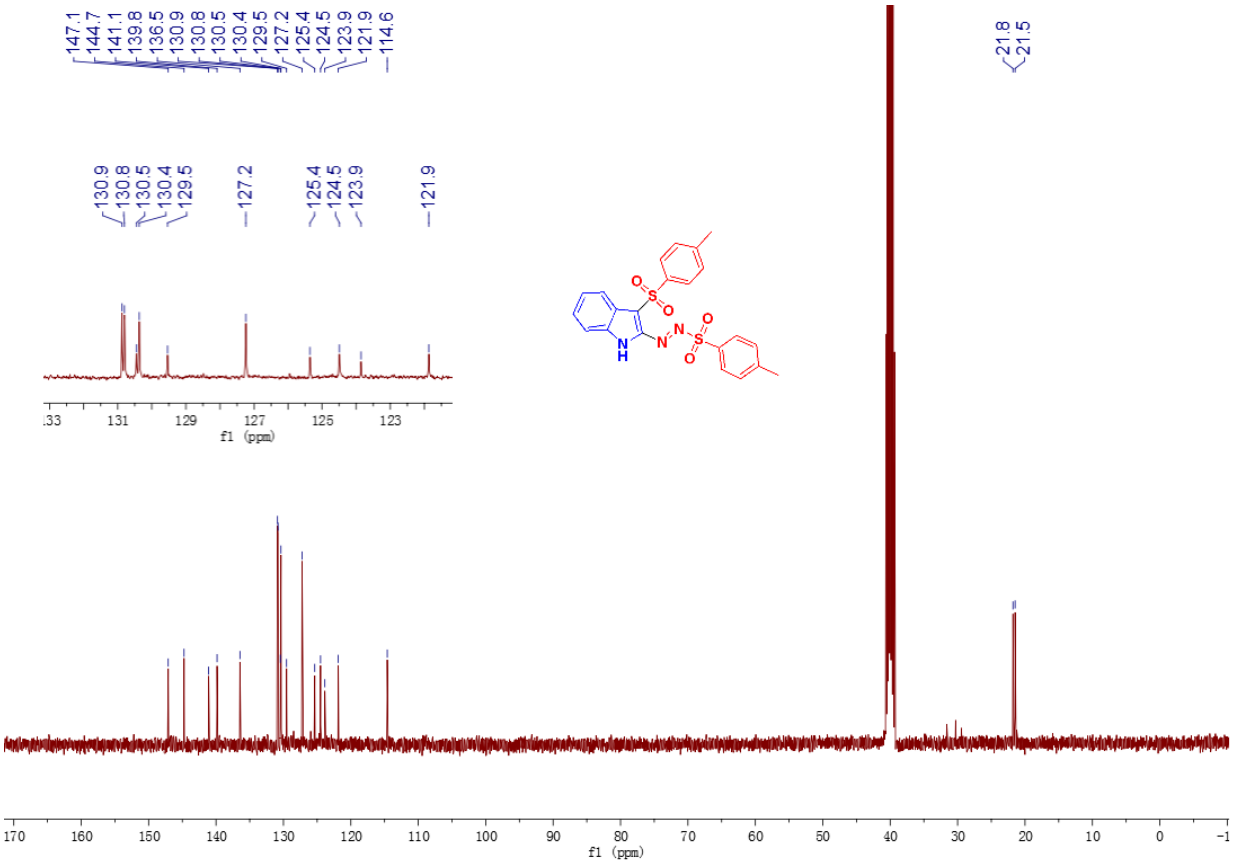
White solid, mp: 153-154 °C.

IR (KBr, *v*, cm^{-1}): 3388, 2360, 1610, 1501, 1471, 1454, 1409, 1386, 1338, 1280, 1236, 1080, 1004, 810.

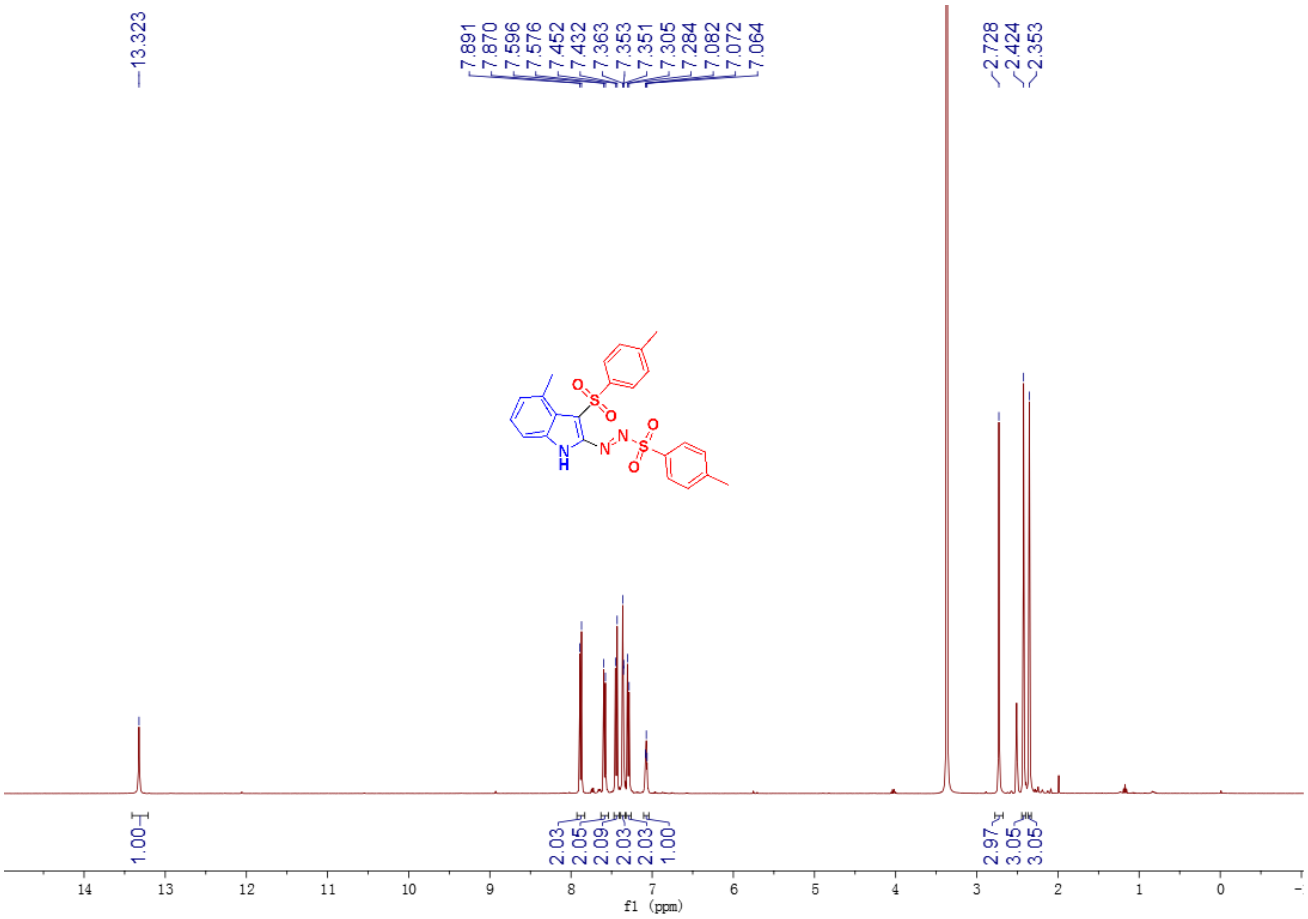
^1H NMR (400 MHz, DMSO-d_6) δ 11.76 (s, 1H), 7.80 (d, *J* = 2.4 Hz, 1H), 7.50 (d, *J* = 8.0 Hz, 1H), 7.40–7.37 (m, 3H), 7.22–7.18 (m, 1H), 7.10–7.06 (m, 1H), 6.95 (d, *J* = 8.4 Hz, 2H).



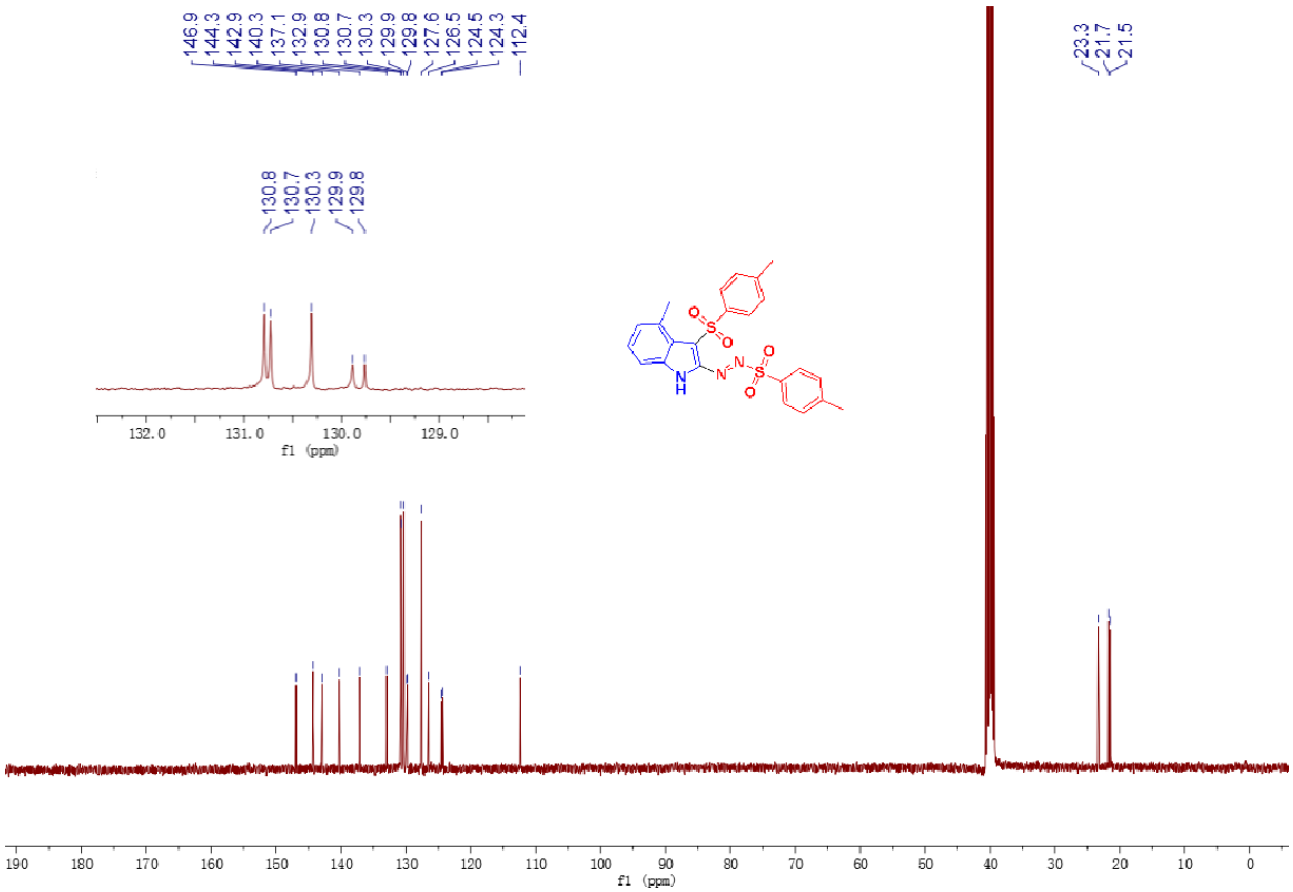
^{1}H NMR Spectrum of Compound **3a** (400Hz, DMSO-d_6)



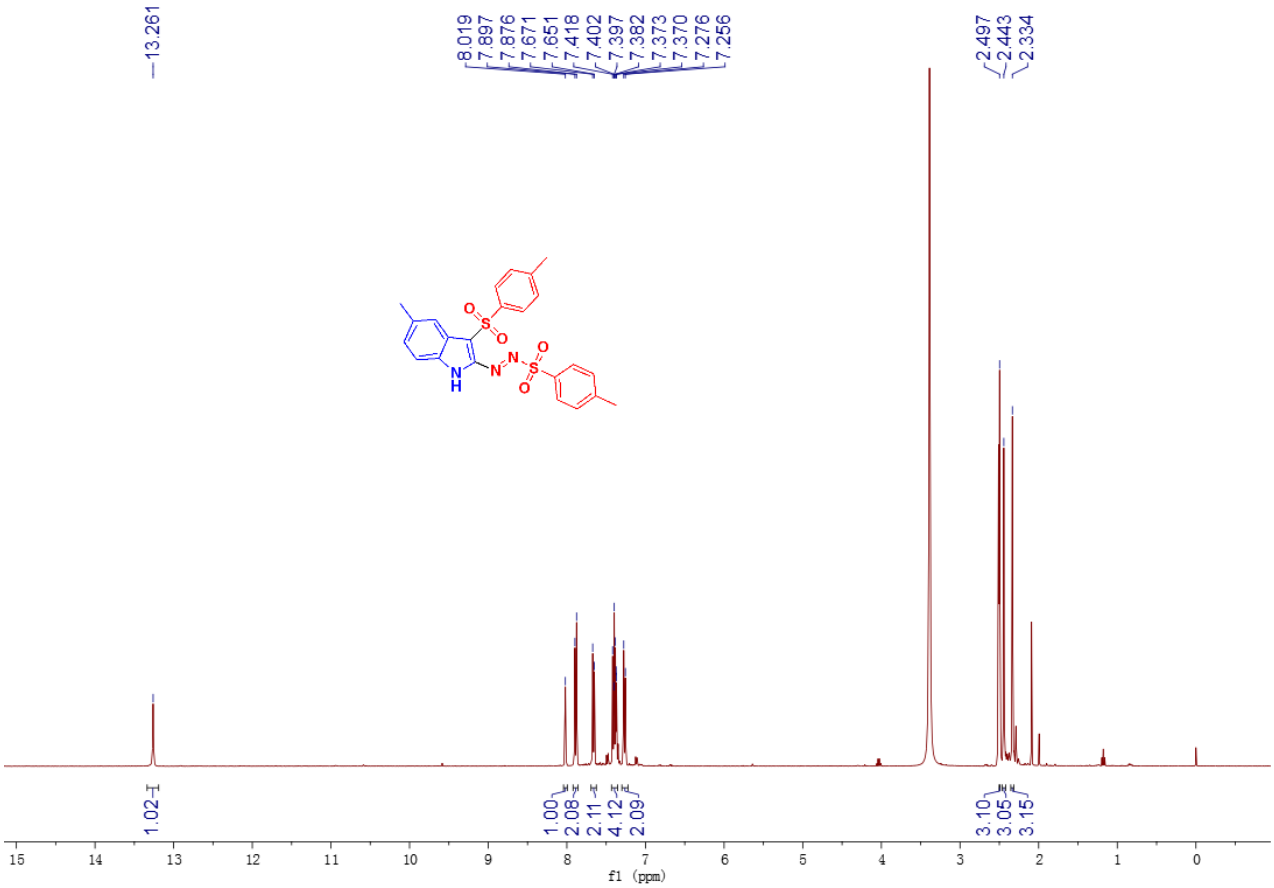
^{13}C NMR Spectrum of Compound **3a** (100Hz, DMSO-d_6)



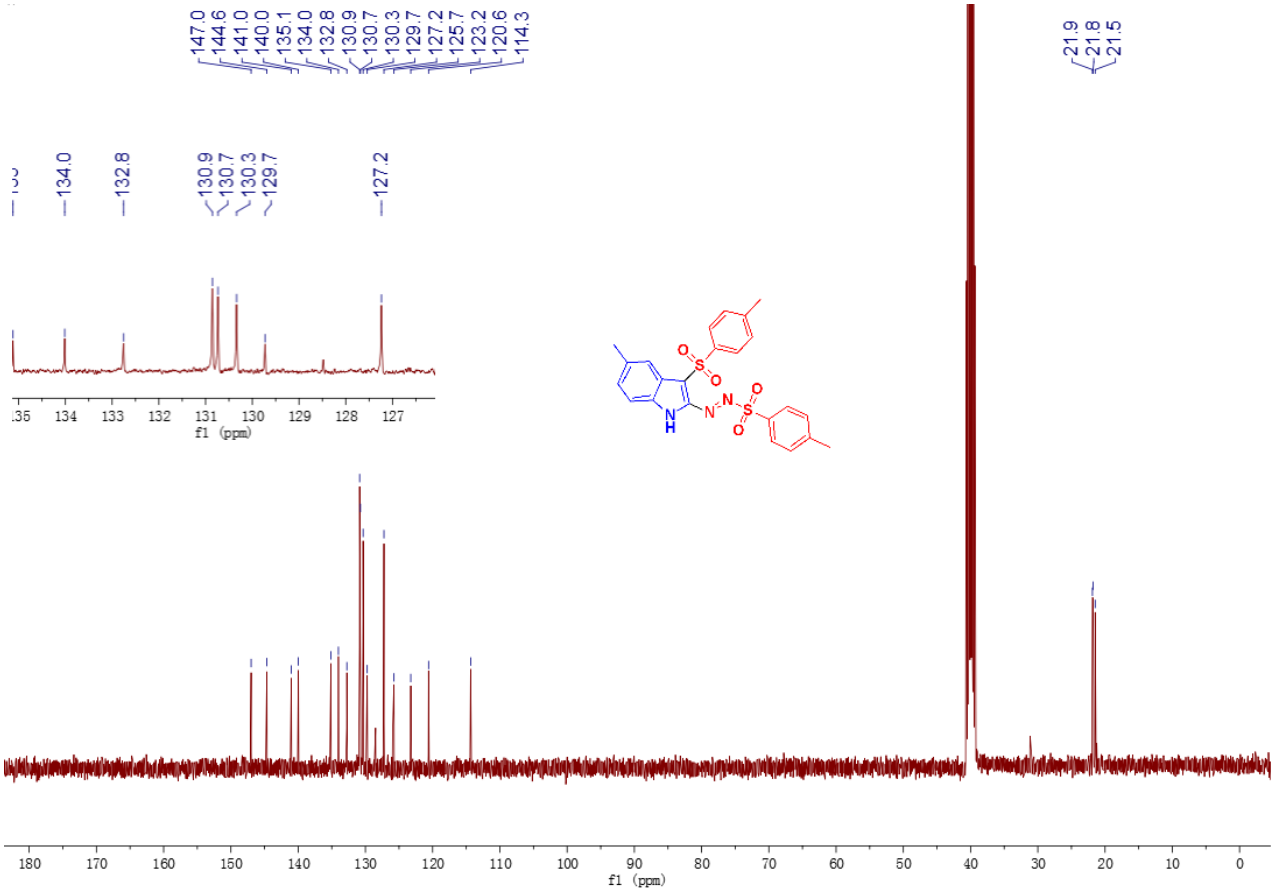
^{1}H NMR Spectrum of Compound **3b** (400Hz, DMSO-d_6)



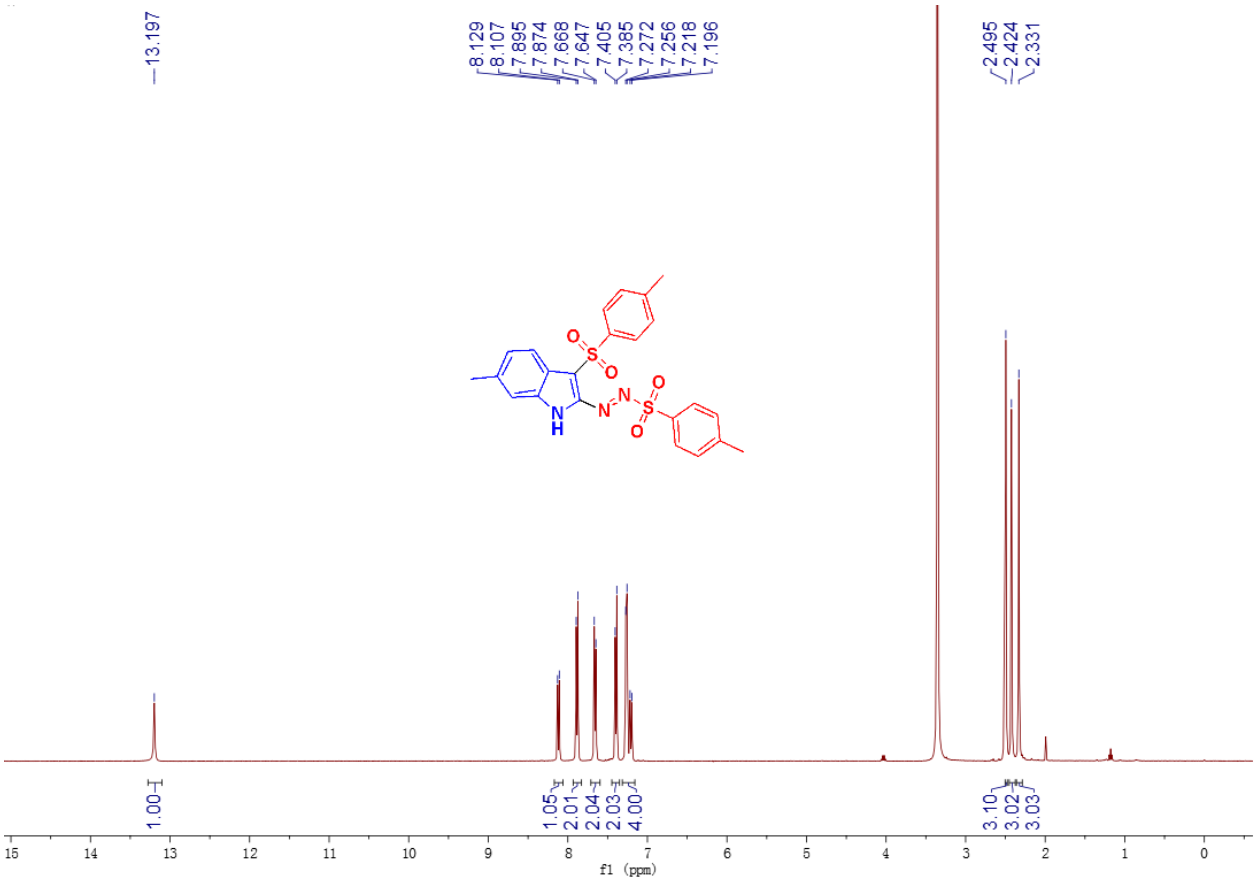
^{13}C NMR Spectrum of Compound **3b** (100Hz, DMSO-d_6)



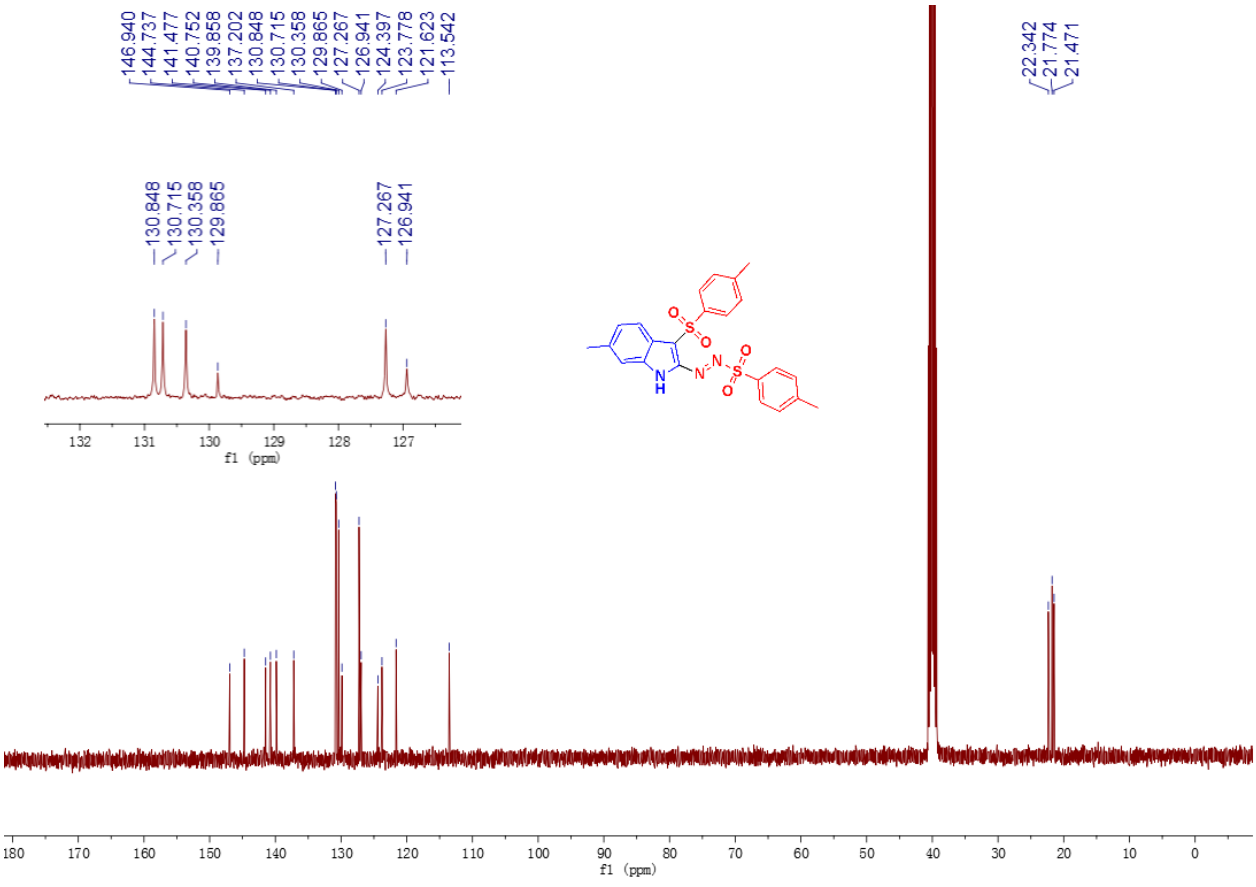
^{1}H NMR Spectrum of Compound **3c** (400Hz, DMSO-d_6)



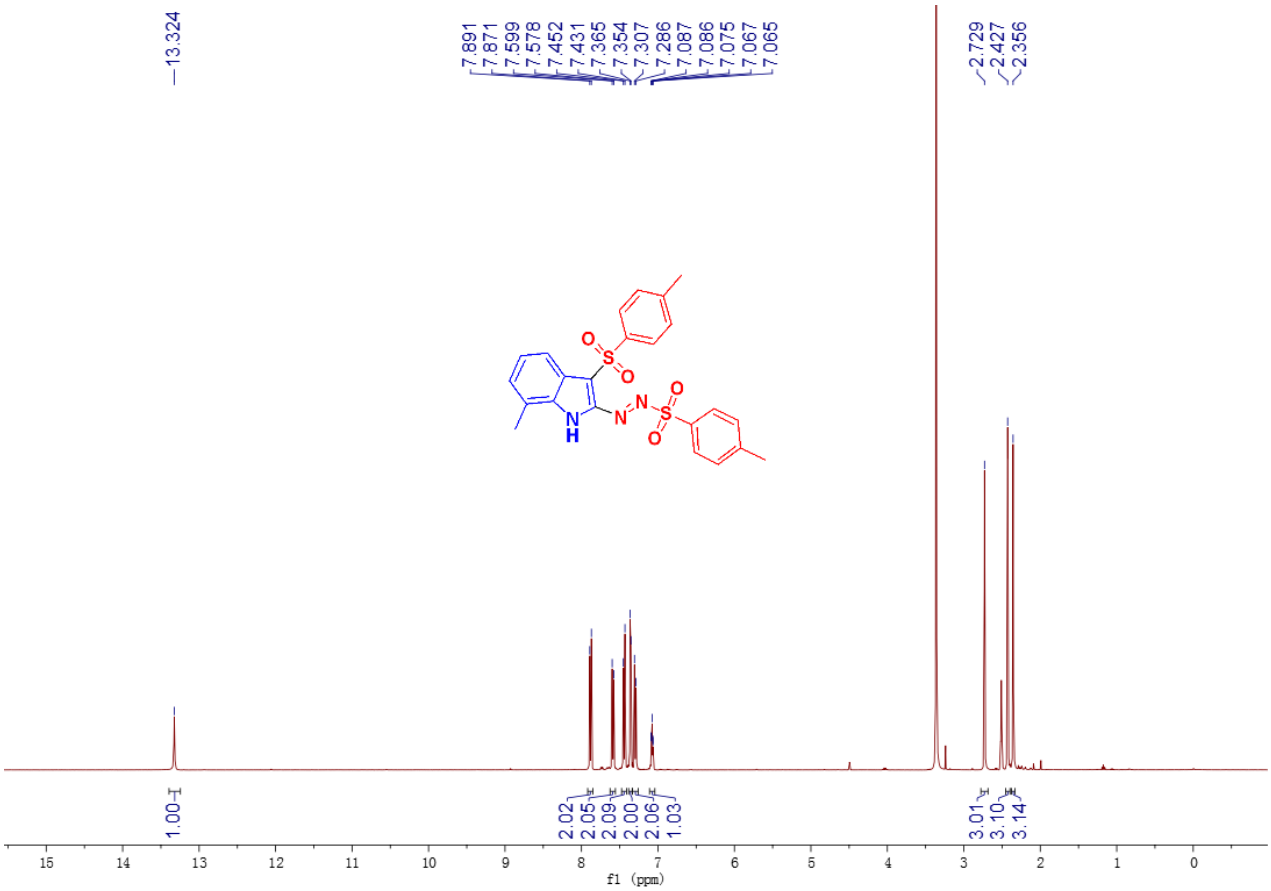
^{13}C NMR Spectrum of Compound **3c** (100Hz, DMSO-d_6)



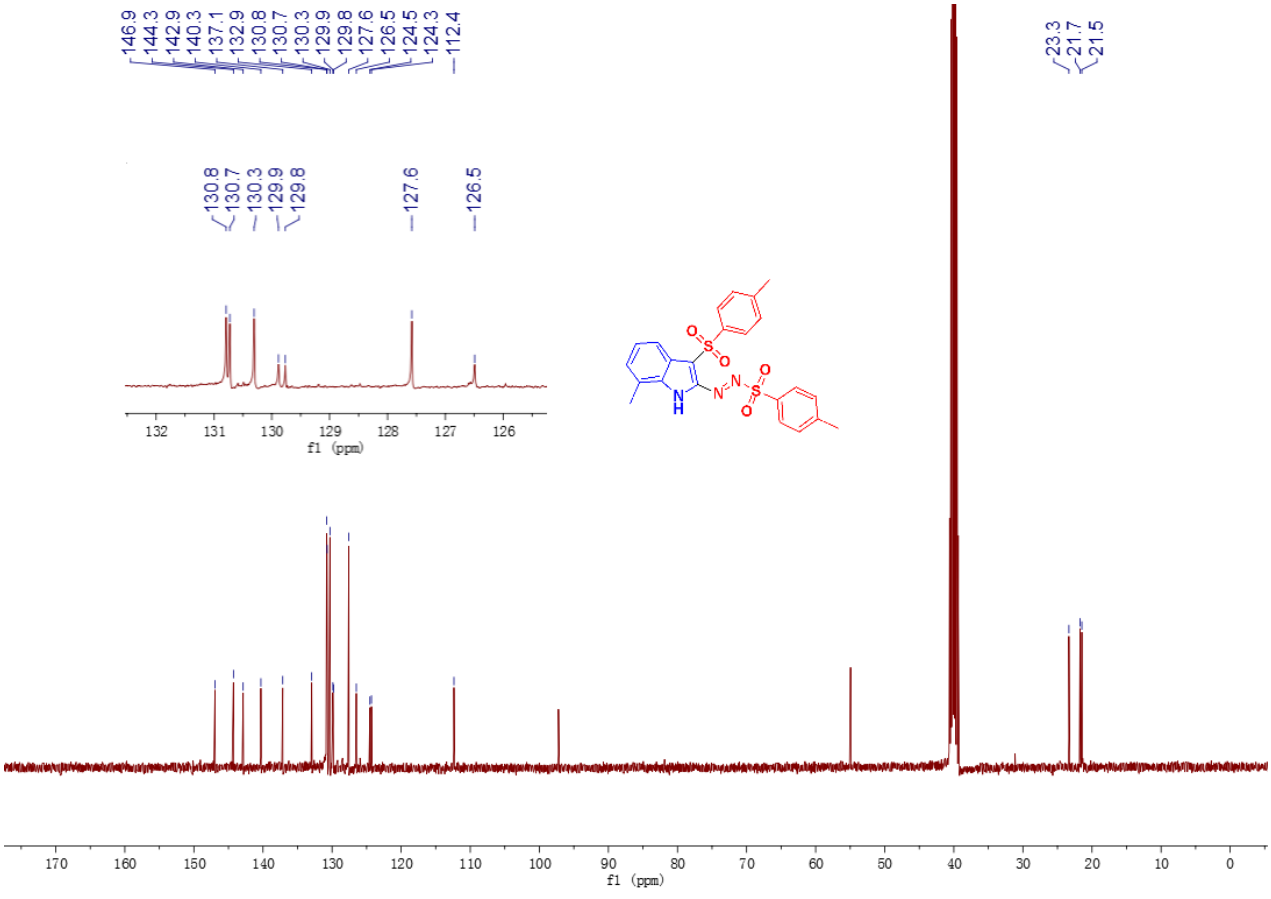
^{1}H NMR Spectrum of Compound **3d** (400Hz, DMSO-d_6)



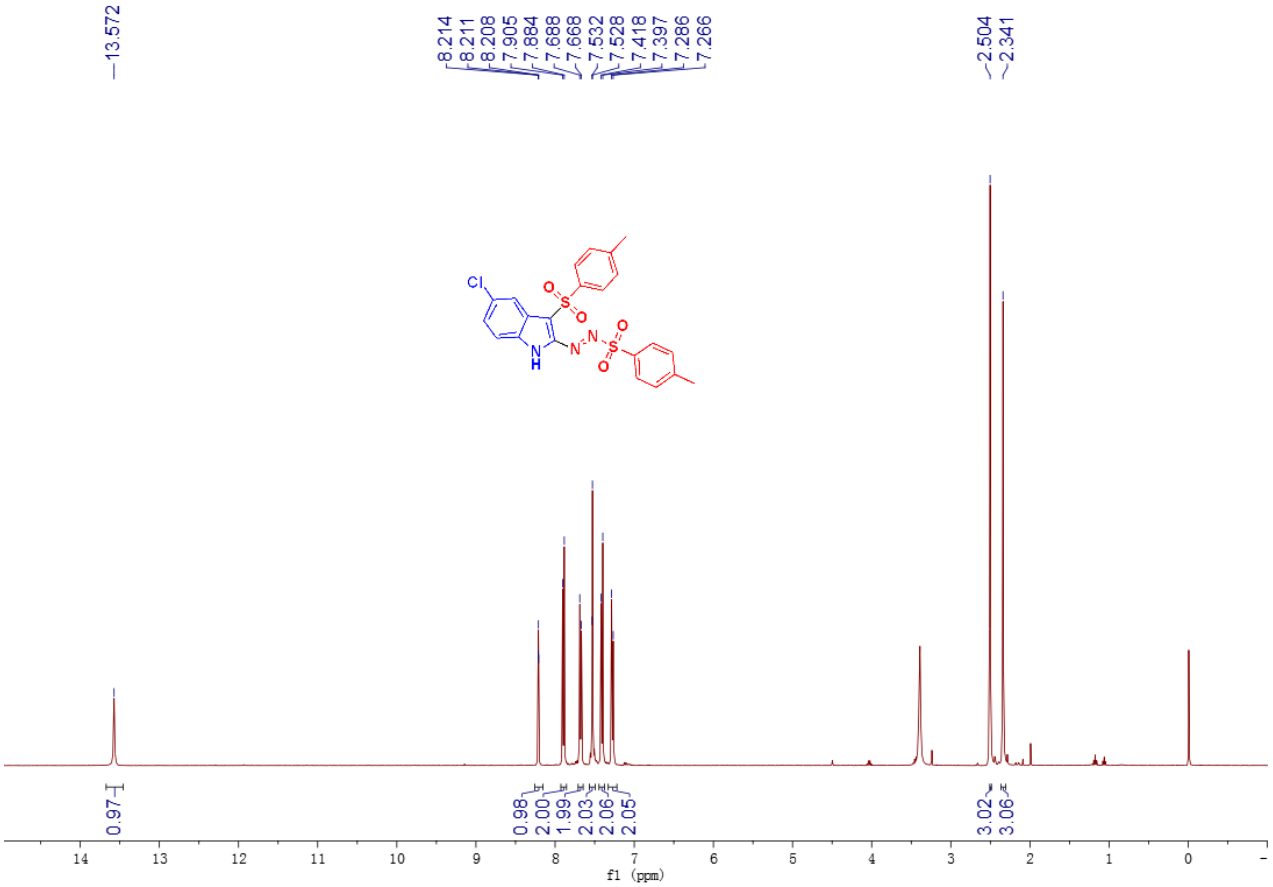
^{13}C NMR Spectrum of Compound **3d** (100Hz, DMSO-d_6)



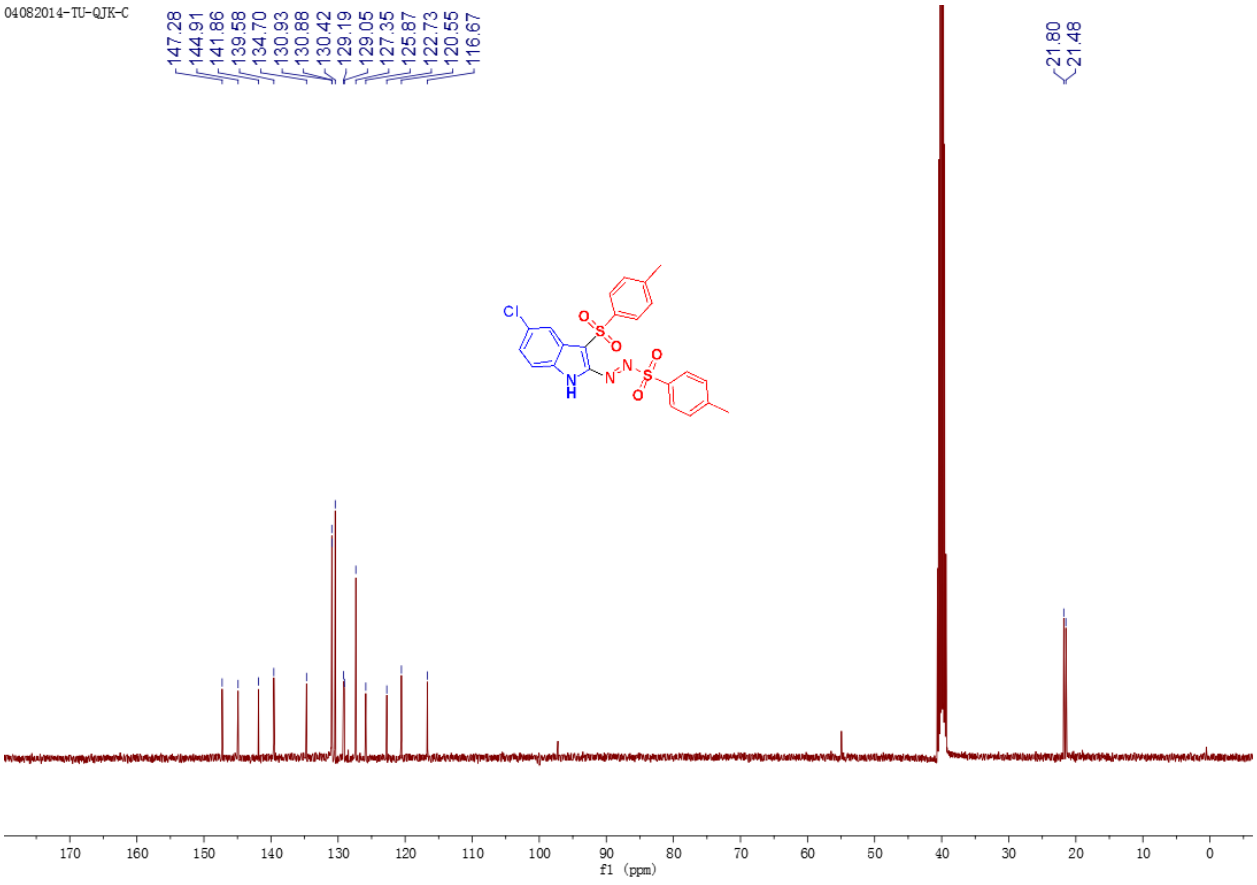
^{1}H NMR Spectrum of Compound **3e** (400Hz, DMSO-d_6)



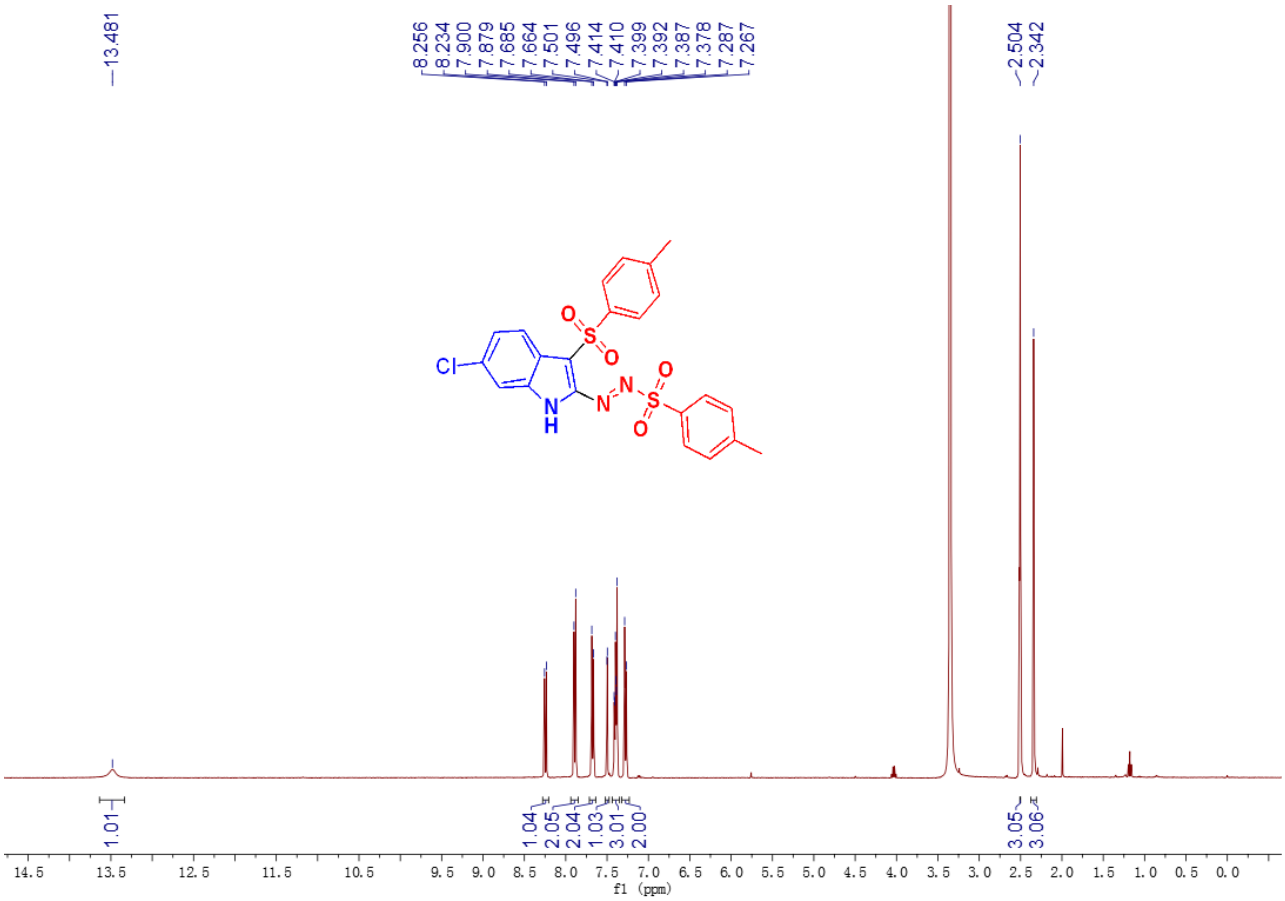
^{13}C NMR Spectrum of Compound **3e** (100Hz, DMSO-d_6)



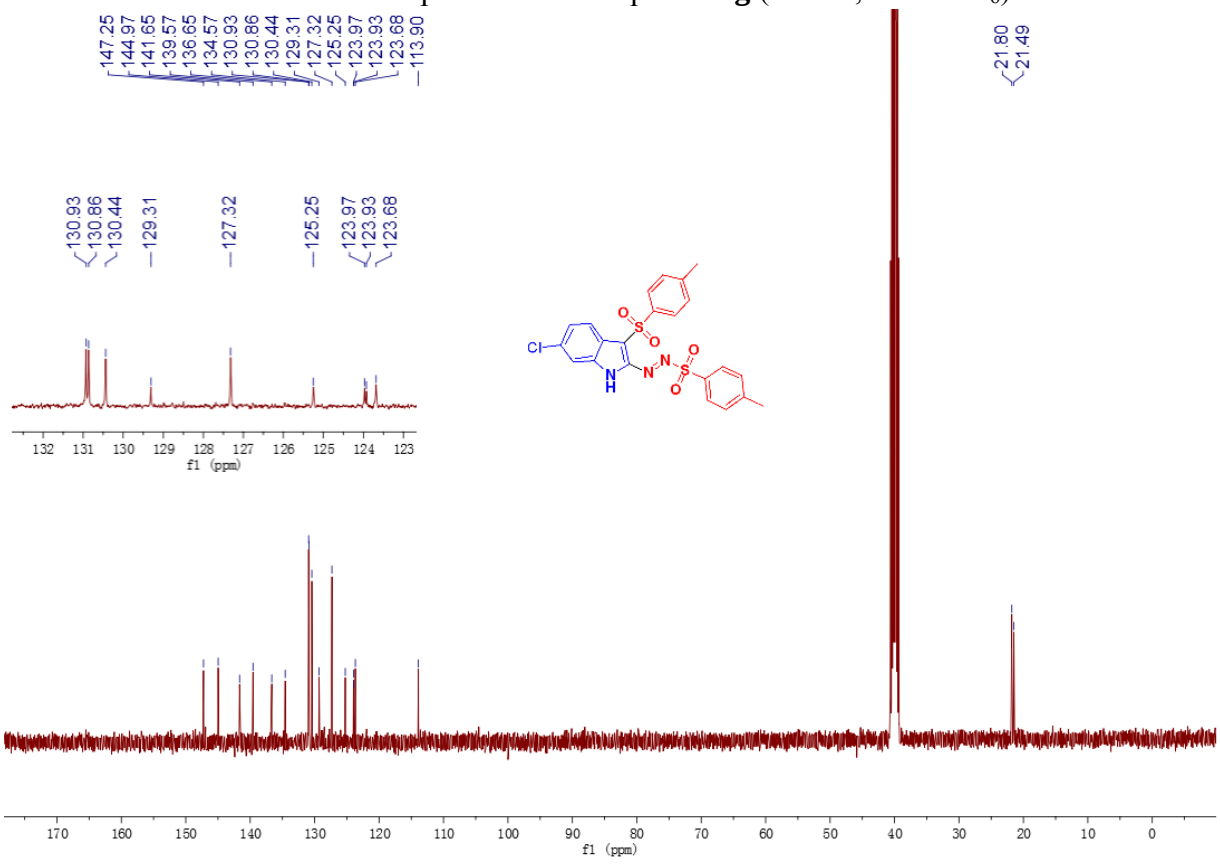
^{1}H NMR Spectrum of Compound **3f** (400Hz, DMSO-d_6)



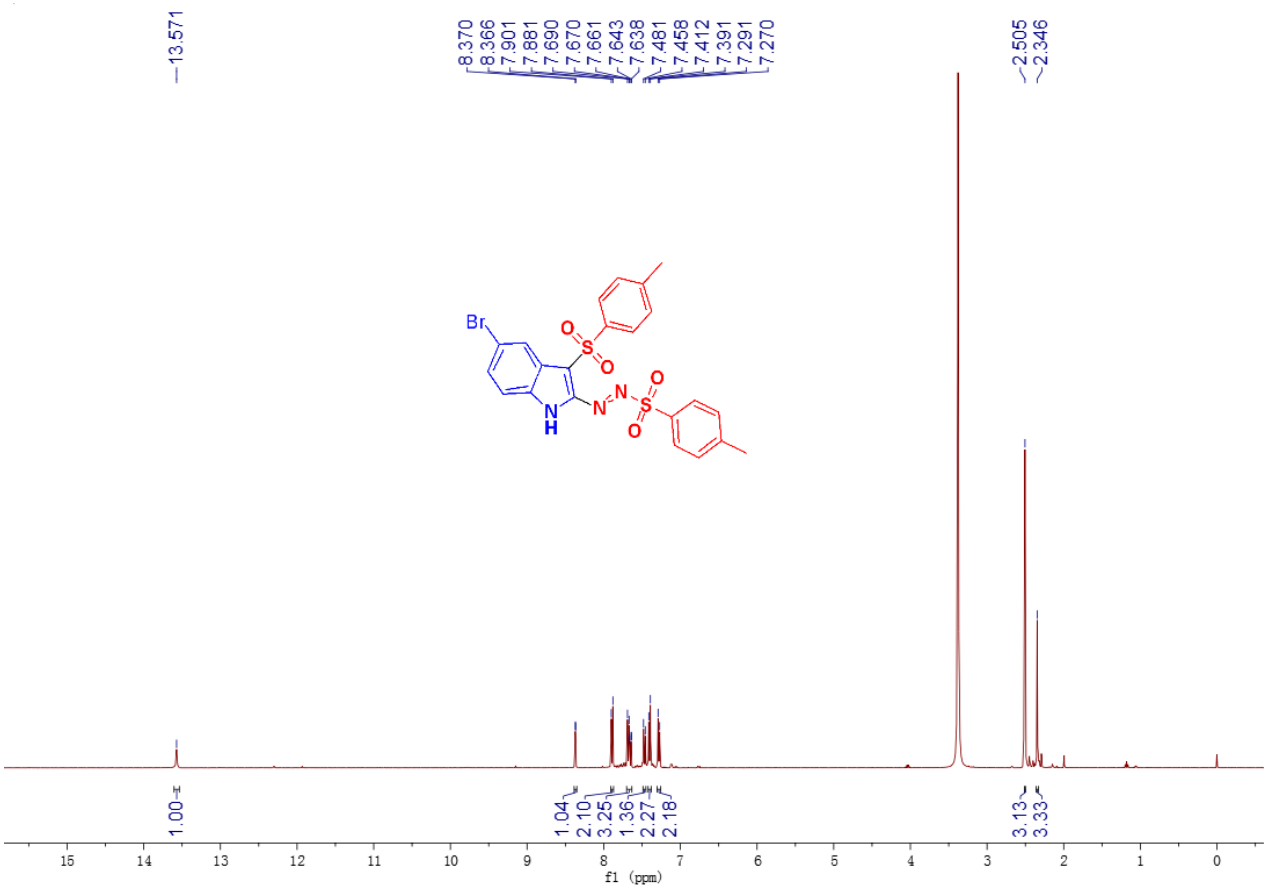
^{13}C NMR Spectrum of Compound **3f** (100Hz, DMSO-d_6)



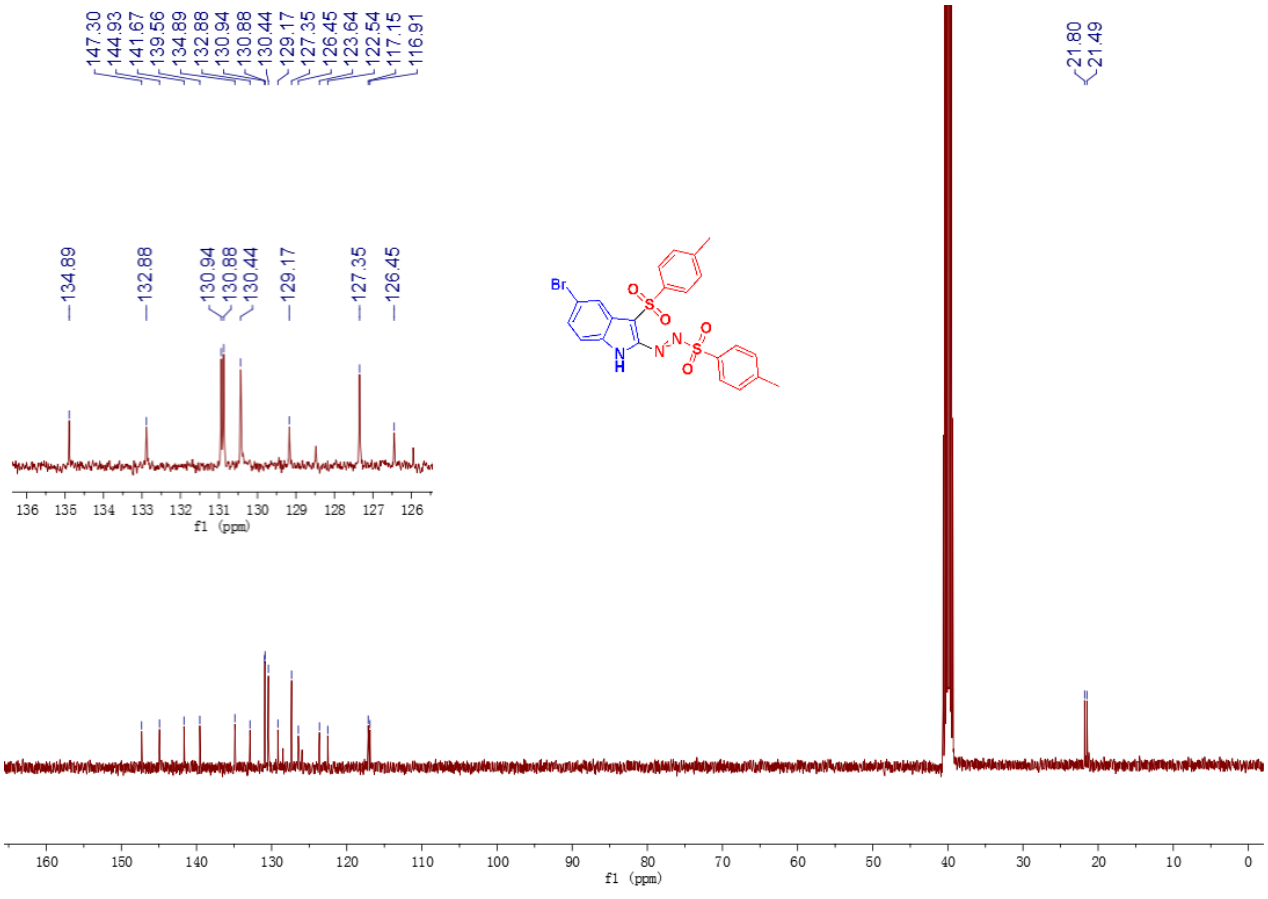
^{1}H NMR Spectrum of Compound **3g** (400Hz, DMSO-d_6)



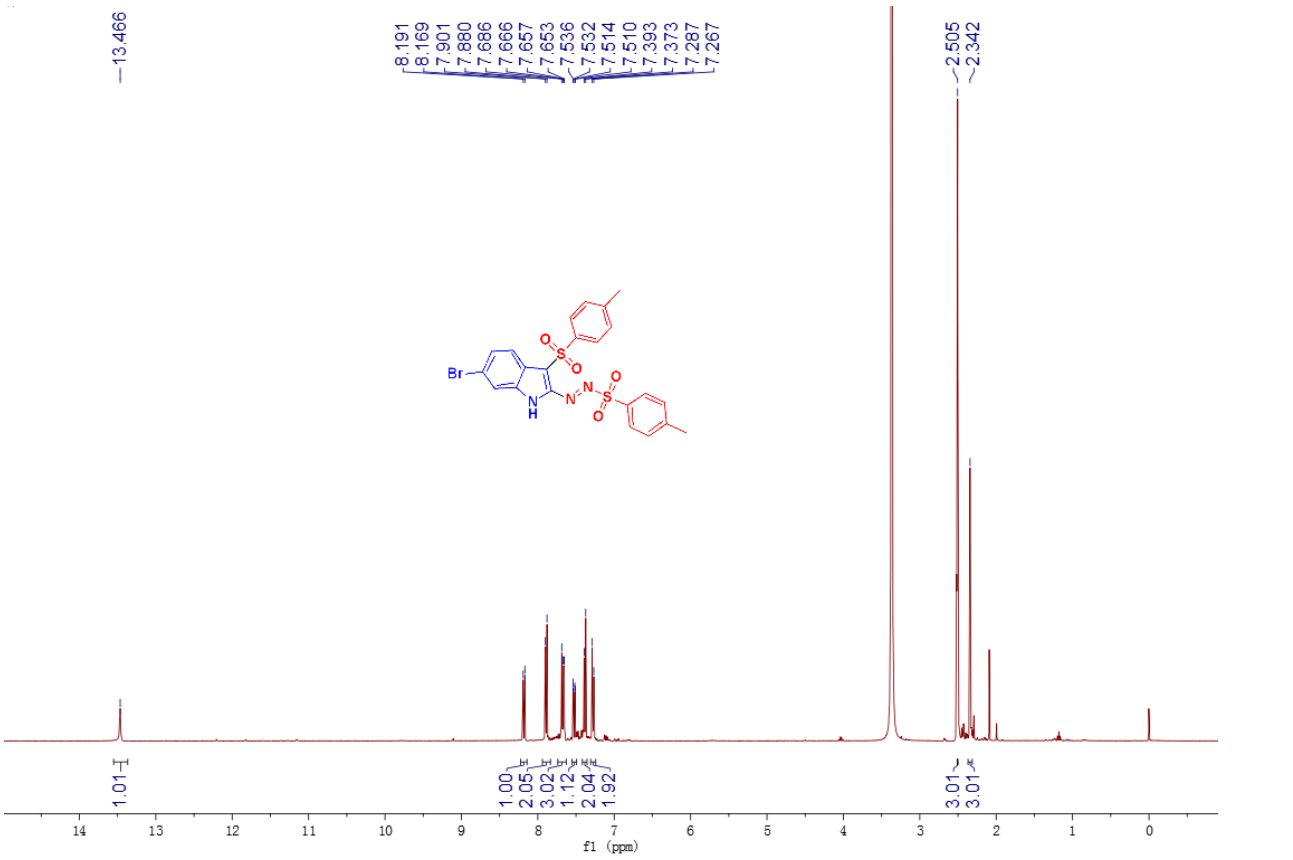
^{13}C NMR Spectrum of Compound **3g** (100Hz, DMSO-d_6)



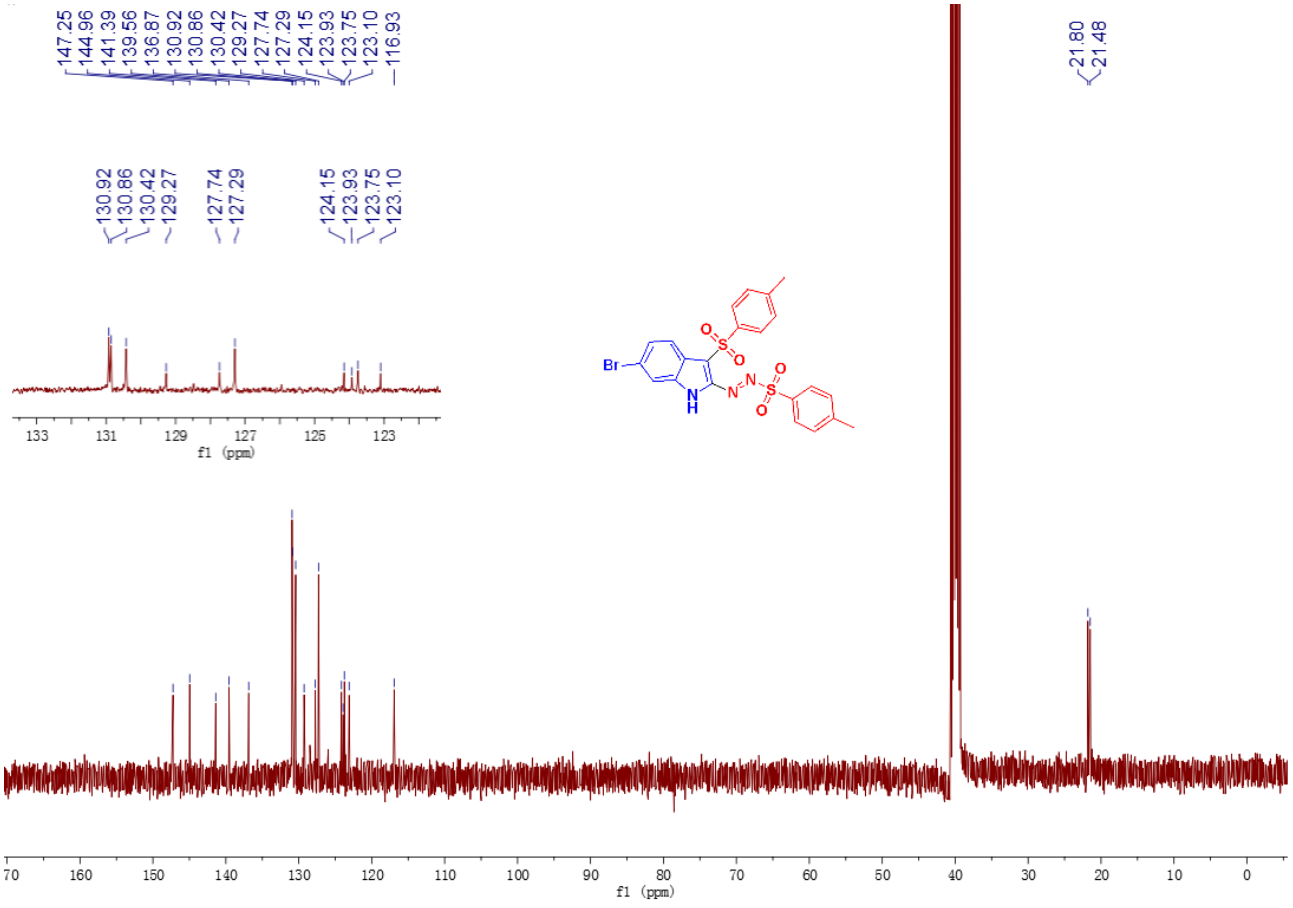
^{1}H NMR Spectrum of Compound **3h** (400Hz, DMSO-d_6)



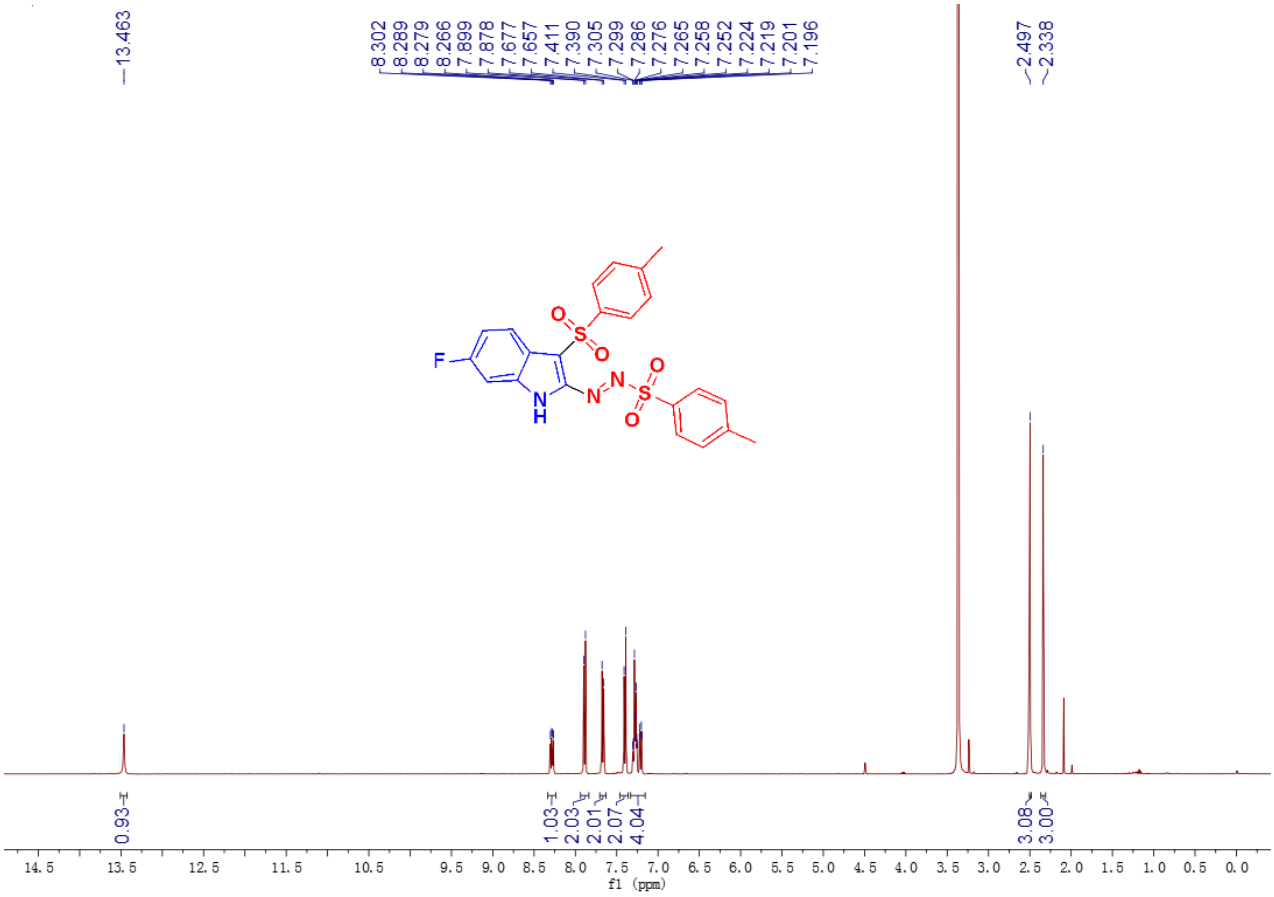
^{13}C NMR Spectrum of Compound **3h** (100Hz, DMSO-d_6)



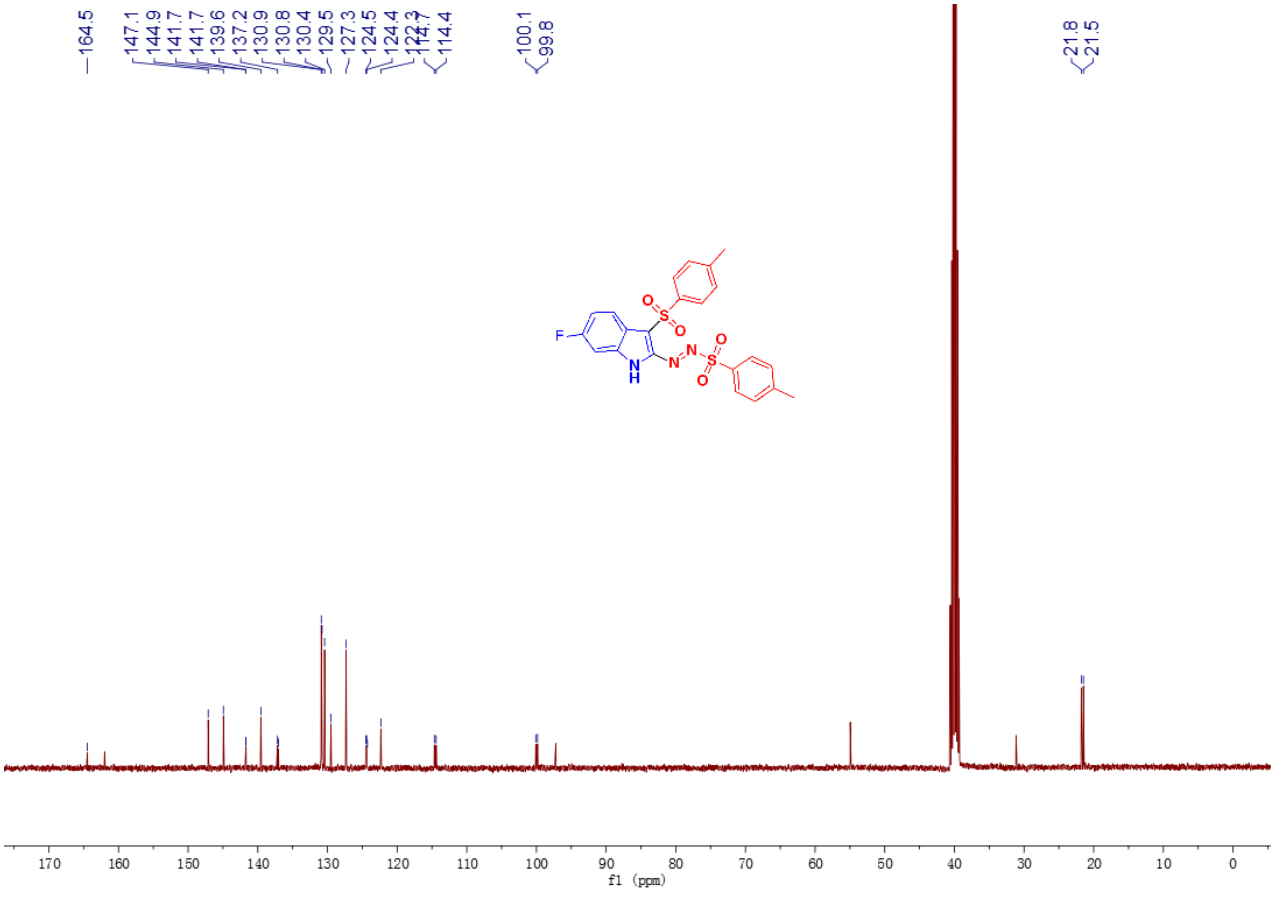
^{1}H NMR Spectrum of Compound **3i** (400Hz, DMSO-d_6)



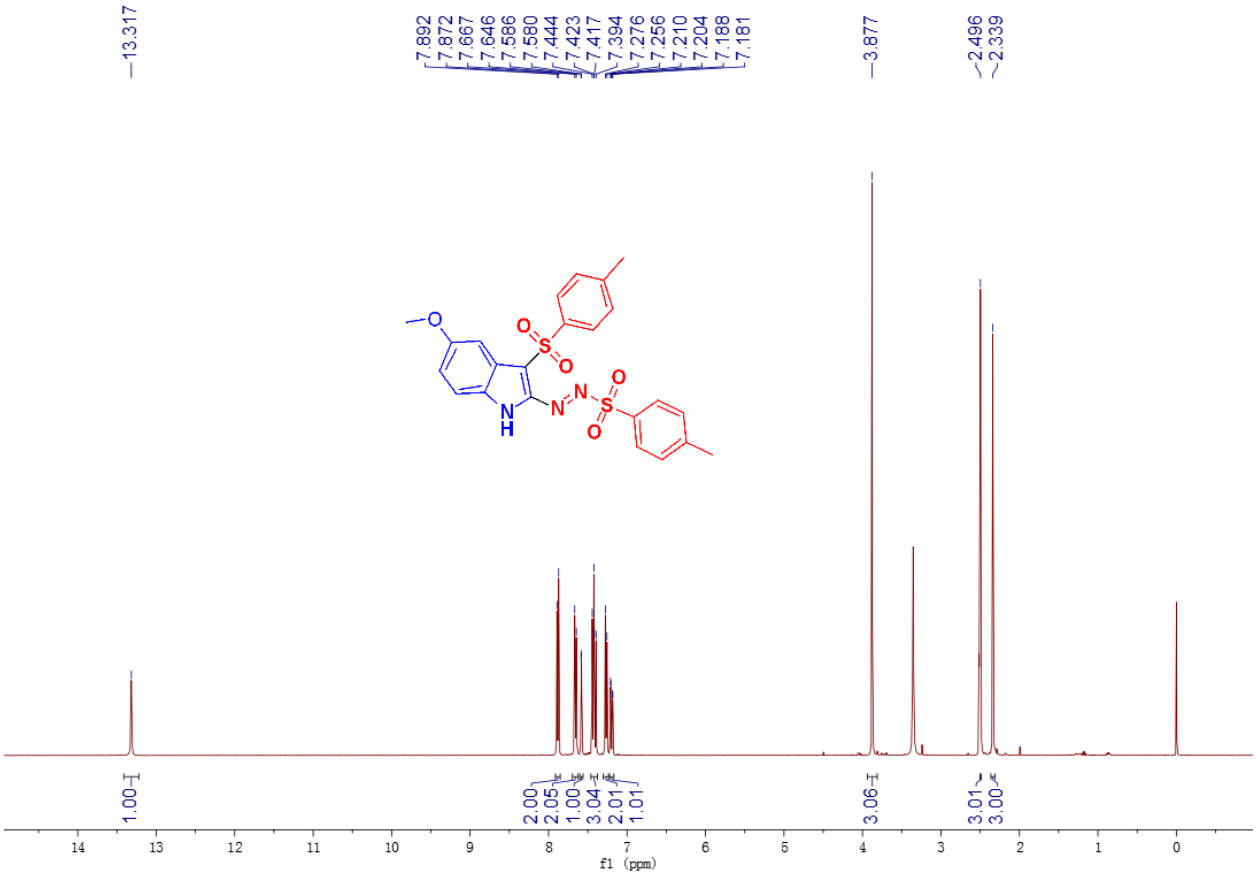
^{13}C NMR Spectrum of Compound **3i** (100Hz, DMSO-d_6)



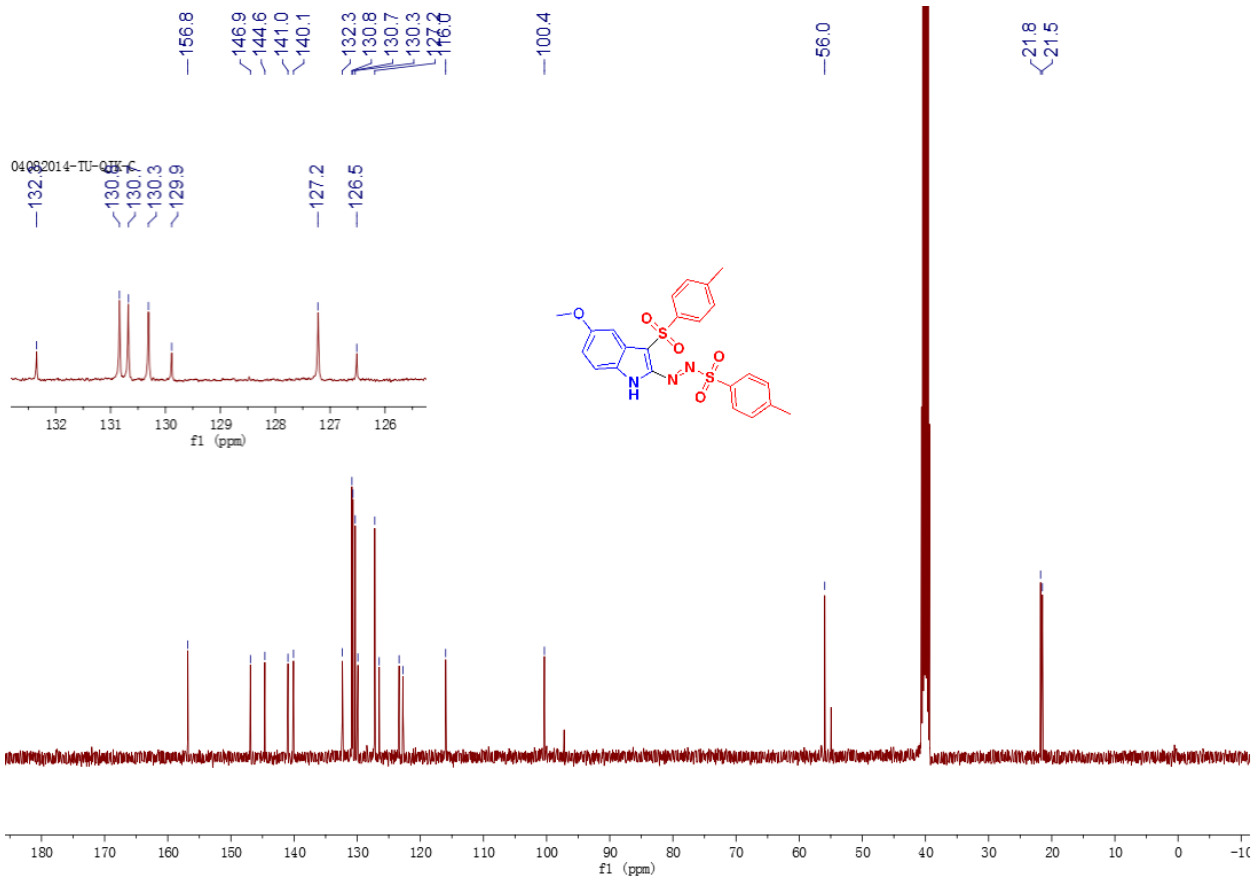
^{1}H NMR Spectrum of Compound **3j** (400Hz, DMSO-d_6)



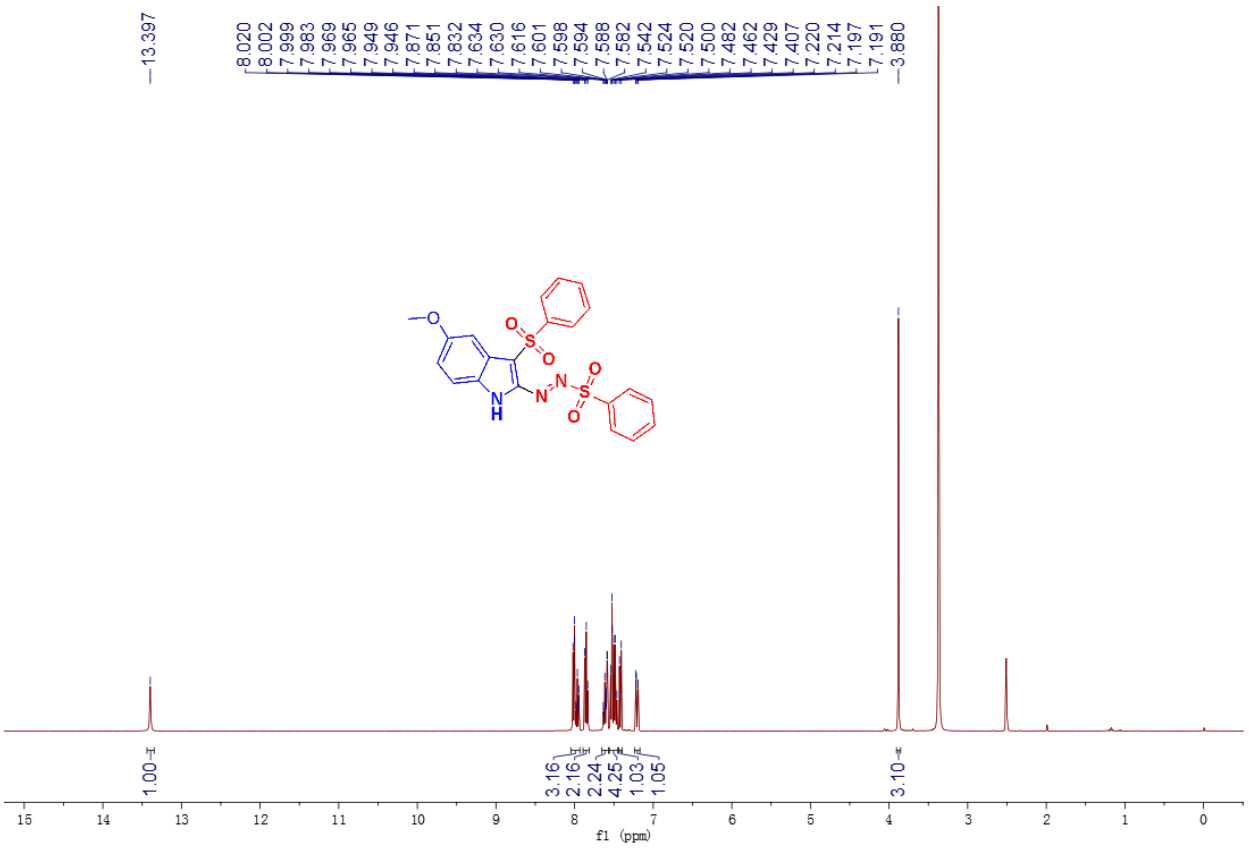
^{13}C NMR Spectrum of Compound **3j** (100Hz, DMSO-d_6)



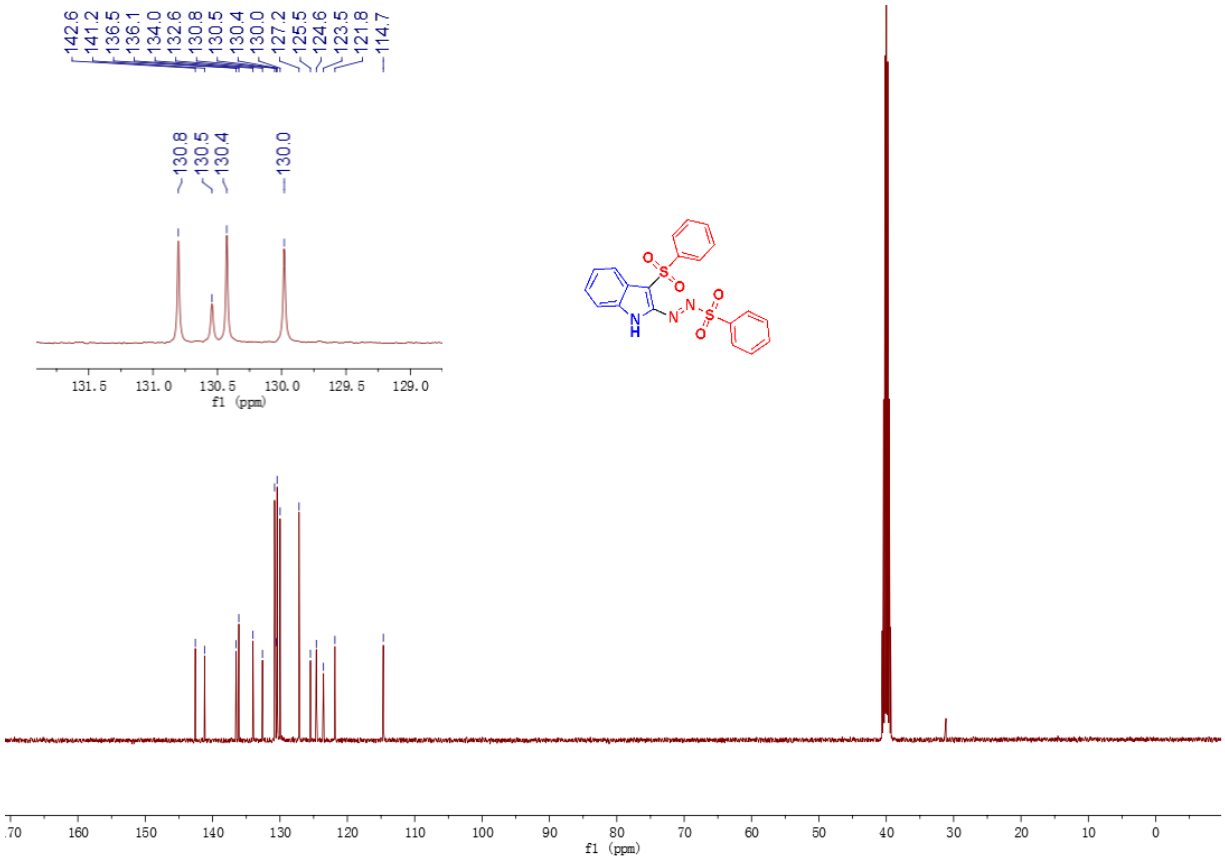
^{1}H NMR Spectrum of Compound **3k** (400Hz, DMSO-d_6)



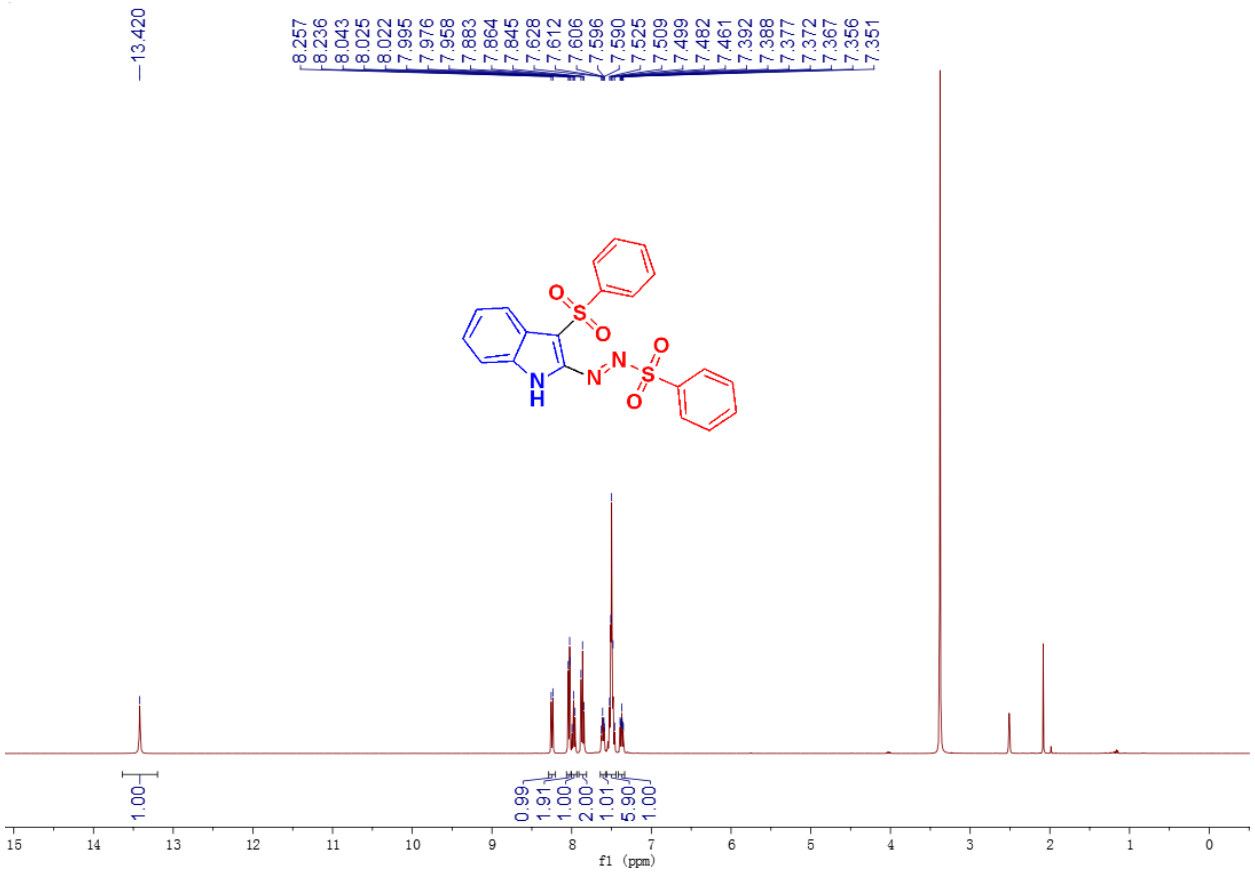
^{13}C NMR Spectrum of Compound **3k** (100Hz, DMSO-d_6)



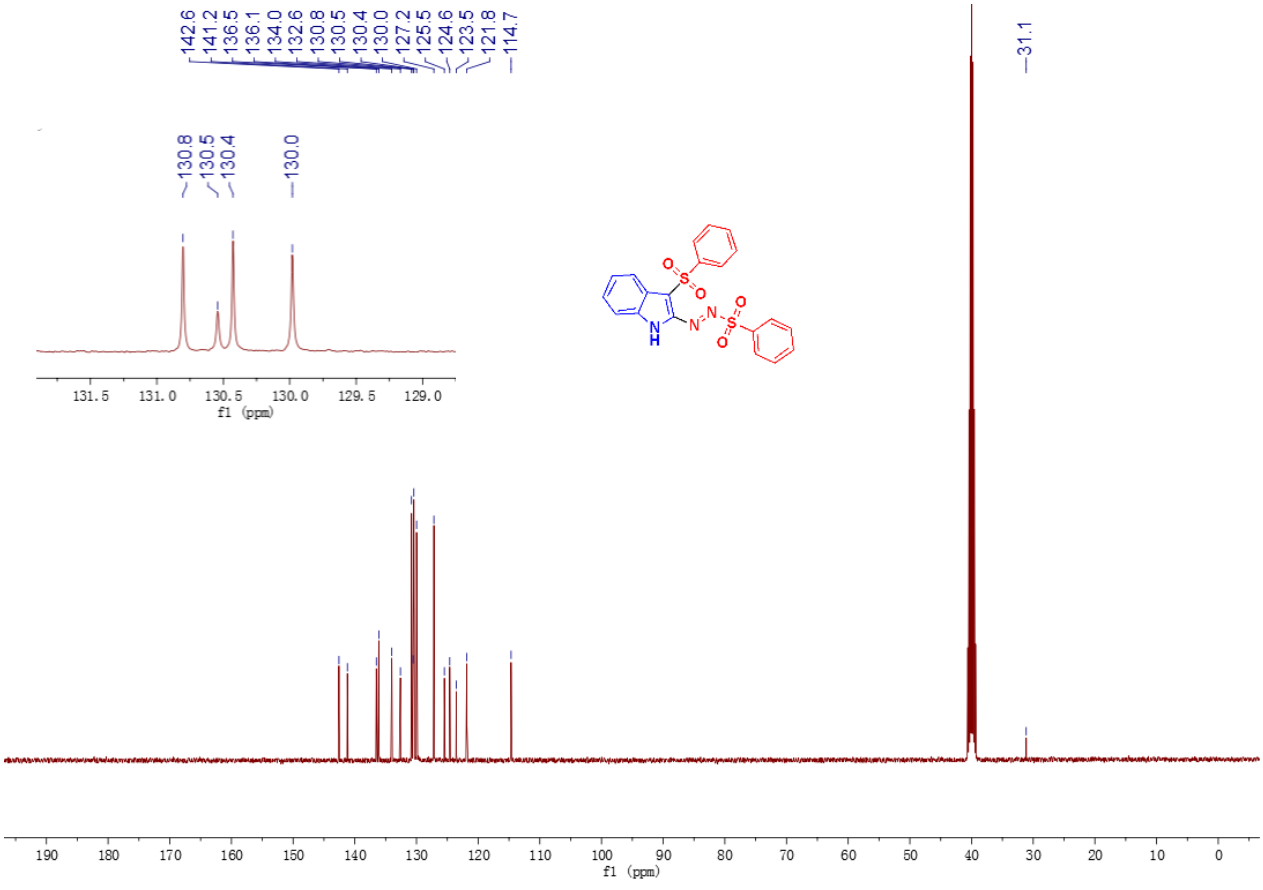
^{1}H NMR Spectrum of Compound **3l** (400Hz, DMSO-d_6)



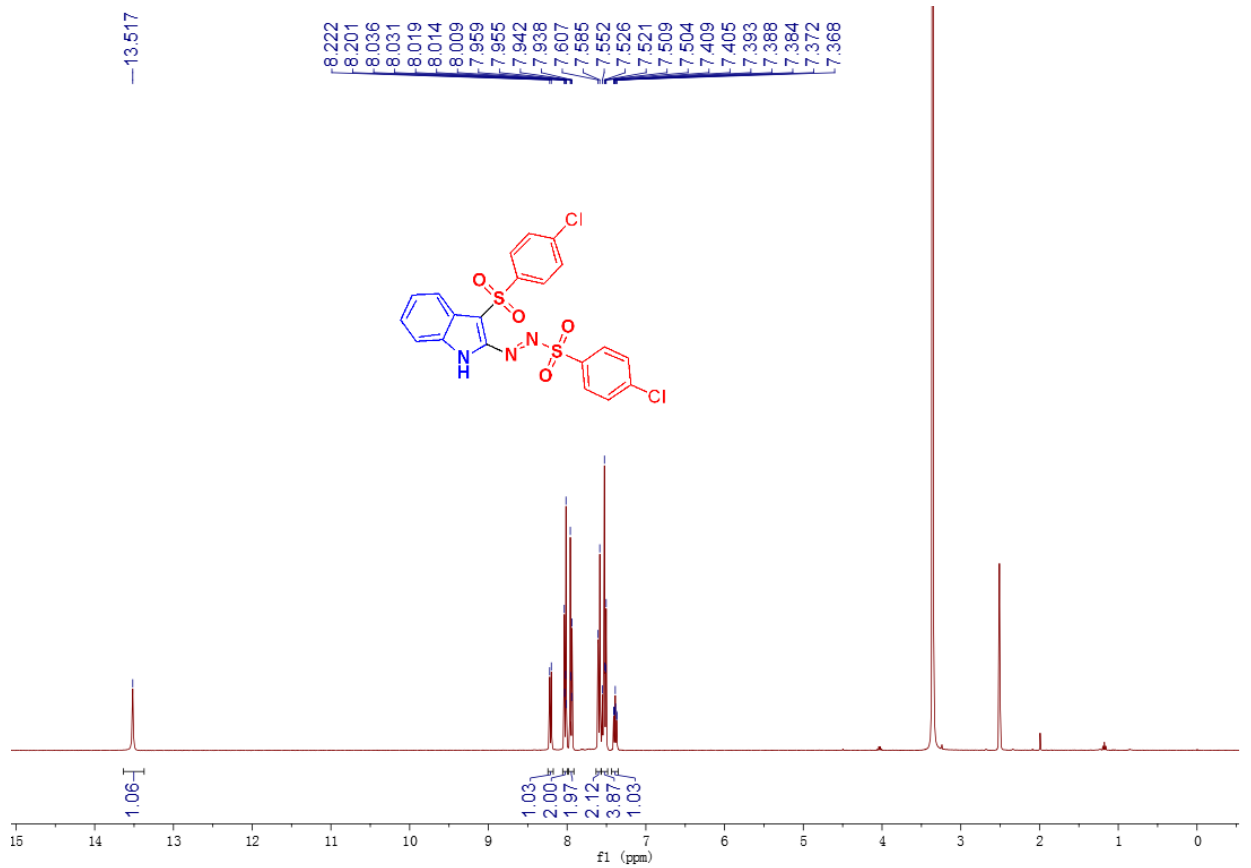
^{13}C NMR Spectrum of Compound **3l** (100Hz, DMSO-d_6)



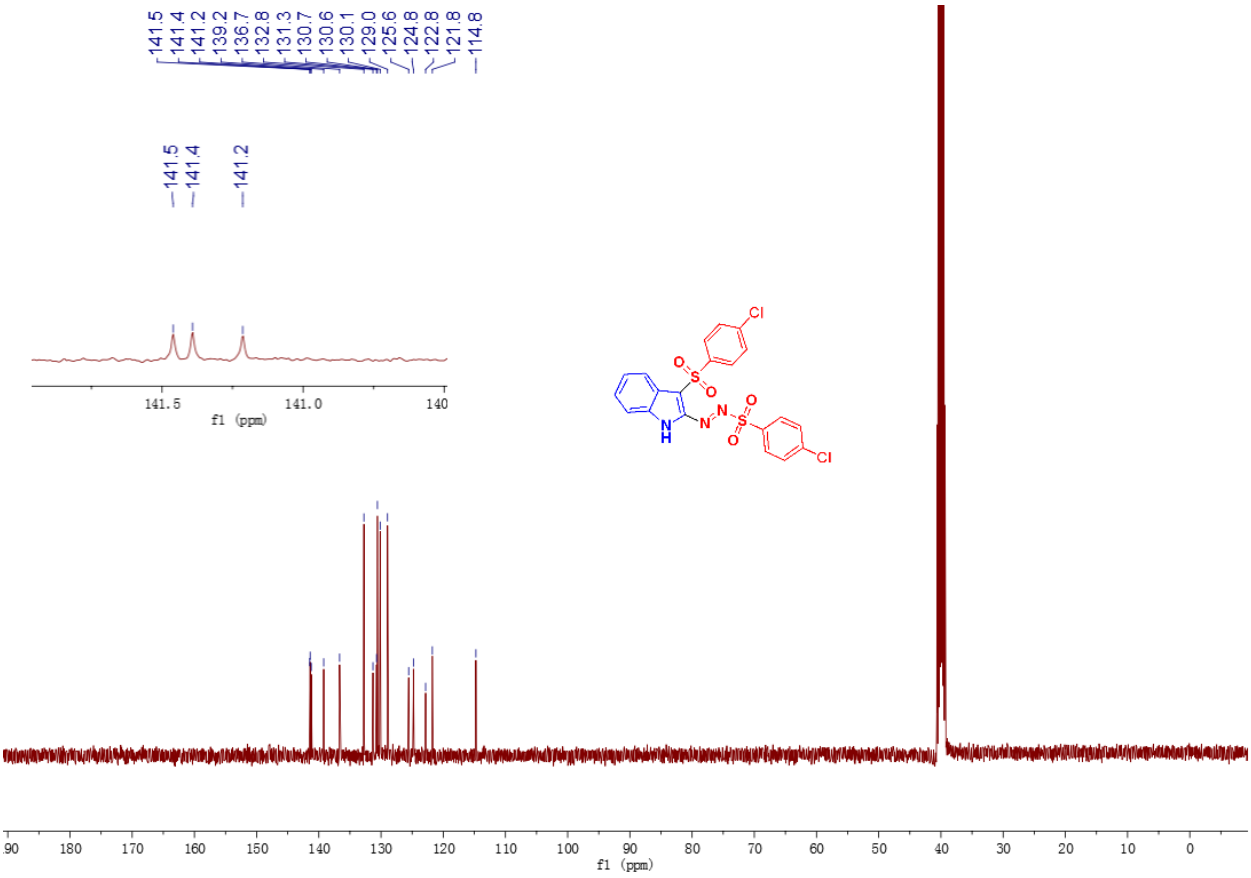
^{1}H NMR Spectrum of Compound **3m** (400Hz, DMSO-d_6)



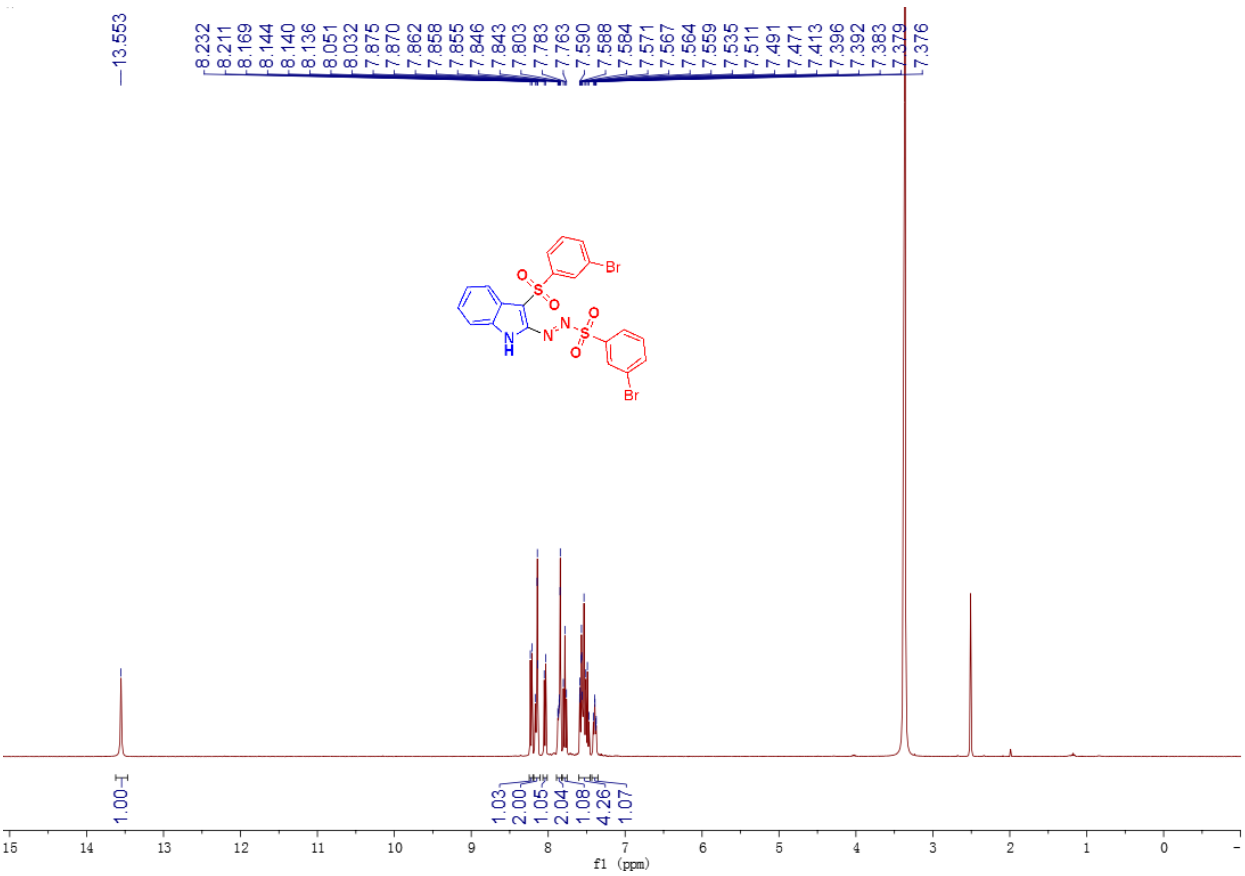
^{13}C NMR Spectrum of Compound **3m** (100Hz, DMSO-d_6)



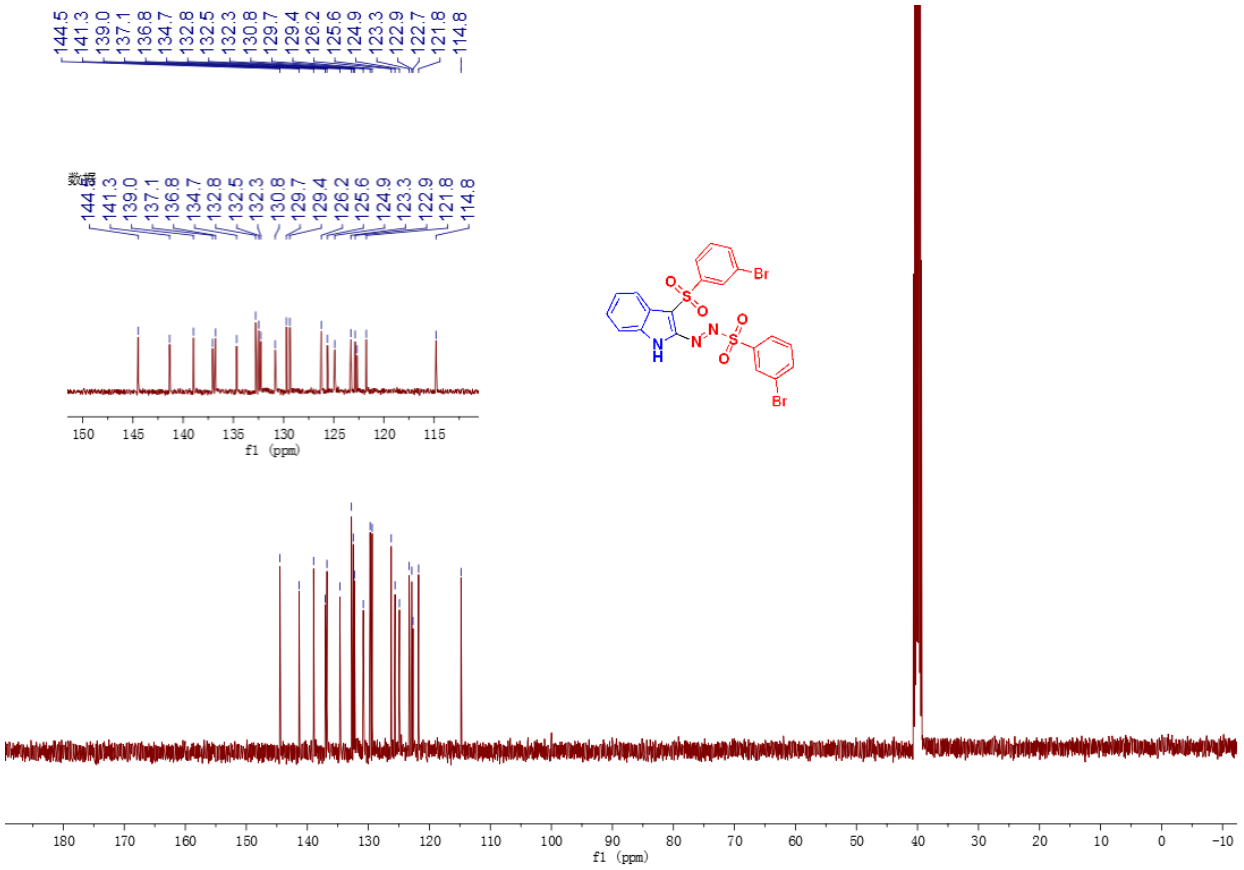
^{1}H NMR Spectrum of Compound **3n** (400Hz, DMSO-d_6)



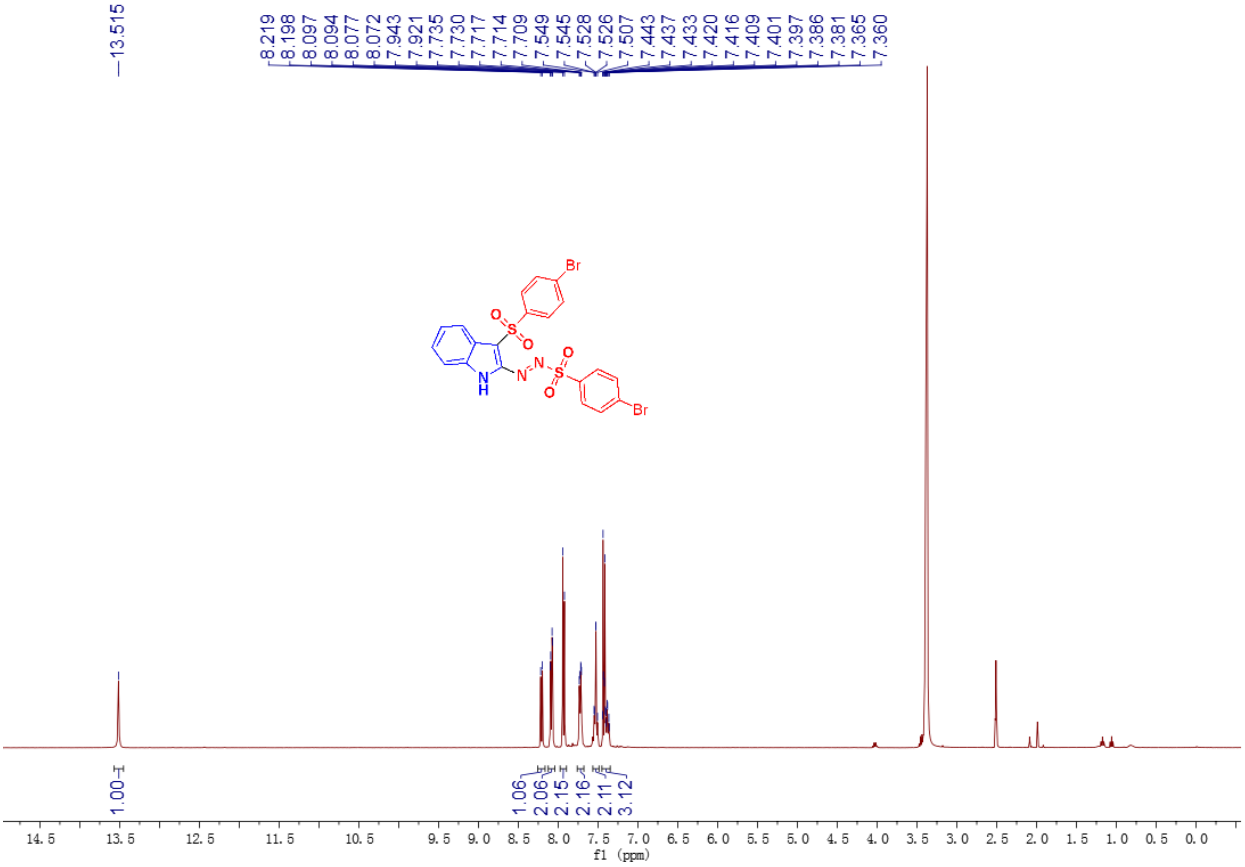
^{13}C NMR Spectrum of Compound **3n** (100Hz, DMSO-d_6)



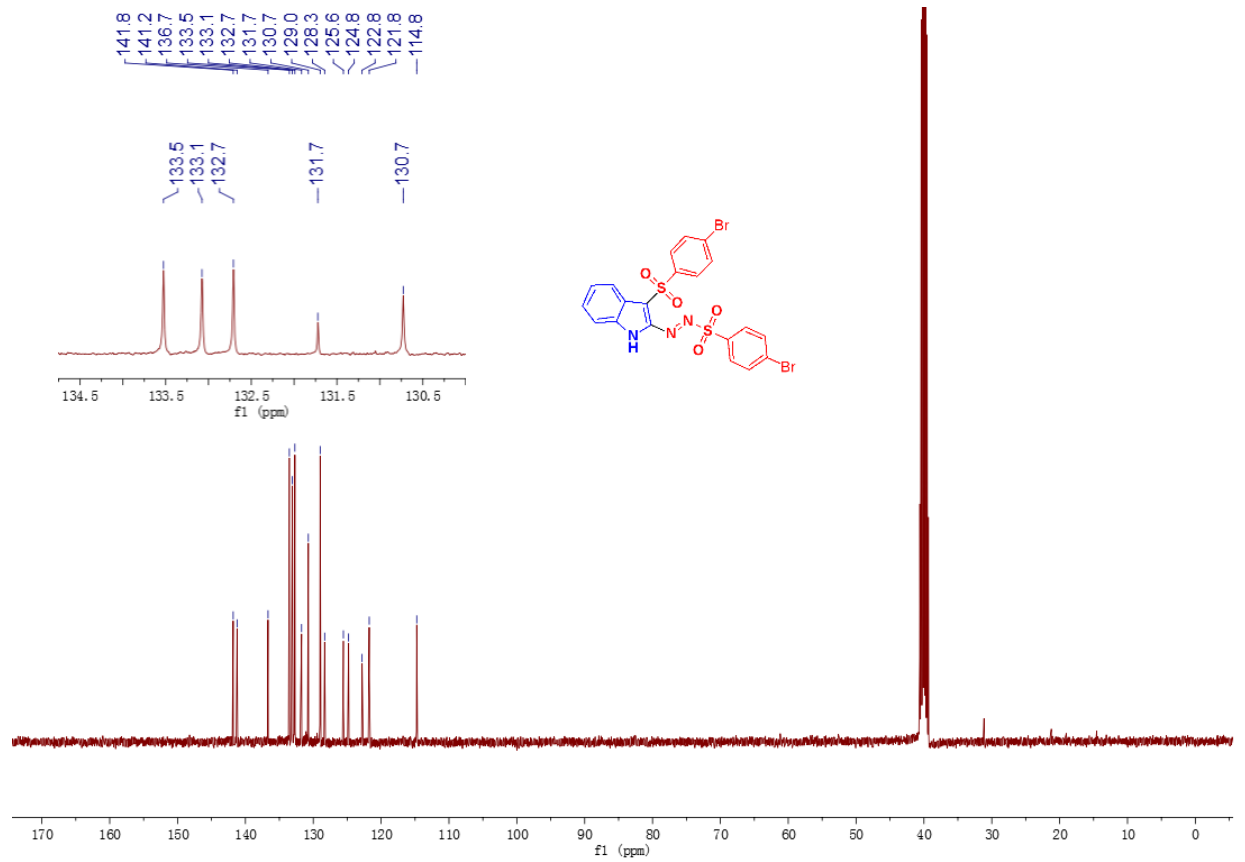
^{1}H NMR Spectrum of Compound **3o** (400Hz, DMSO-d_6)



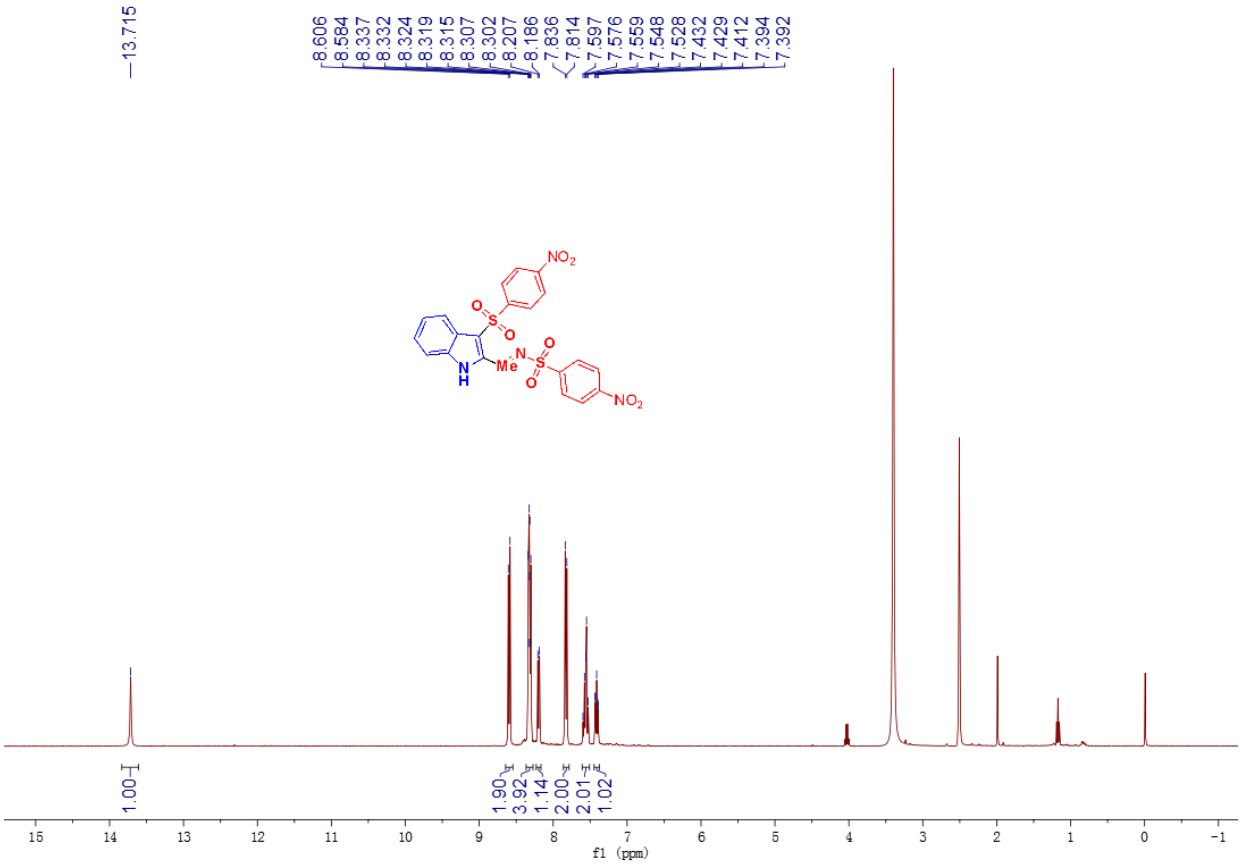
^{13}C NMR Spectrum of Compound **3o** (100Hz, DMSO-d_6)



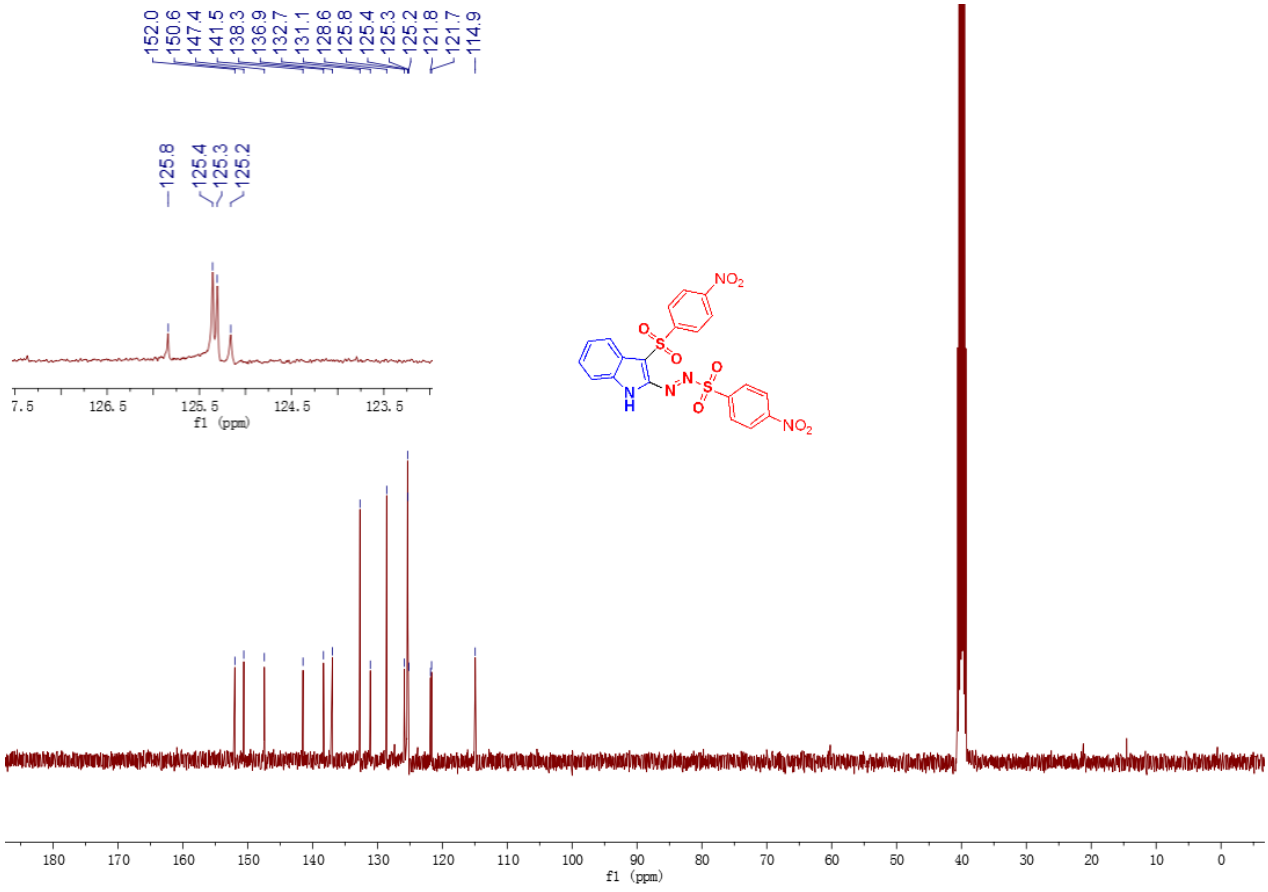
^{1}H NMR Spectrum of Compound **3p** (400Hz, DMSO-d_6)



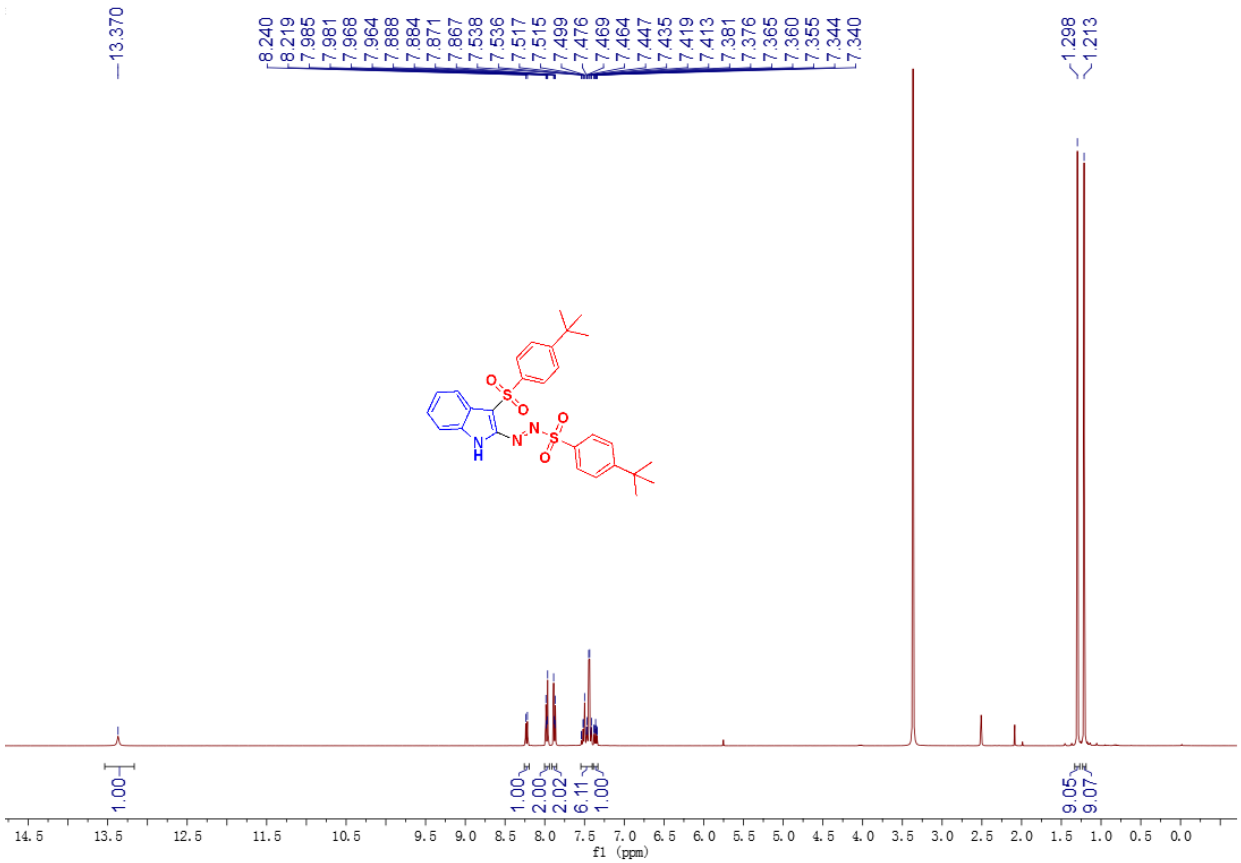
^{13}C NMR Spectrum of Compound **3p** (100Hz, DMSO-d_6)



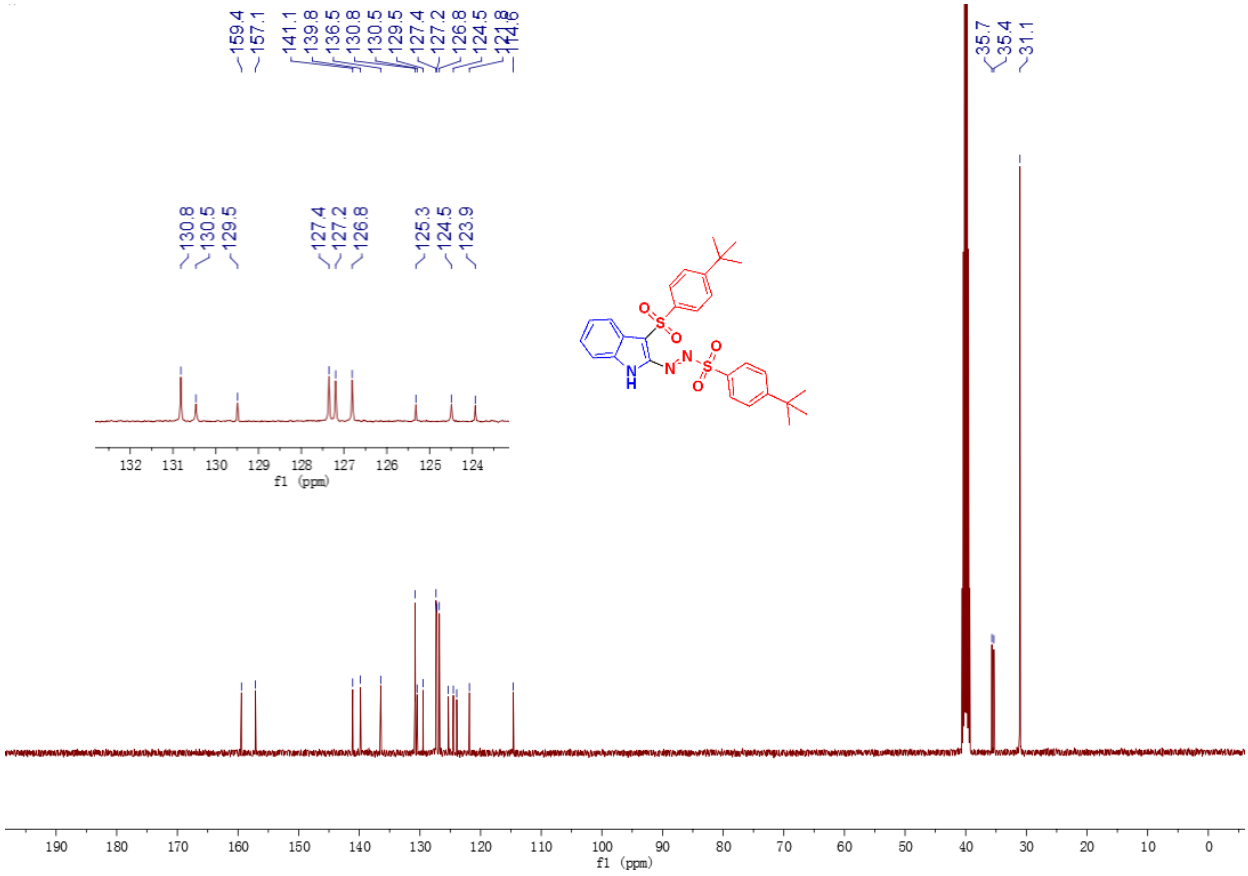
^{1}H NMR Spectrum of Compound **3q** (400Hz, DMSO-d_6)



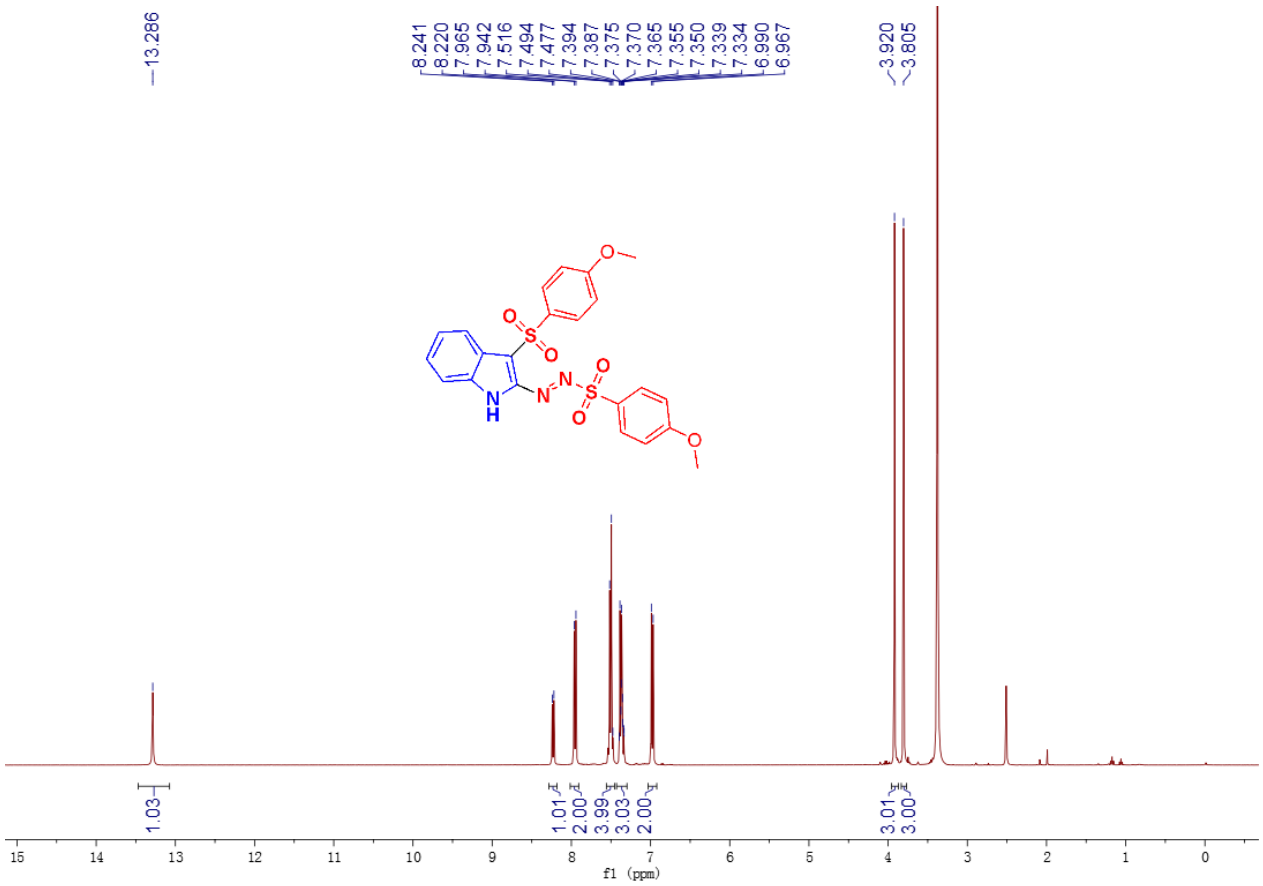
^{13}C NMR Spectrum of Compound **3q** (100Hz, DMSO-d_6)



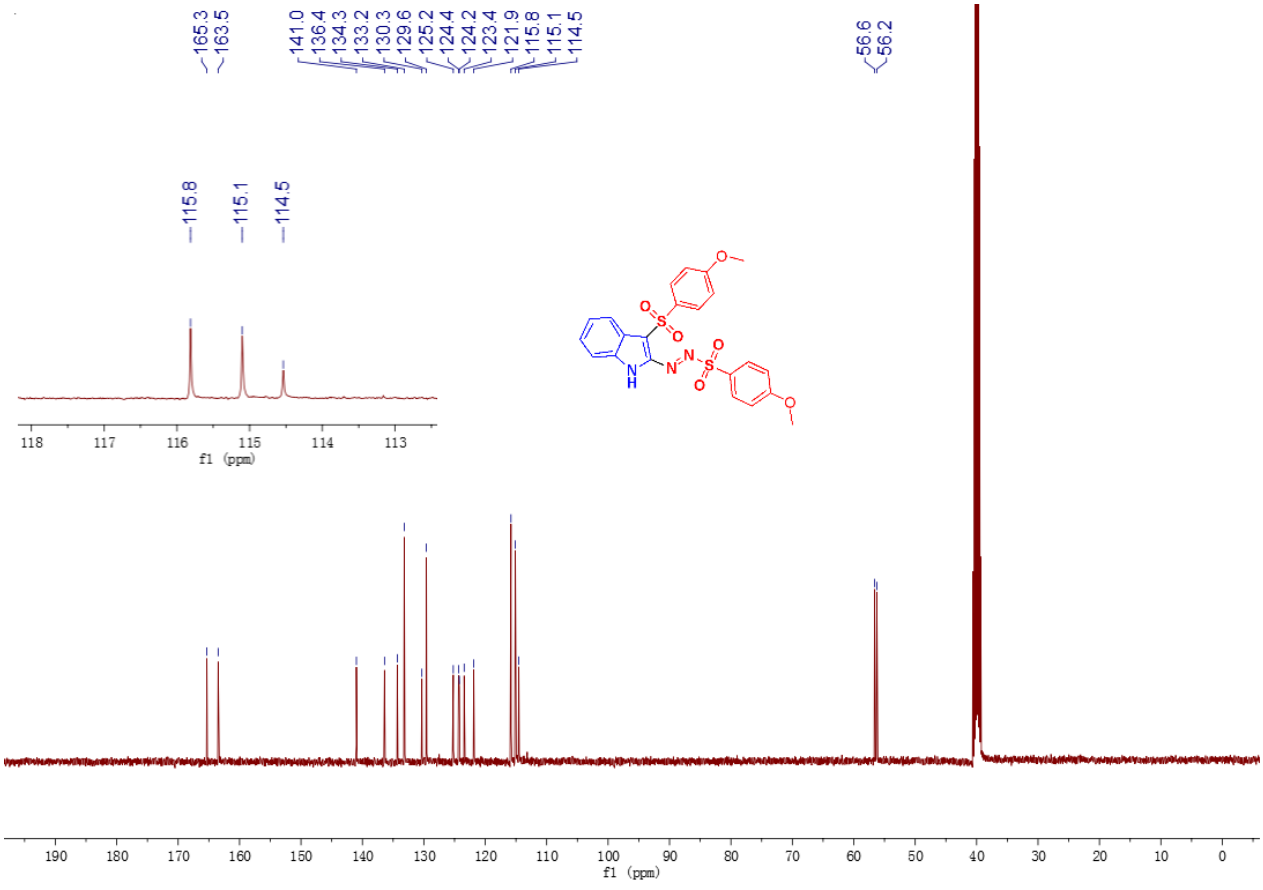
^{1}H NMR Spectrum of Compound **3r** (400Hz, DMSO-d_6)



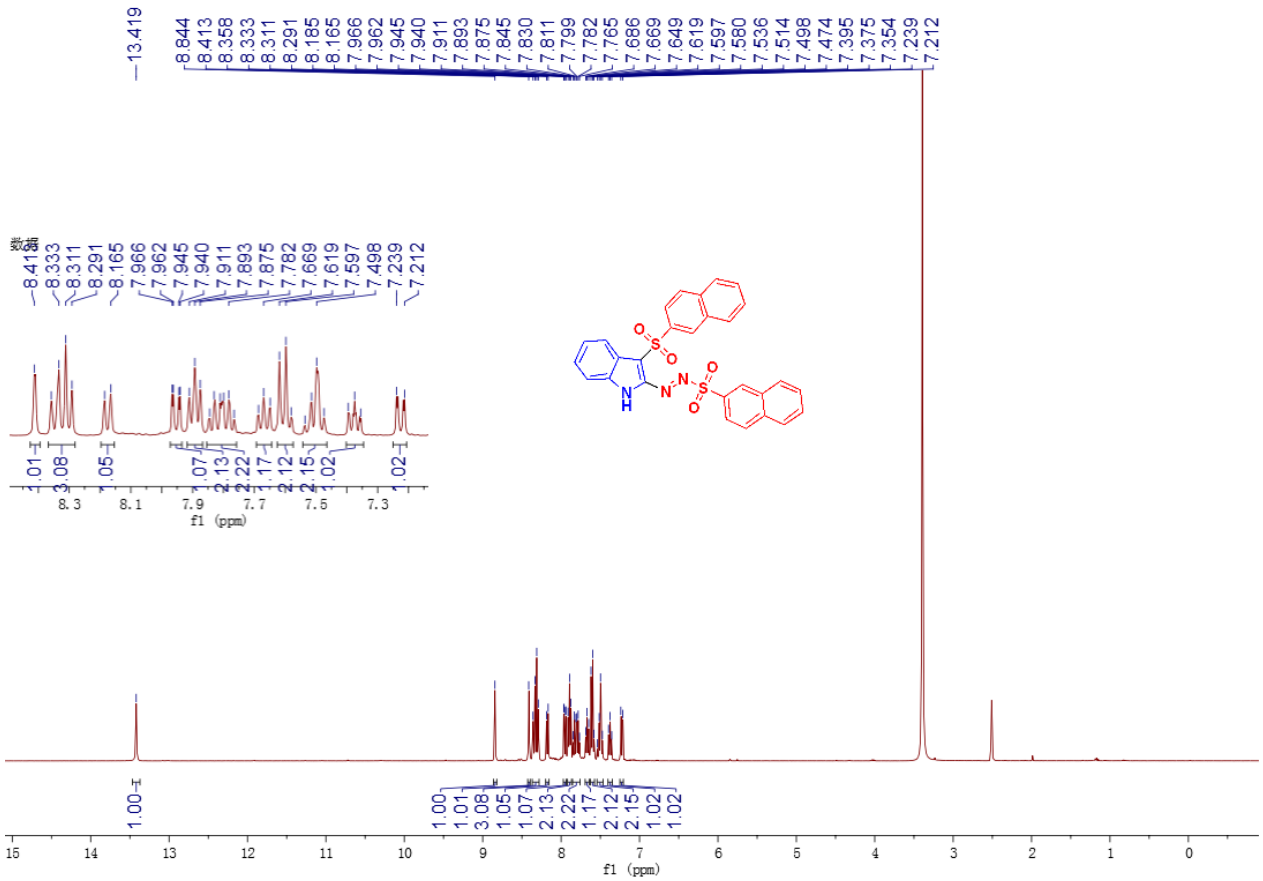
^{13}C NMR Spectrum of Compound **3r** (100Hz, DMSO-d_6)



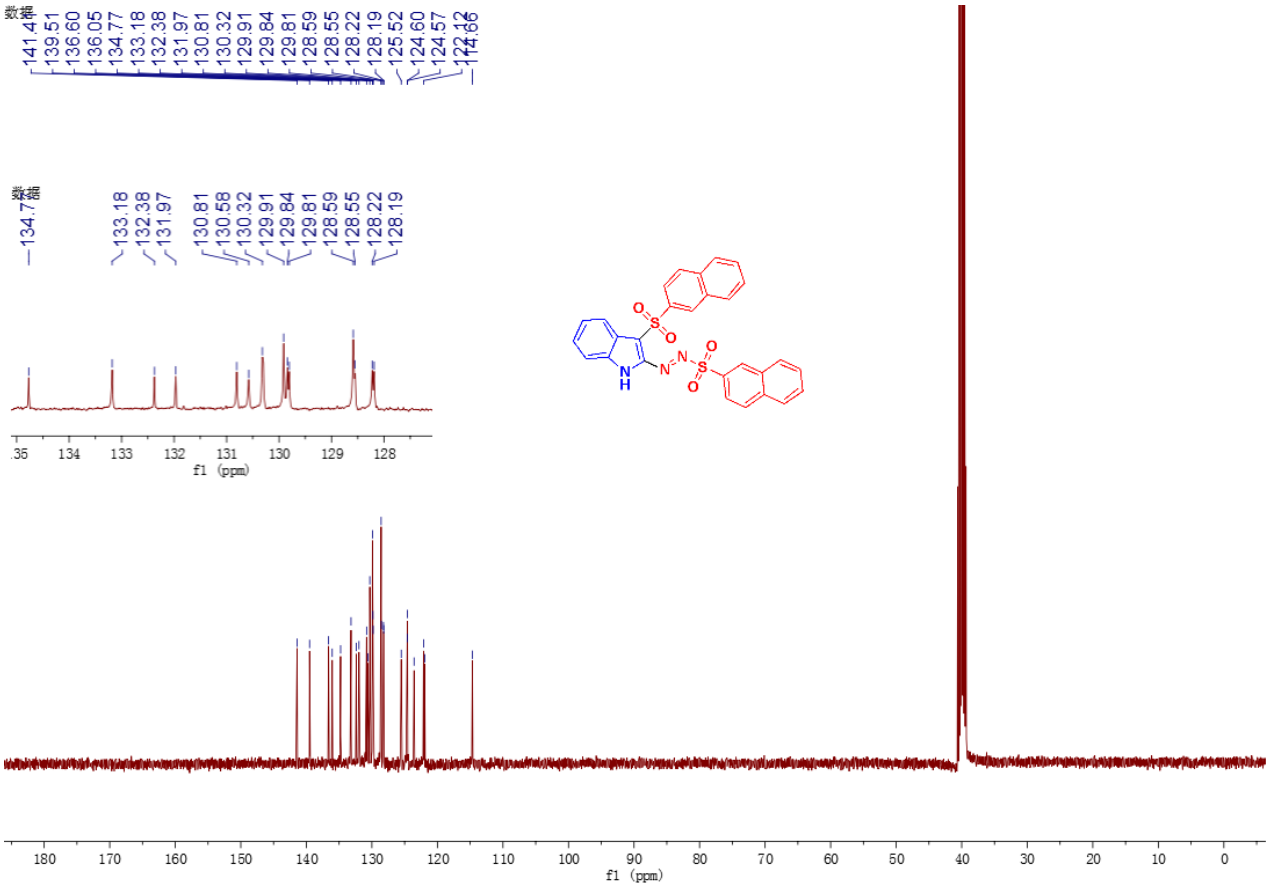
^{1}H NMR Spectrum of Compound **3s** (400Hz, DMSO-d_6)



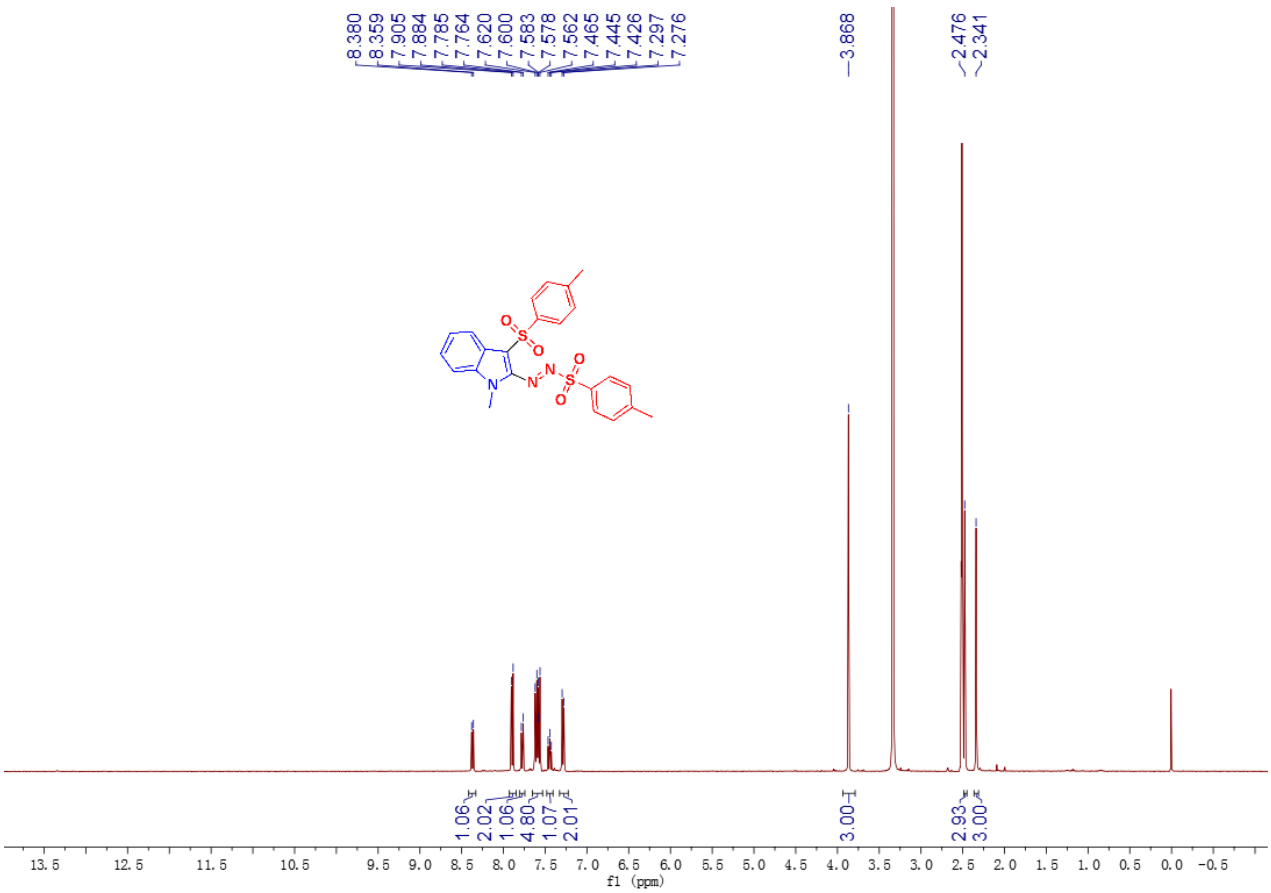
^{13}C NMR Spectrum of Compound **3s** (100Hz, DMSO-d_6)



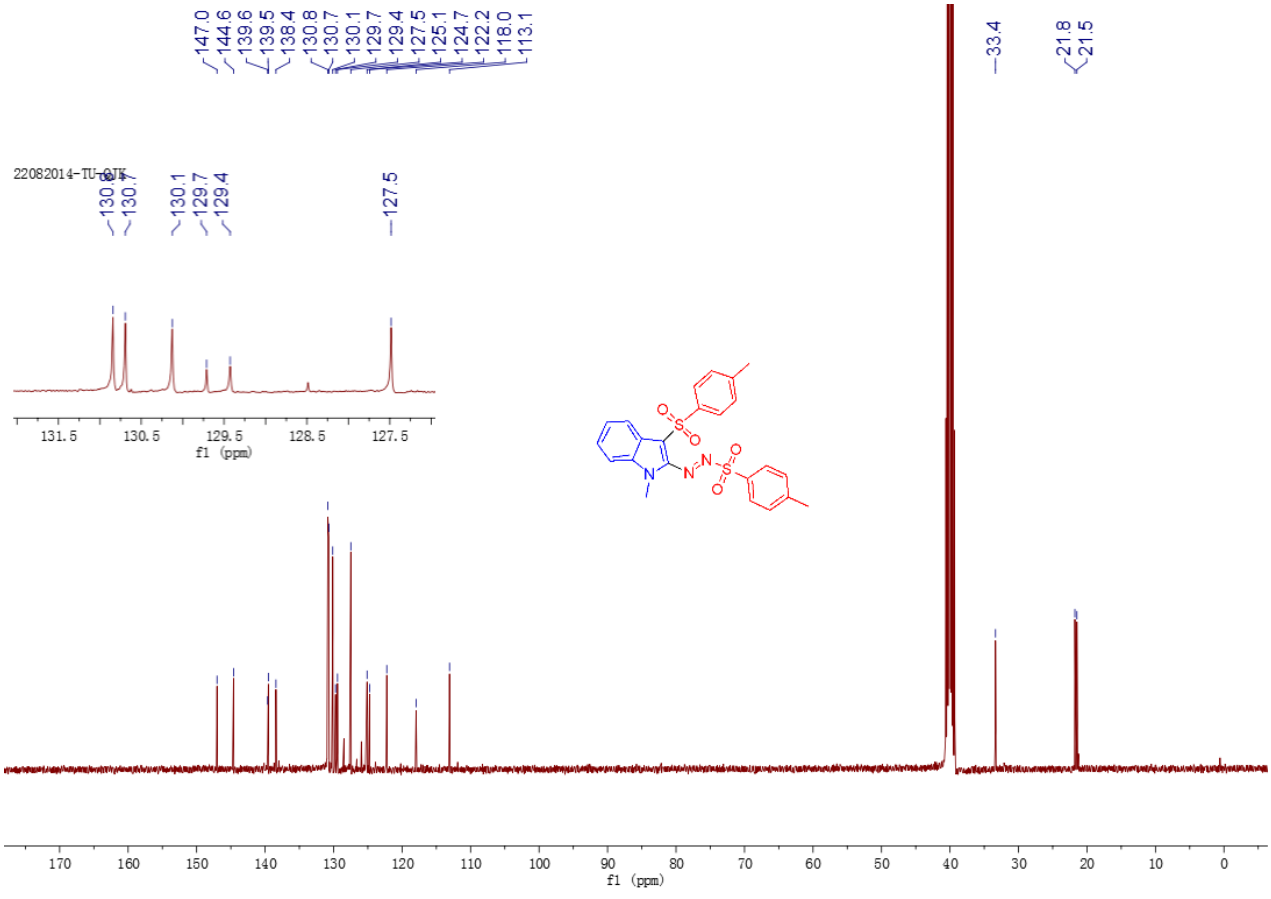
^{1}H NMR Spectrum of Compound **3t** (400Hz, DMSO-d_6)



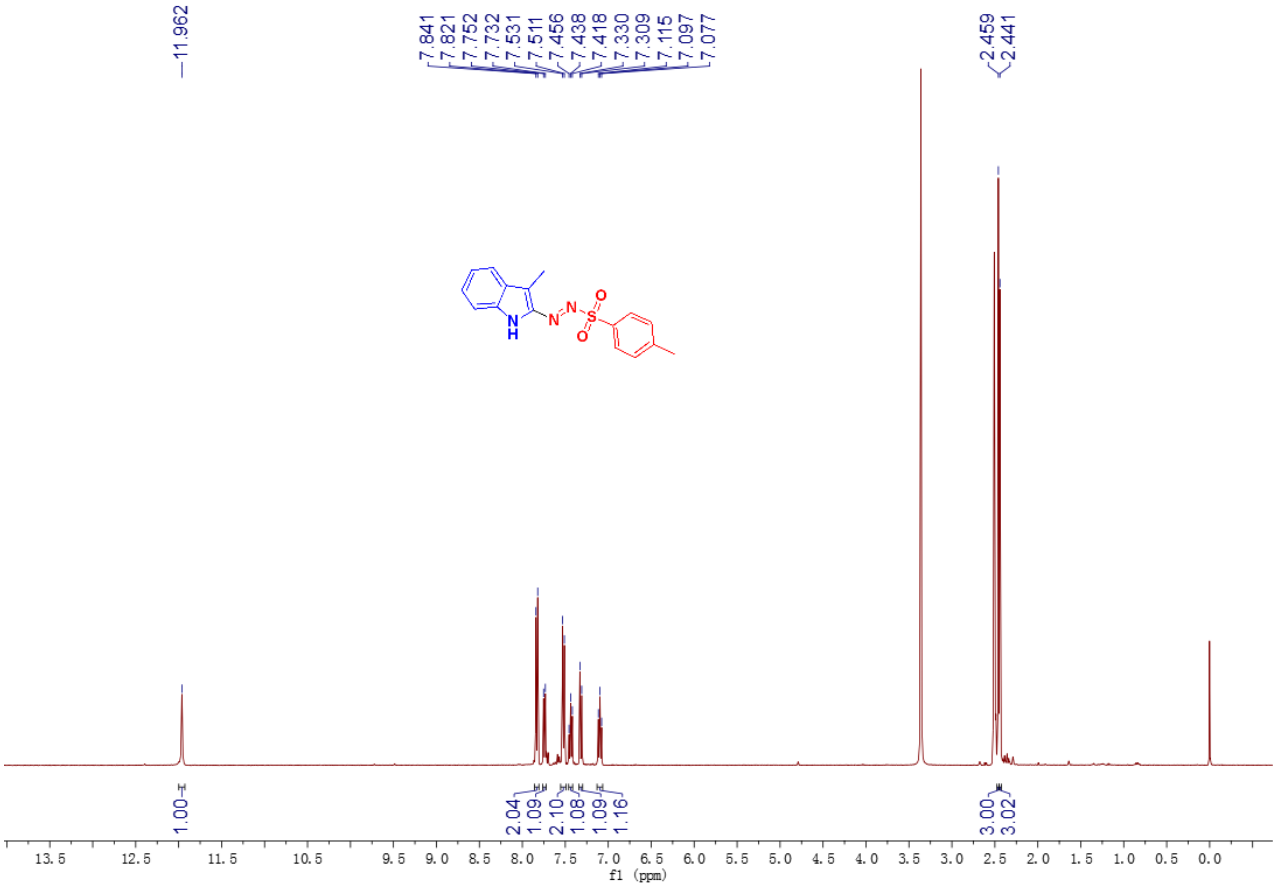
^{13}C NMR Spectrum of Compound **3t** (100Hz, DMSO-d_6)



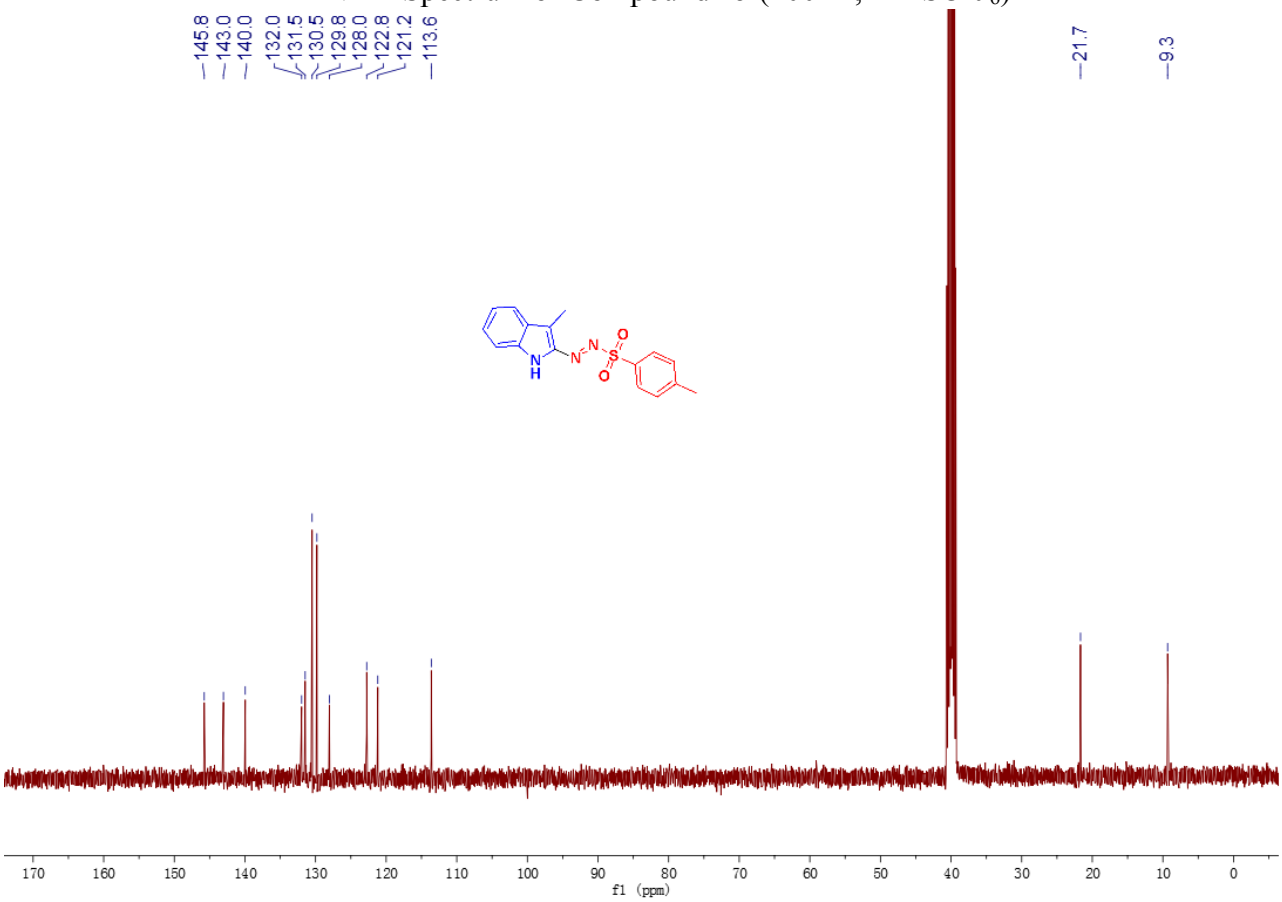
^{1}H NMR Spectrum of Compound **3u** (400Hz, DMSO-d_6)



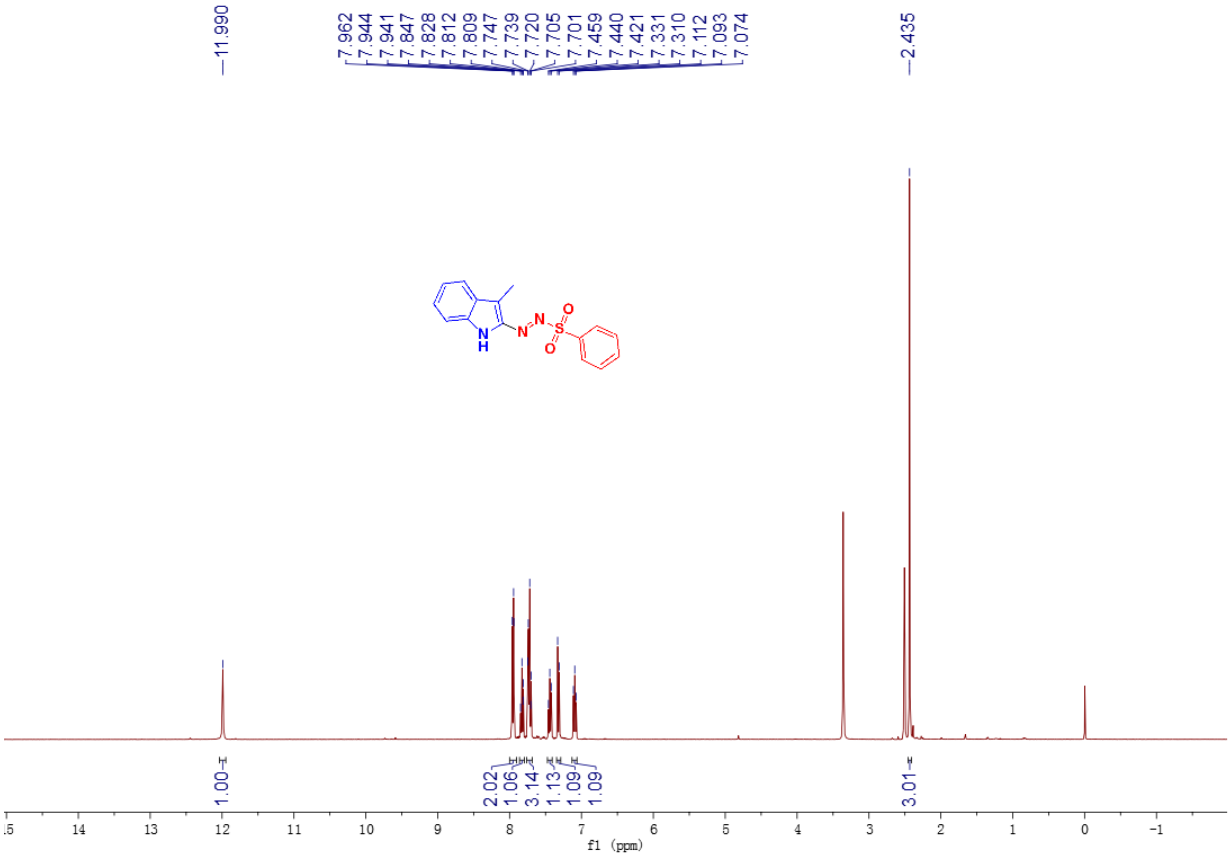
^{13}C NMR Spectrum of Compound **3u** (100Hz, DMSO-d_6)



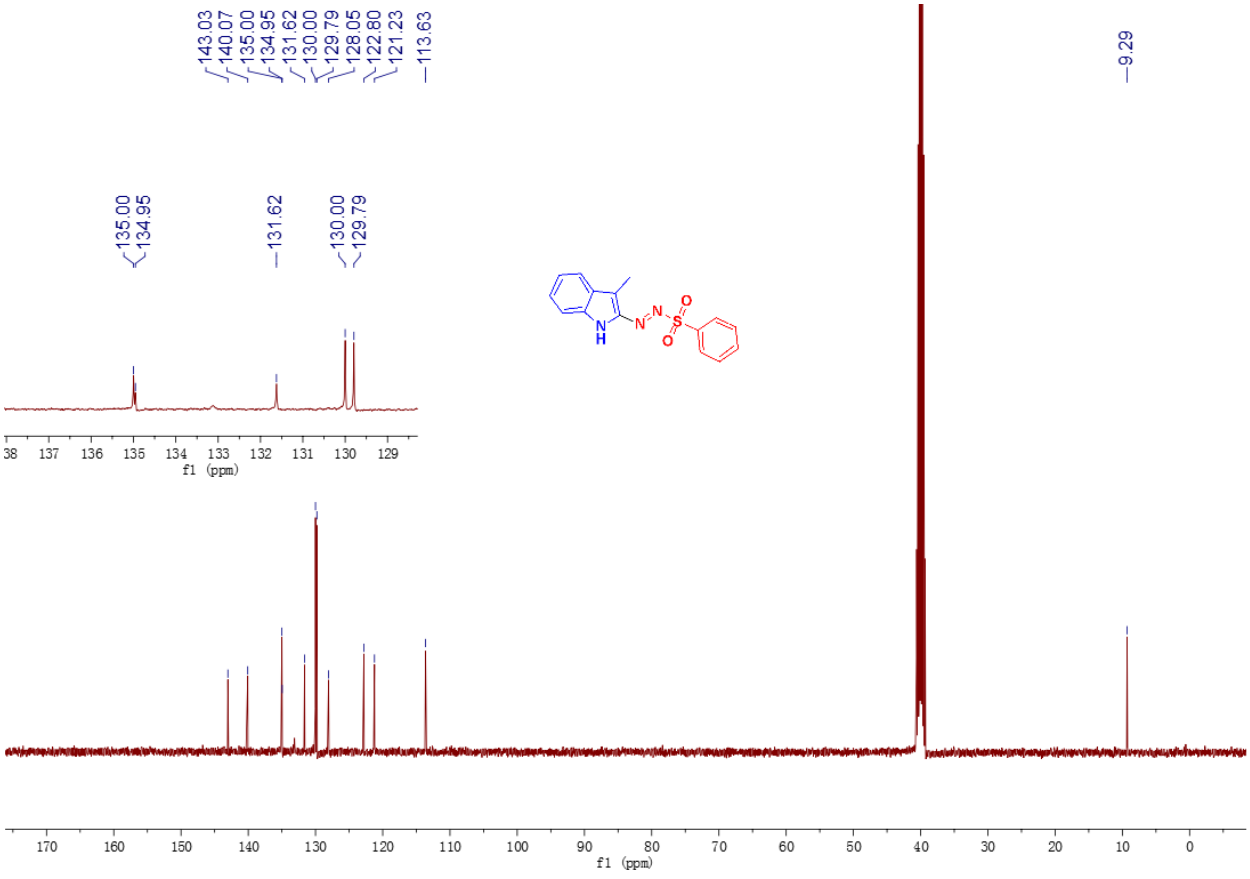
^{1}H NMR Spectrum of Compound **4a** (400Hz, DMSO-d_6)



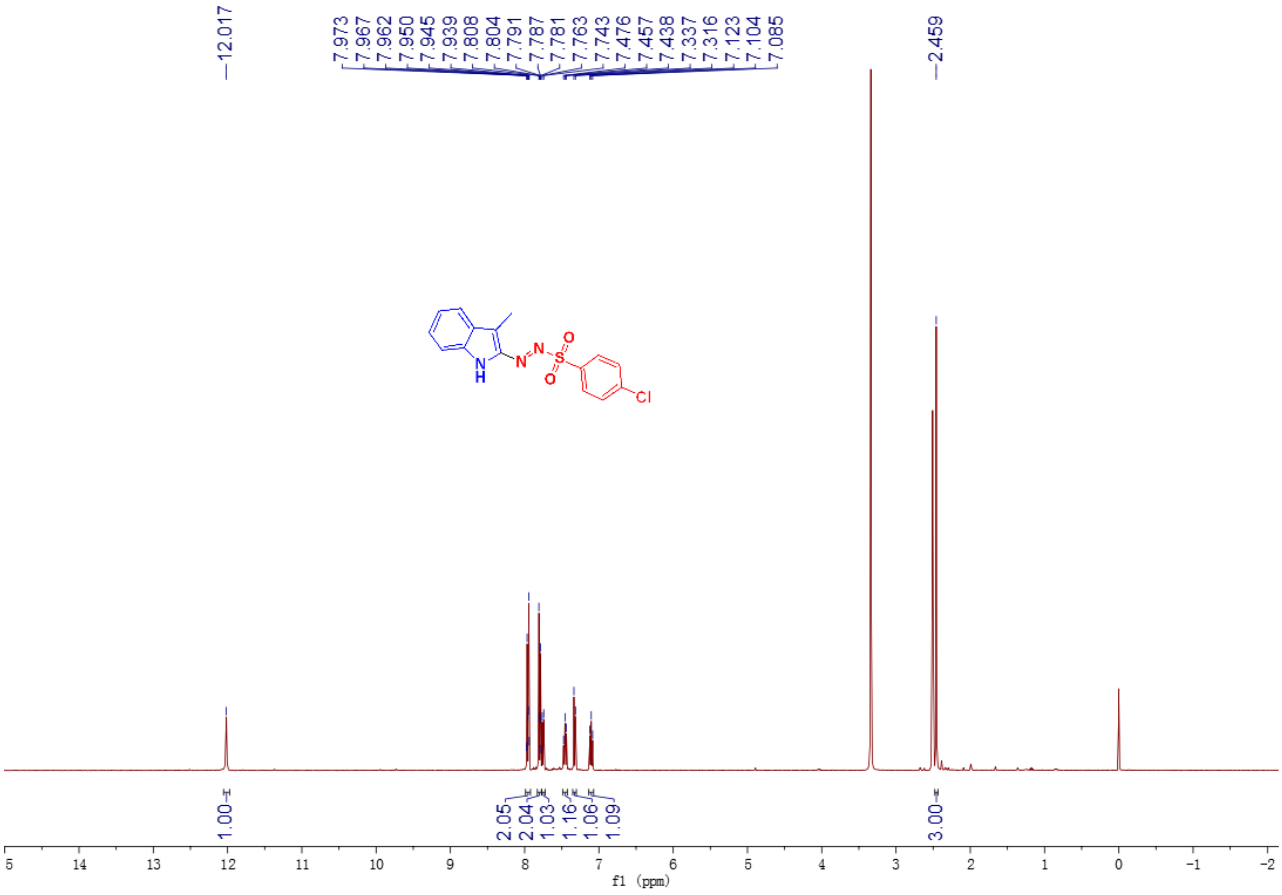
^{13}C NMR Spectrum of Compound **4a** (100Hz, DMSO-d_6)



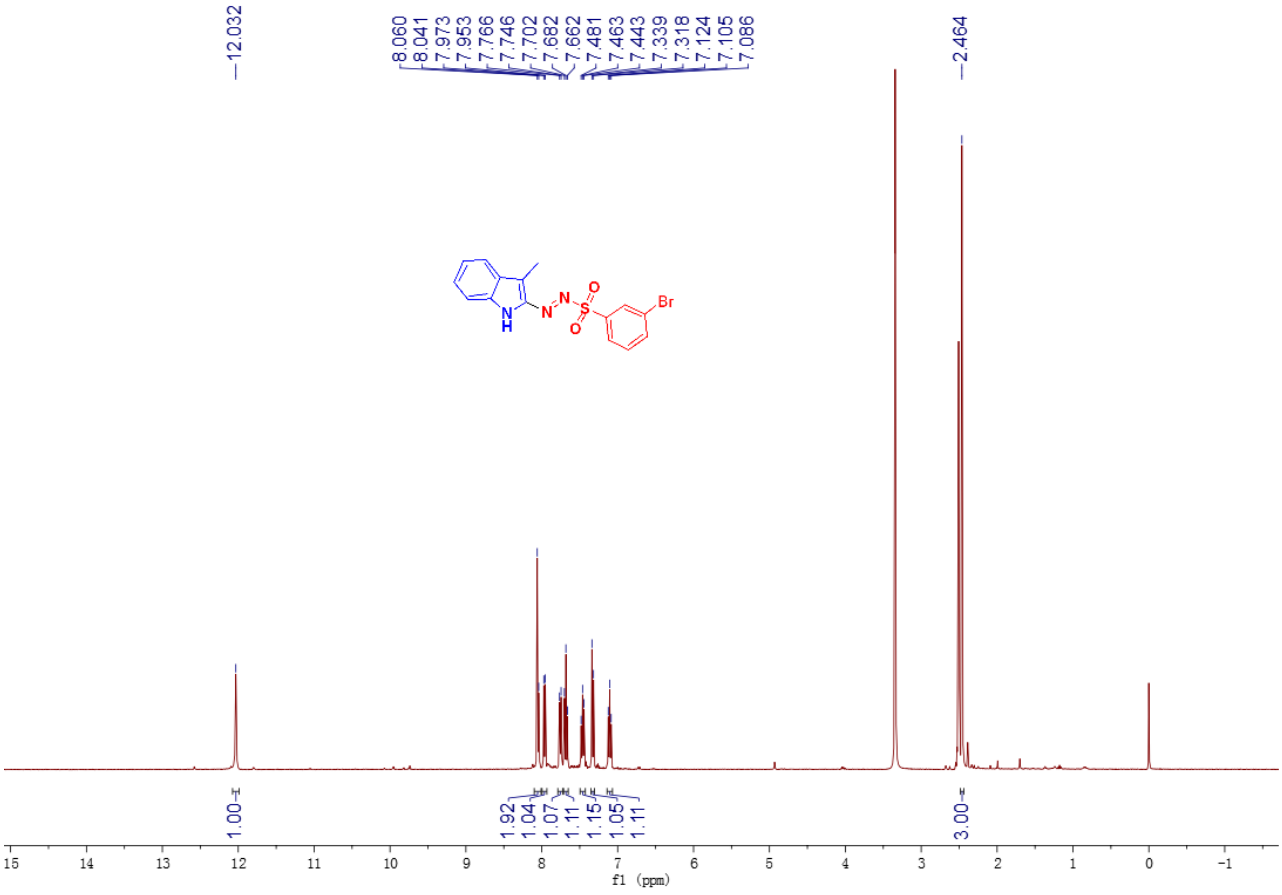
^{1}H NMR Spectrum of Compound **4b** (400Hz, DMSO-d_6)



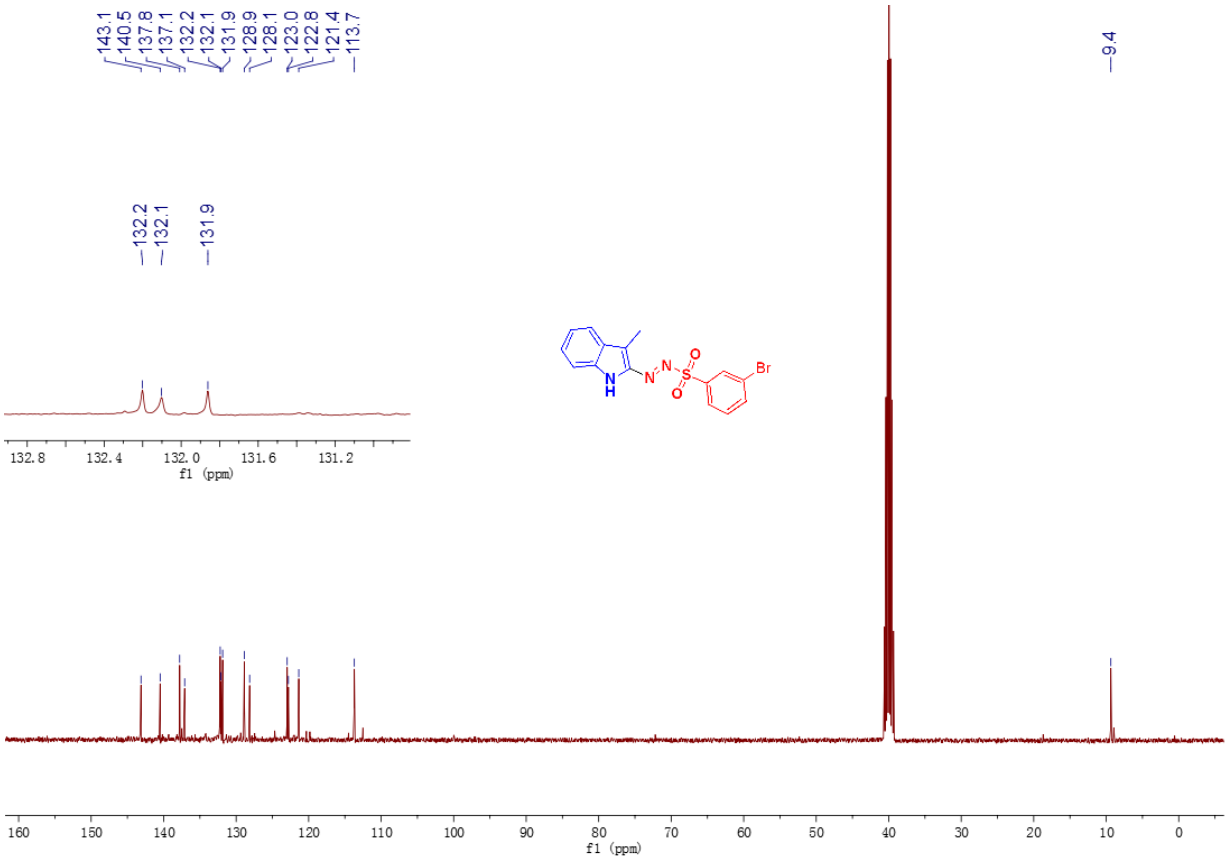
^{13}C NMR Spectrum of Compound **4b** (100Hz, DMSO-d_6)



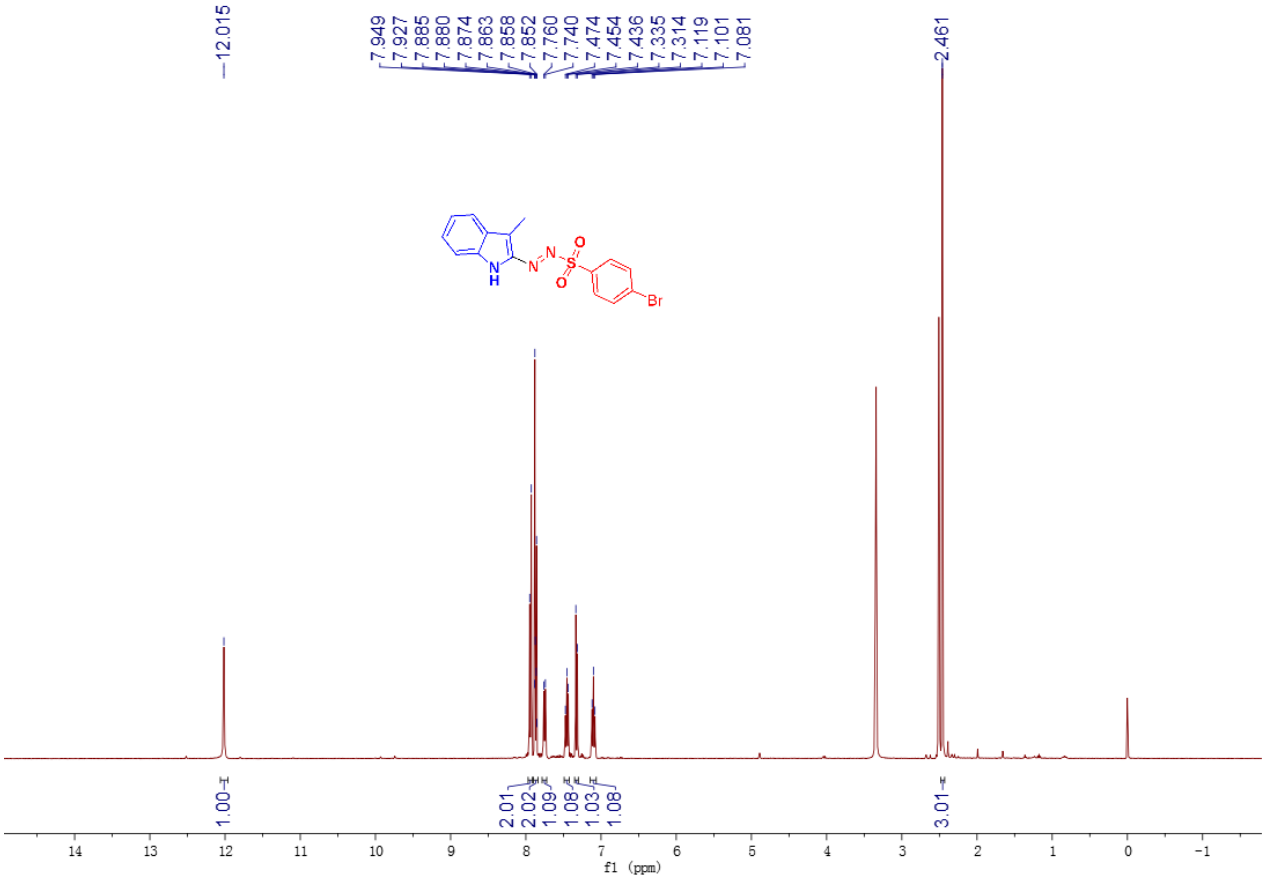
^{1}H NMR Spectrum of Compound **4c** (400Hz, DMSO-d_6)



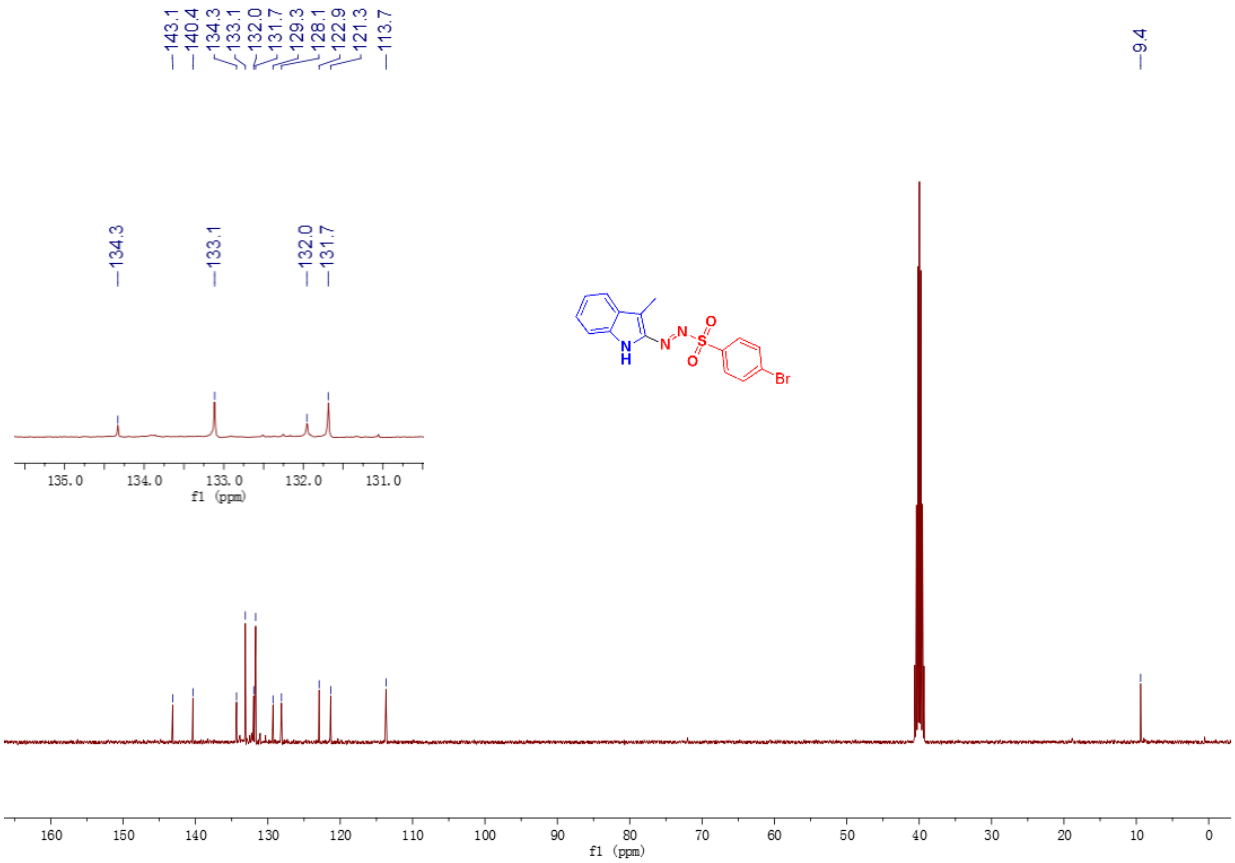
^{1}H NMR Spectrum of Compound **4d** (400Hz, DMSO-d_6)



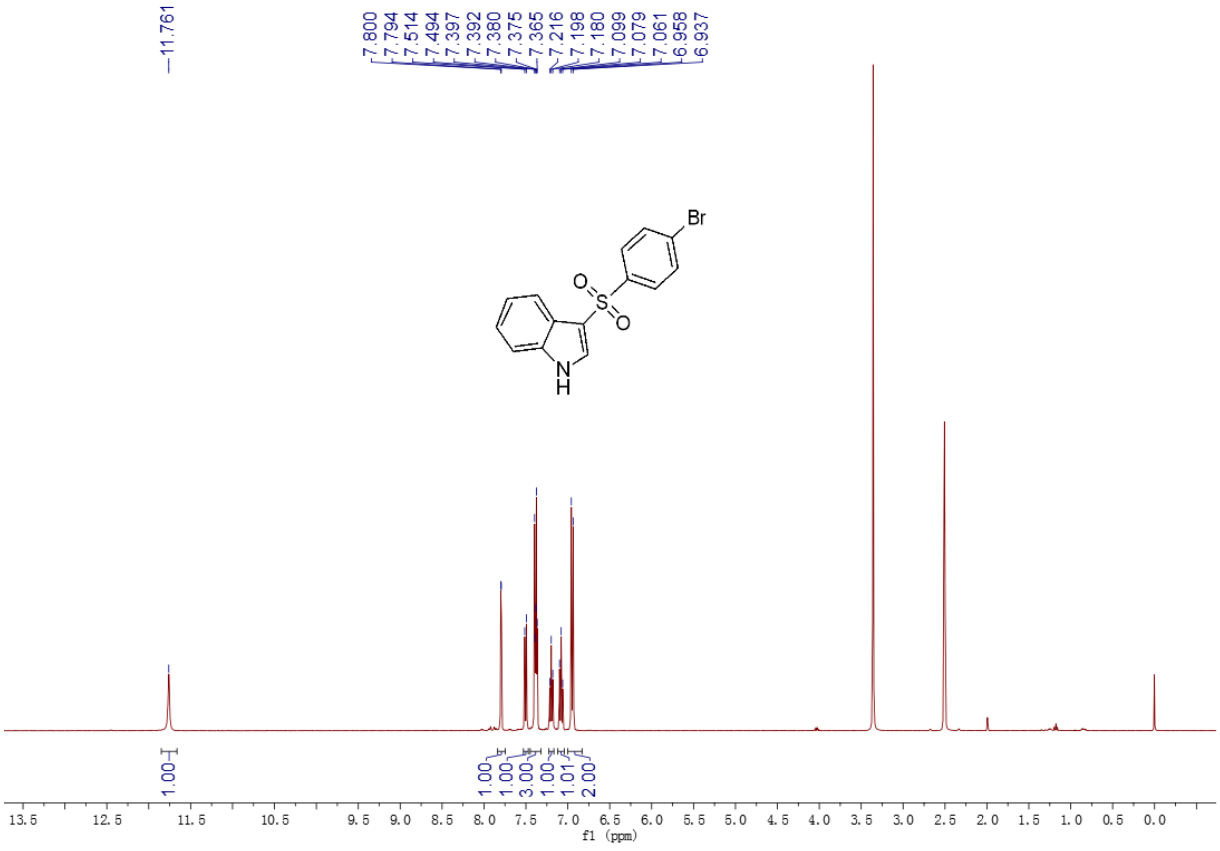
^{13}C NMR Spectrum of Compound **4d** (100Hz, DMSO-d_6)



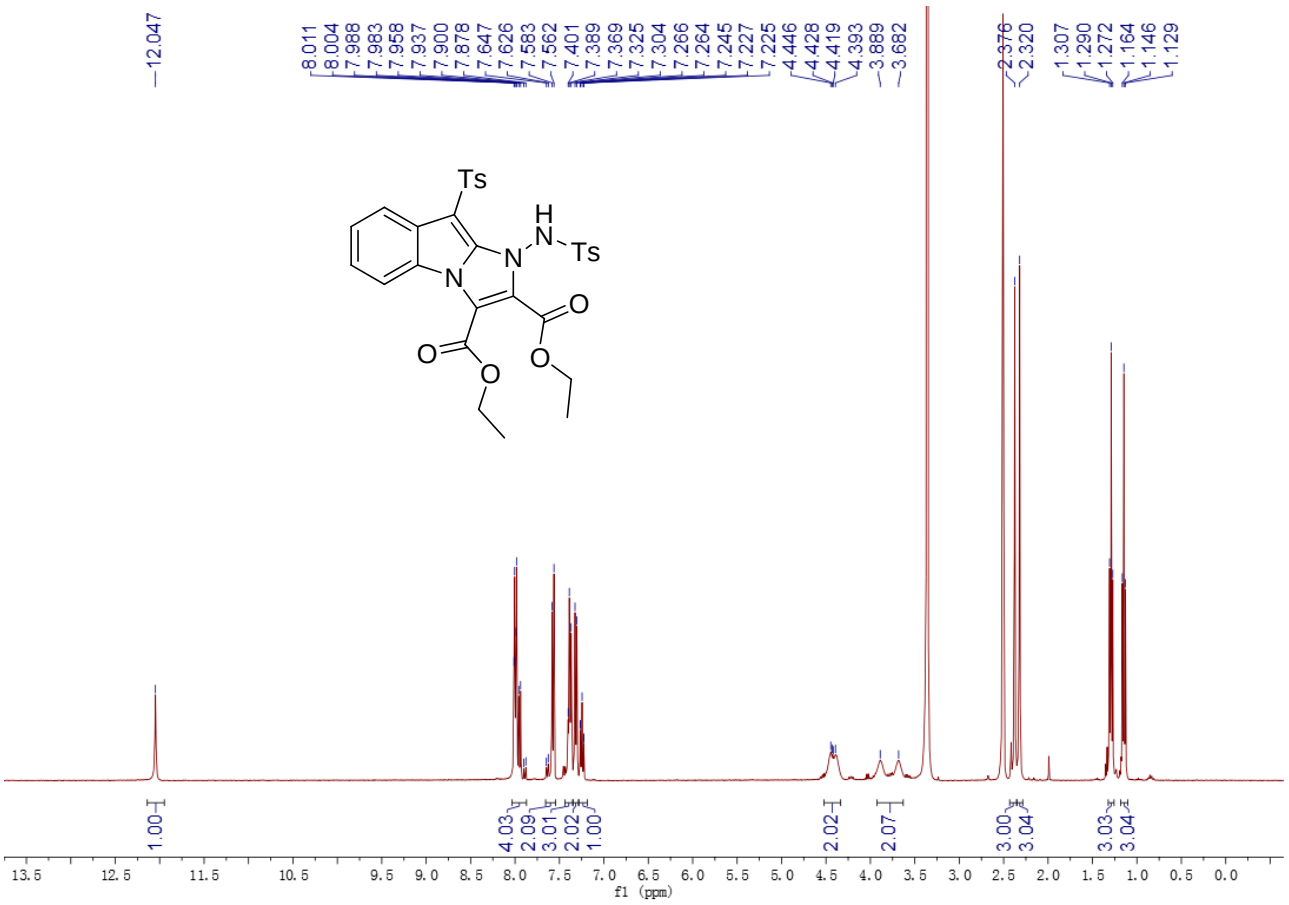
^{1}H NMR Spectrum of Compound **4e** (400Hz, DMSO-d_6)



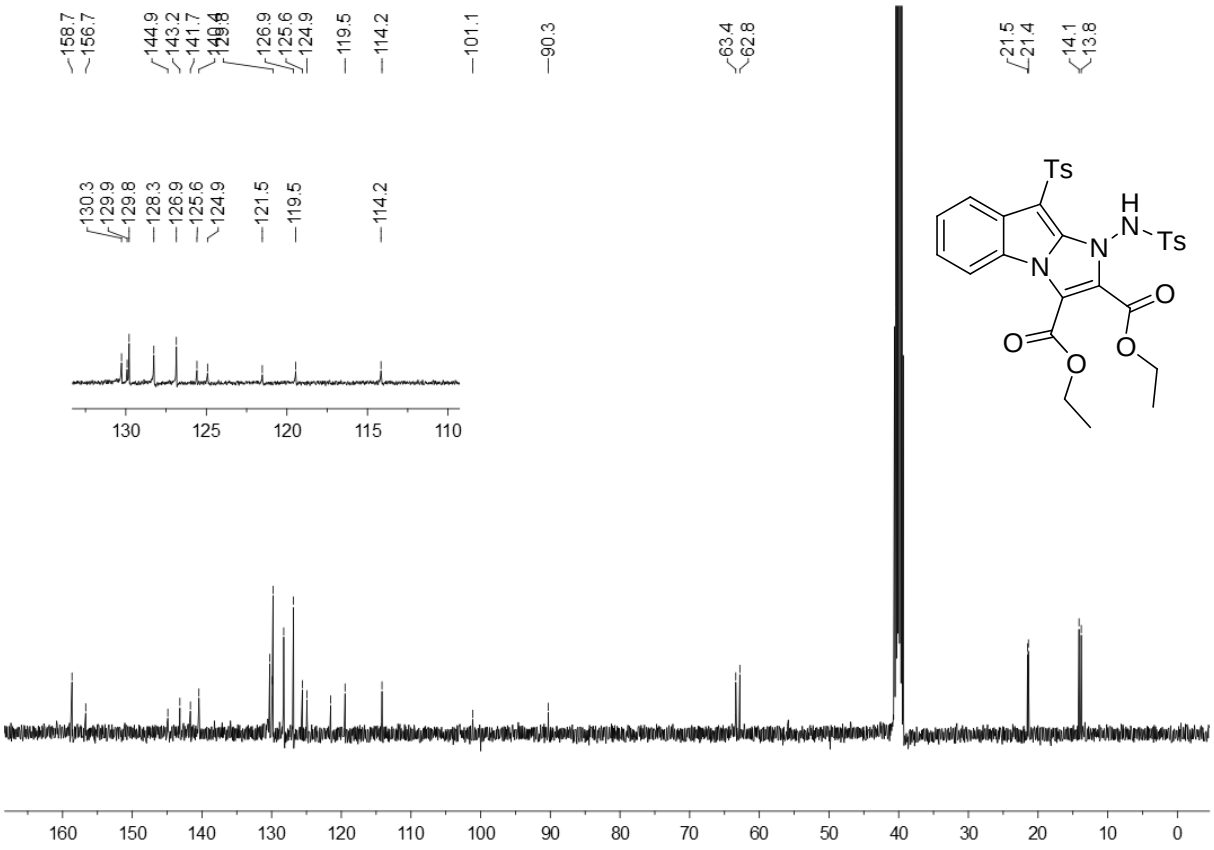
^{13}C NMR Spectrum of Compound **4e** (100Hz, DMSO-d_6)



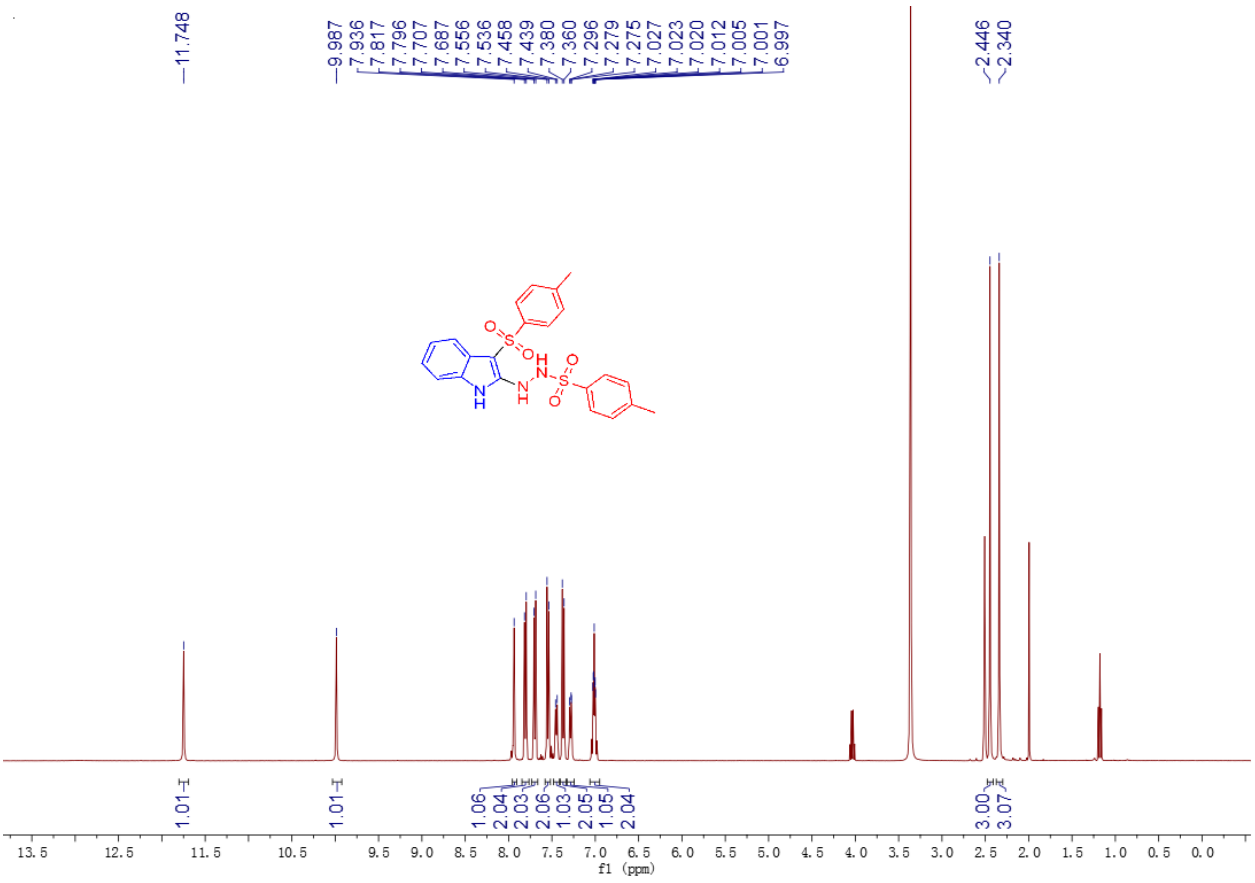
^{1}H NMR Spectrum of Compound **1o** (400Hz, DMSO-d_6)



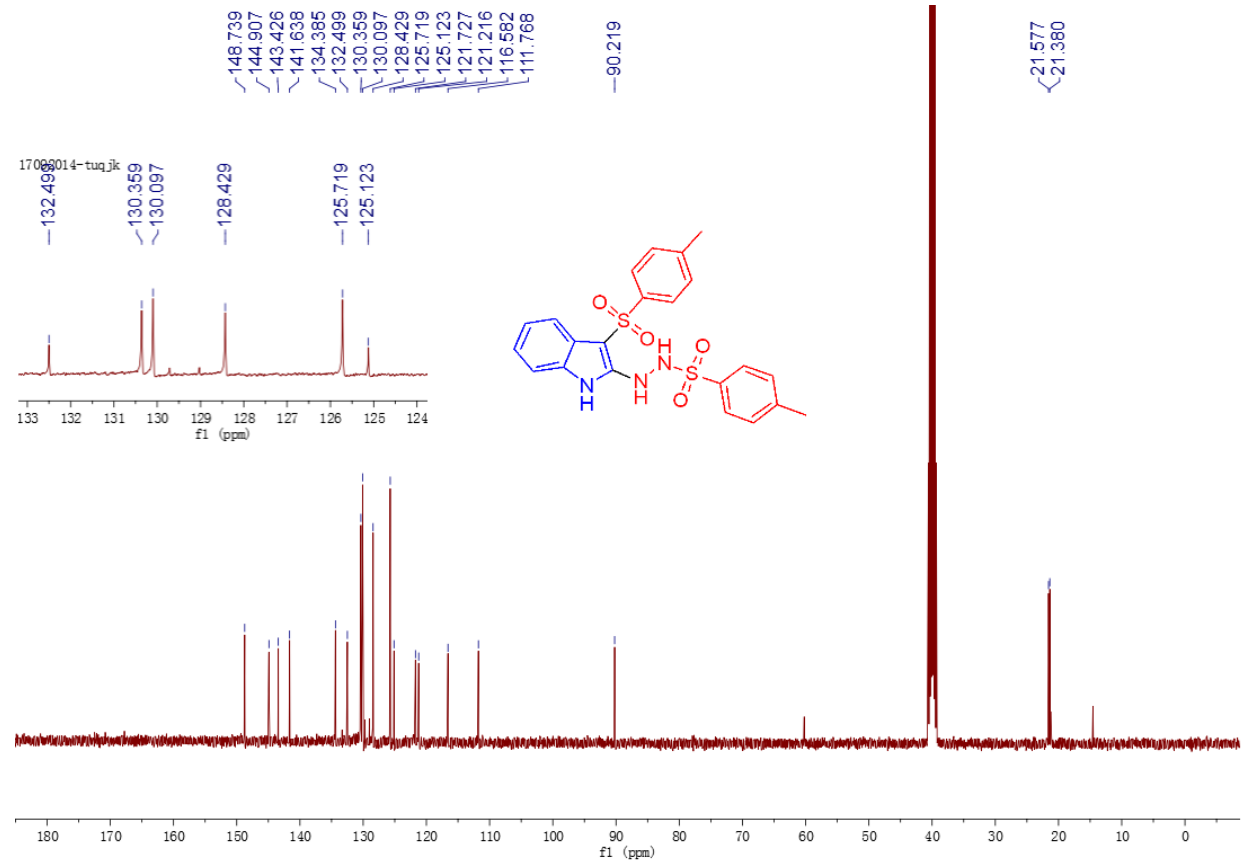
H NMR Spectrum of Compound **5** (400Hz, DMSO-d_6)



^{13}C NMR Spectrum of Compound **5** (100Hz, DMSO-d_6)



^{1}H NMR Spectrum of Compound **6** (400Hz, DMSO-d_6)



^{13}C NMR Spectrum of Compound **6** (100Hz, DMSO-d_6)