Supporting Information for

Cobalt(II)-Catalyzed Bis-isocyanides Insertion Reactions with Sulfonyl Azides *via* Nitrene Radical：Chemoselective Synthesis of The Sulfonylamidyl amide and 3-Imine Indole Derivatives

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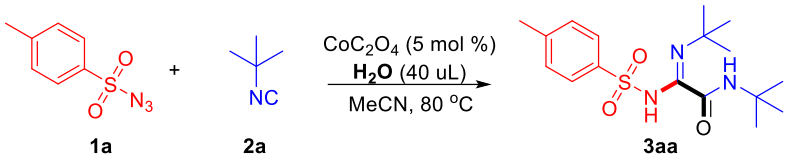
Experimental Section

General

Melting points were recorded on an Electrothermal digital melting point apparatus and were uncorrected. IR spectra were recorded on a Bruker Tensor 27 spectrophotometer. ^{1}H NMR and ^{13}C NMR spectra were recorded on a Bruker 400 MHz (^{1}H NMR) and 400 MHz (^{13}C NMR) spectrumeter using $CDCl_3$ or DMSO-d_6 as solvent and TMS as internal standard. EPR spectra were recorded on a Bruker EXM-10/2 spectrophotometer. High resolution mass spectra were obtained using GCT-TOF instrument with ESI source or EI source.

Typical procedure for sulfonylamidyl amides 3

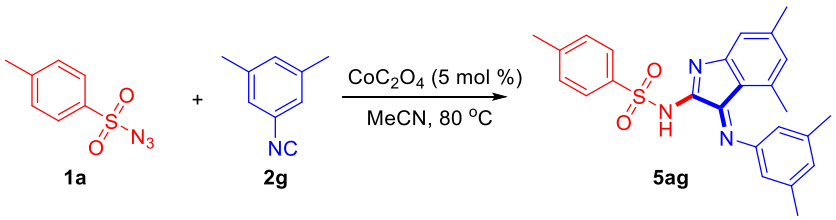
Synthesis of **3aa**



A mixture of sulfonyl azides **1a** (0.5 mmol, 98.6 mg), isonitriles **2a** (1.2 mmol, 200 uL), CoC_2O_4 (5 mol %) and MeCN (3 mL) were added into a flask and stirred at 80 °C. Then the mixture was vigorously stirred under reflux conditions monitored by TLC analysis (about 8h). After removing the solvents in vacuo, the residue was directly purified by flash column chromatography by using ethyl acetate (EA) and petroleum ether (PE) (EA/PE = 1/4) as eluents to afford pure product **3aa**.

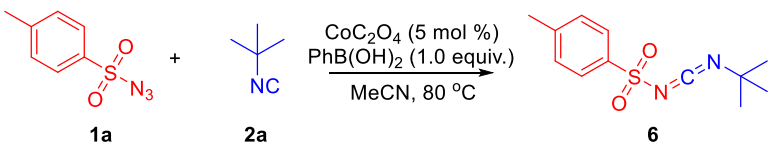
Typical procedure for 3-imine indoles 5

Synthesis of **5ag**



A mixture of sulfonyl azides **1a** (0.5 mmol, 98.6 mg), isonitriles **2g** (1.2 mmol, 157.4 mg), CoC_2O_4 (1 mol %) and MeCN (3 mL) were added into a flask and stirred at 80 °C. Then the mixture was vigorously stirred under reflux conditions monitored by TLC analysis (about 6h). After removing the solvents in vacuo, the residue was directly purified by flash column chromatography by using ethyl acetate (EA) and petroleum ether (PE) (EA/PE = 1/4) as eluents to afford pure product **5ag**.

Typical procedure for compound 6



Tosyl azide (1.0 mmol), *t*-BuNC(1.2 mmol), Phenylboronic acid (1.0 mmol), CoC_2O_4(5 mol%) were place in a reaction vessel. Acetonitrile was then addedand the

mixture heated at 80˚C for 12 h before being concentrated in vacuo to give the crude product. Products purified by column chromatography.

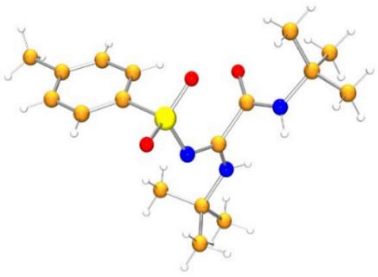


Figure S1. X-ray crystal structure of 3aa

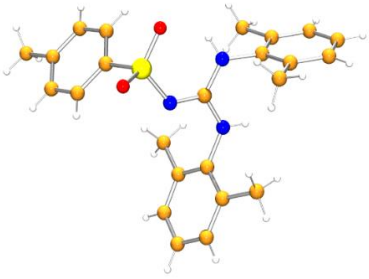


Figure S2. X-ray crystal structure of 4ad

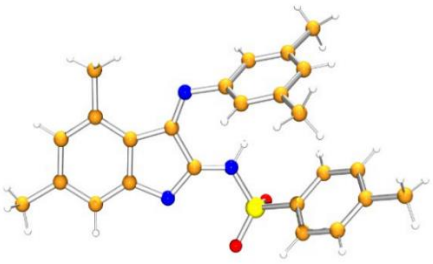


Figure S3. X-ray crystal structure of 5ag

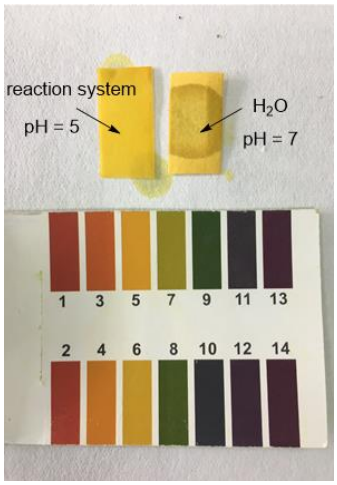
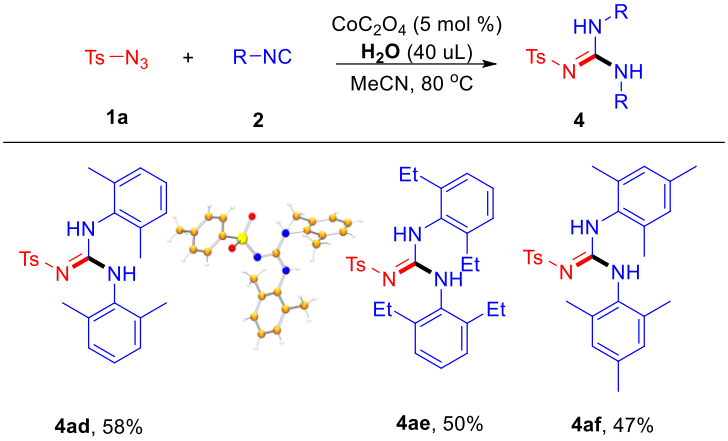


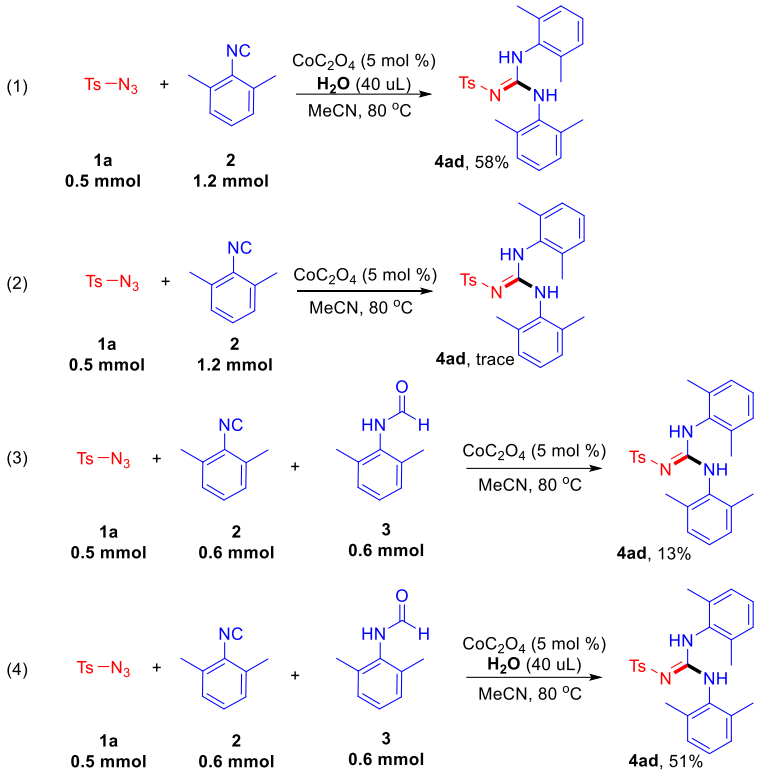
Figure S4. pH value of the reaction system.

Table S1. Synthesis of sulfonylguanidine 4[a,b].



[a]Reaction conditions: 1a (0.5 mmol), 2 (1.2 mmol), CoC_2O_4 (5 mol%), H_2O (40 uL), MeCN (3 mL), 8h, under air atmosphere. [b]Isolated yield.

Scheme S1. Control reactions for synthesis of sulfonylguanidine 4



Scheme S2. Plausible mechanism for synthesis of sulfonylguanidine 4

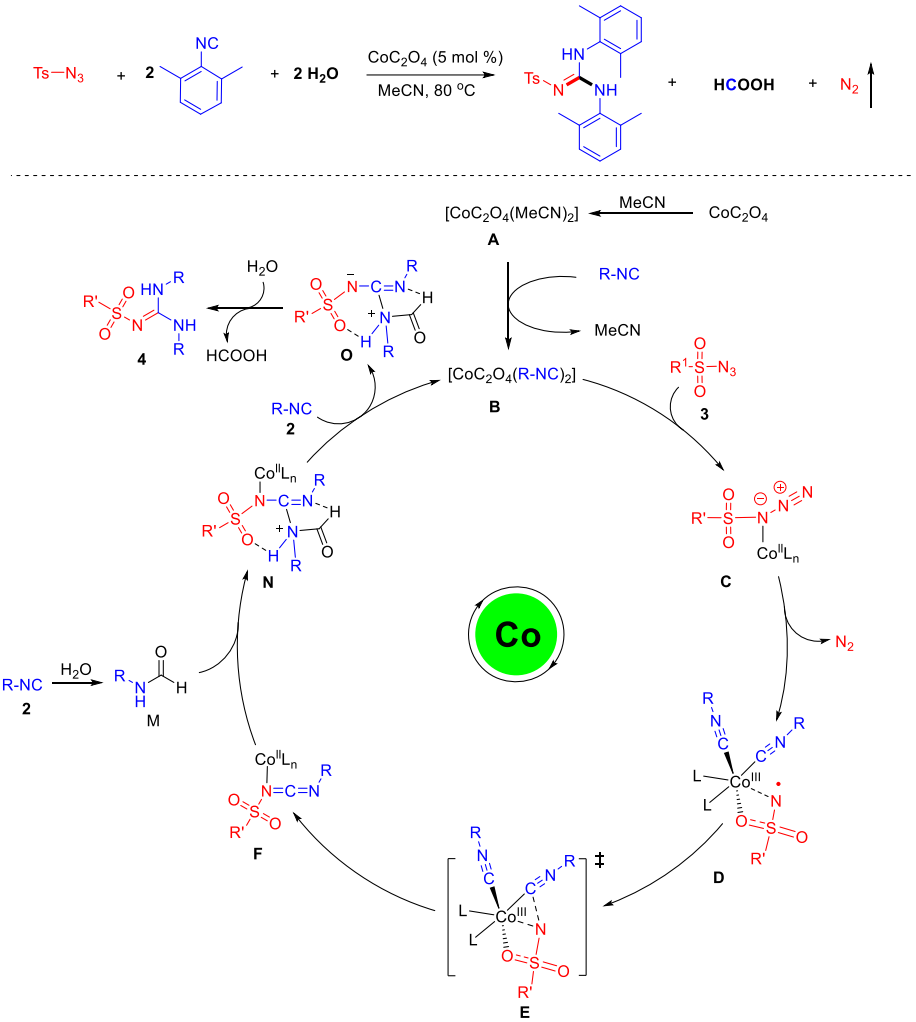
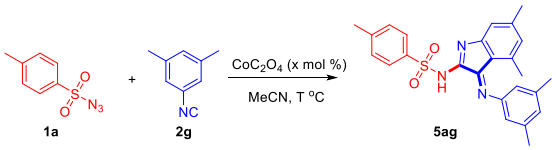


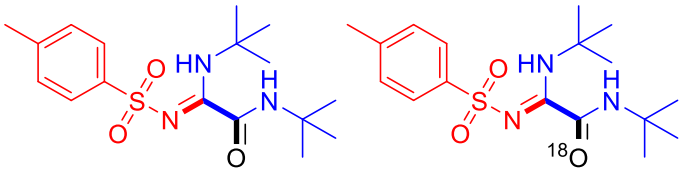
Table S2. Optimization of reaction conditions for the synthesis of 3-imine indole 5[a]



Entry	Cat. (5 mol %)	Time (h)	T (°C)	Yield (%)[b]
1	CoC_2O_4	2	80	76
2	CoC_2O_4	4	80	88
3	CoC_2O_4	6	80	97
4	CoC_2O_4	6	60	79
5	CoC_2O_4	6	40	64
6	CoC_2O_4	6	r.t.	35
7	**CoC_2O_4 (1)**	**6**	**80**	**96(91)[c]**
8	----	6	80	----

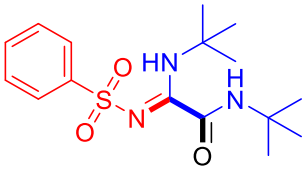
[a]Reaction conditions: **1a** (0.5 mmol), **2g** (1.2 mmol), Co catalyst (5 mol%), MeCN (3 mL) under air atmosphere. [b]The yields were determined by LC analysis using diphenyl as an internal standard. [c]Isolated yield.

Characterization Data of Compounds 3aa-6



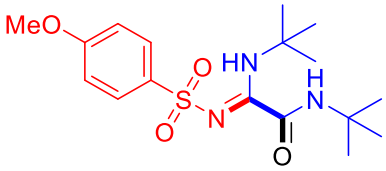
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(tosylimino)acetamide (3aa)

Yield = 50% (88.4 mg). White solid. M.p. 125.6-126.5 ℃. IR 3299, 2966, 2926, 1662, 1553, 1298, 1154, 1085, 814, 700, 665 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.70 (s, 1H), 7.81 (d, *J* = 8.3 Hz, 2H), 7.28 (d, *J* = 8.1 Hz, 2H), 7.14 (s, 1H), 2.42 (s, 3H), 1.45 (s, 9H), 1.32 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.2, 153.8, 142.0, 139.7, 128.8, 125.5, 53.1, 52.6, 27.4, 27.1, 21.0 ppm. HRMS (ESI) m/z calculated for $C_{17}H_{27}N_3O_3S$, $[M+Na]^+$ 376.1671; found 346.1663, ($^{18}O[M+Na]^+$ 378.1713; found 378.1723).



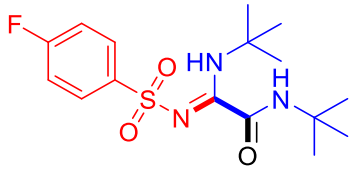
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((phenylsulfonyl)imino)acetamide (3ba)

Yield = 63% (107.5 mg). White solid. M.p. 102.4-103.0 ℃. IR 3291, 2979, 2929, 1681, 1558, 1278, 1145, 1085, 981, 744, 688, 664 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.59 (s, 1H), 7.93 – 7.89 (m, 2H), 7.50 – 7.47 (m, 2H), 7.20 (s, 1H), 1.44 (d, *J* = 2.9 Hz, 9H), 1.30 (d, *J* = 2.9 Hz, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.1, 153.9, 153.8, 142.5, 131.4, 128.2, 125.4, 53.2, 52.6, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{16}H_{25}N_3O_3S$, $[M+Na]^+$ 362.1514; found 362.1505.



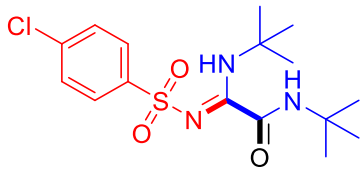
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-methoxyphenyl)sulfonyl)imino)acetamide (3ca)

Yield = 56% (104.1 mg). White solid. M.p. 118.2-119.5 ℃. IR 3333, 3299, 2974, 1683, 1548, 1367, 1281, 1247, 1142, 1017, 839, 801, 718, 690 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.62 (s, 1H), 7.84 (d, *J* = 8.9 Hz, 2H), 7.13 (s, 1H), 6.94 (d, *J* = 8.9 Hz, 2H), 3.84 (s, 3H), 1.43 (s, 9H), 1.30 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 161.7, 158.3, 153.7, 134.6, 127.5, 113.3, 55.0, 53.1, 52.5, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{17}H_{27}N_3O_4S$, $[M+Na]^+$ 392.1620; found 392.1609.



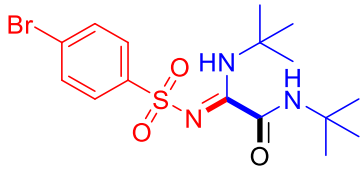
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-fluorophenyl)sulfonyl)imino)acetamide (3da)

Yield = 72% (127.9 mg). White solid. M.p. 94.8-95.6 ℃. IR 3359, 3259, 2986, 2970, 1682, 1570, 1270, 1225, 1144, 1079, 841, 732, 666 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.53 (s, 1H), 7.93 (dd, *J* = 8.9, 5.1 Hz, 2H), 7.19 – 7.13 (m, 3H), 1.45 (s, 9H), 1.31 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.3, 162.8, 158.1, 153.9, 128.1 (d, *J* = 9.2 Hz), 115.3 (d, *J* = 22.5 Hz), 53.2, 52.7, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{16}H_{24}FN_3O_3S$, $[M+Na]^+$ 380.1420; found 380.1408.



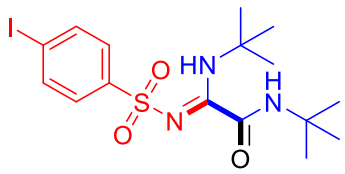
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-chlorophenyl)sulfonyl)imino)acetamide (3ea)

Yield = 86% (159.8 mg). White solid. M.p. 156.5-157.2 ℃. IR 3497, 3336, 2970, 2932, 1672, 1527, 1285, 1141, 1085, 994, 758, 673, 625 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.49 (s, 1H), 7.89 – 7.82 (m, 2H), 7.49 – 7.42 (m, 2H), 7.20 (s, 1H), 1.45 (s, 9H), 1.30 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.0, 154.0, 141.1, 137.8, 128.5, 127.0, 53.3, 52.7, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{16}H_{24}ClN_3O_3S$, $[M+Na]^+$ 396.1125; found 396.1115.



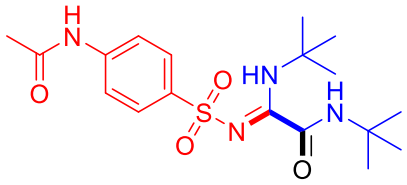
(Z)-2-(((4-bromophenyl)sulfonyl)imino)-N-(tert-butyl)-2-(tert-butylamino)acetamide (3fa)

Yield = 88% (185.1 mg). White solid. M.p. 105.6-106.8 ℃. IR 3335, 3234, 2969, 2931, 1672, 1526, 1365, 1285, 1140, 1087, 994, 817, 747, 670 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.49 (s, 1H), 7.81 – 7.77 (m, 2H), 7.64 – 7.61 (m, 2H), 7.18 (s, 1H), 1.45 (s, 9H), 1.31 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.0, 154.0, 141.6, 131.5, 127.1, 126.2, 53.3, 52.7, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{16}H_{24}BrN_3O_3S$, $[M+Na]^+$ 440.0619; found 440.0613.



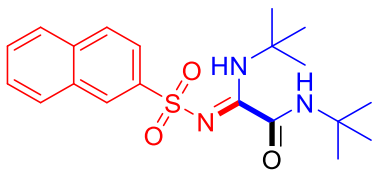
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-iodophenyl)sulfonyl)imino)acetamide (3ga)

Yield = 83% (194.3 mg). White solid. M.p. 161.0-162.0 ℃. IR 3314, 3228, 2967, 2926, 1646, 1540, 1366, 1284, 1145, 1087, 992, 799, 709, 670 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.47 (s, 1H), 7.84 (d, *J* = 8.6 Hz, 2H), 7.63 (d, *J* = 8.5 Hz, 2H), 7.20 (s, 1H), 1.44 (s, 9H), 1.30 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.1, 154.0, 142.3, 137.4, 127.0, 98.6, 53.3, 52.7, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{16}H_{24}IN_3O_3S$, $[M+Na]^+$ 488.0481; found 488.0472.



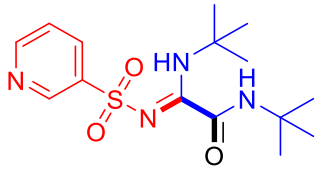
(Z)-2-(((4-acetamidophenyl)sulfonyl)imino)-N-(tert-butyl)-2-(tert-butylamino)acetamide (3ha)

Yield = 61% (120.2 mg). White solid. M.p.238.0-238.1 ℃. IR 3303, 3258, 3074, 2968, 2929, 1665, 1572, 1530, 1266, 1146, 1092, 985, 836, 744, 669, 627 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.54 (s, 1H), 7.93 (s, 1H), 7.83 – 7.79 (m, 2H), 7.62 (d, *J* = 8.4 Hz, 2H), 7.13 (s, 1H), 2.17 (s, 3H), 1.43 (s, 9H), 1.30 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 168.2, 158.2, 153.8, 140.9, 137.3, 126.6, 118.5, 53.2, 52.6, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{18}H_{28}N_4O_4S$, $[M+Na]^+$ 419.1729; found 419.1720.



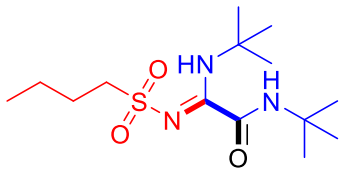
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((naphthalen-2-ylsulfonyl)imino)acetamide (3ia)

Yield = 63% (123.2 mg). White solid. M.p. 124.1-125.6 ℃. IR 3315, 3224, 2972, 2927, 1650, 1557, 1366, 1276, 1145, 1122, 1027, 995, 861, 819, 748, 701, 650 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 8.44 (d, *J* = 1.8 Hz, 1H), 7.93 – 7.85 (m, 4H), 7.60 – 7.53 (m, 2H), 7.18 (s, 1H), 1.44 (s, 9H), 1.27 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.4, 139.4, 134.0, 131.5, 128.7, 128.5, 127.9, 127.3, 126.8, 125.9, 121.7, 53.2, 52.5, 27.5, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{20}H_{27}N_3O_3S$, $[M+Na]^+$ 412.1671; found 412.1658.



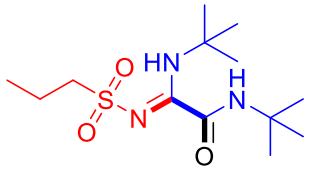
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((pyridin-3-ylsulfonyl)imino)acetamide (3ja)

Yield = 41% (69.8 mg). White solid. M.p. 146.1-147.3 ℃. IR 3307, 2968, 2902, 1686, 1536, 1294, 1160, 1107, 997, 750, 704, 670, 628 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.17 (s, 1H), 8.77 (d, *J* = 4.9 Hz, 1H), 8.45 (s, 1H), 8.20 (d, *J* = 8.1 Hz, 1H), 7.44 (dd, *J* = 8.0, 4.9 Hz, 1H), 7.25 (d, *J* = 8.2 Hz, 1H), 1.46 (s, 9H), 1.32 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.9, 154.2, 152.1, 146.8, 139.0, 133.1, 122.9, 53.4, 52.8, 27.4, 27.1 ppm. HRMS (ESI) m/z calculated for $C_{15}H_{24}N_4O_3S$, $[M+H]^+$ 341.1647; found 341.1637.



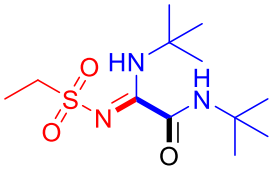
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((butylsulfonyl)imino)acetamide (3ka)

Yield = 71% (113.4 mg). White solid. M.p. 54.6-55.2 ℃. IR 3293, 3226, 2964, 2933, 1649, 1605, 1551, 1366, 1268, 1215, 1119, 997, 802, 646 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.54 (s, 1H), 7.08 (s, 1H), 3.19 – 3.08 (m, 2H), 1.88 (tt, *J* = 7.9, 6.3 Hz, 2H), 1.41 (s, 20H), 0.95 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.3, 154.5, 54.8, 52.9, 52.5, 27.4, 27.3, 25.1, 21.0, 13.1 ppm. HRMS (ESI) m/z calculated for $C_{14}H_{29}N_3O_3S$, $[M+Na]^+$ 342.1827; found 342.1832.



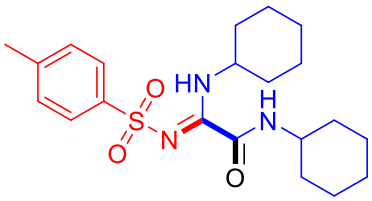
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((propylsulfonyl)imino)acetamide (3la)

Yield = 74% (113.0 mg). White solid. M.p. 58.2-59.0 ℃. IR 3301, 3231, 2971, 2925, 1670, 1535, 1368, 1280, 1243, 1115, 993, 865, 734, 656 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.07 (s, 1H), 3.15 – 3.05 (m, 2H), 1.98 – 1.88 (m, 2H), 1.41 (s, 18H), 1.07 (t, *J* = 7.5 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.2, 154.5, 56.8, 52.9, 52.5, 27.4, 27.3, 16.9, 12.6 ppm. HRMS (ESI) m/z calculated for $C_{13}H_{27}N_3O_3S$, $[M+Na]^+$ 328.1671; found 328.1663.



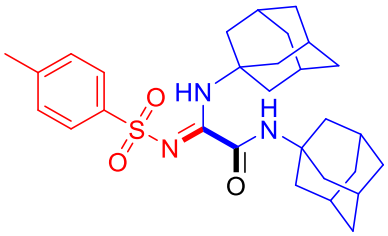
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((ethylsulfonyl)imino)acetamide (3ma)

Yield = 75% (109.3 mg). White solid. M.p. 102.5-103.0 ℃. IR 3292, 3074, 2972, 2927, 1672, 1545, 1369, 1270, 1123, 994, 857, 785, 745, 656 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.57 (s, 1H), 7.09 (s, 1H), 3.15 (q, *J* = 7.4 Hz, 2H), 1.45 (d, *J* = 7.4 Hz, 3H), 1.41 (s, 18H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.2, 154.6, 52.9, 52.5, 49.4, 27.4, 27.3, 7.9 ppm. HRMS (ESI) m/z calculated for $C_{12}H_{25}N_3O_3S$, $[M+Na]^+$ 314.1514; found 314.1507.



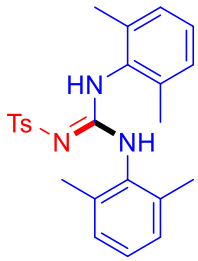
(Z)-N-cyclohexyl-2-(cyclohexylamino)-2-(tosylimino)acetamide (3ab)

Yield = 42% (85.2 mg). White solid. M.p. 170.1-171.2 ℃. IR 3314, 2976, 2911, 1669, 1540, 1279, 1144, 1088, 809, 711, 689, 652 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.74 (t, *J* = 9.4 Hz, 2H), 7.22 (d, *J* = 8.1 Hz, 2H), 4.21 (d, *J* = 57.2 Hz, 1H), 3.63 (d, *J* = 28.7 Hz, 1H), 2.35 (s, 3H), 2.03 – 0.99 (m, 22H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 158.4, 158.1, 154.2, 149.3, 142.9, 142.0, 140.0, 138.2, 129.0, 128.8, 125.9, 125.6, 53.5, 52.1, 49.1, 48.6, 33.5, 32.0, 31.9, 31.6, 24.8, 24.7, 24.6, 24.3, 24.0, 23.9, 23.8, 21.1, 21.0 ppm. HRMS (ESI) m/z calculated for $C_{21}H_{31}N_3O_3S$, $[M+H]^+$ 406.2164; found 406.2153.



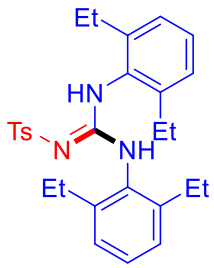
(Z)-N-((1s,3S)-adamantan-1-yl)-2-(((3S,5S,7S)-adamantan-1-yl)amino)-2-(tosylimino)acetamide (3ac)

Yield = 48% (122.3 mg). White solid. M.p. 183.2-184.0 ℃. IR 3316, 2970, 2905, 1665, 1535, 1278, 1140, 1084, 808, 710, 687, 662 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.49 (s, 1H), 7.83 (d, *J* = 8.0 Hz, 2H), 7.28 (d, *J* = 7.8 Hz, 2H), 7.05 (s, 1H), 2.42 (s, 3H), 2.14 – 1.97 (m, 20H), 1.71 – 1.58 (m, 10H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.3, 152.7, 141.4, 139.3, 128.1, 124.9, 53.3, 52.8, 39.5, 38.9, 35.2, 35.1, 28.3, 28.1, 20.5 ppm. HRMS (ESI) m/z calculated for $C_{29}H_{39}N_3O_3S$, $[M+H]^+$ 510.2790; found 510.2775.



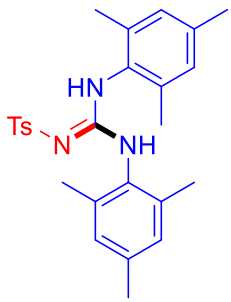
N-(bis((2,6-dimethylphenyl)amino)methylene)-4-methylbenzenesulfonamide (4ad)

Yield = 58% (122.3 mg). White solid. M.p. 106.9-108.4 ℃. IR 3361, 3262, 2987, 2901, 1599, 1580, 1519, 1379, 1256, 1138, 1088, 902, 780, 713, 686 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.88 (s, 1H), 7.75 (d, *J* = 7.9 Hz, 2H), 7.25 – 7.11 (m, 5H), 7.02 (d, *J* = 7.4 Hz, 1H), 6.95 (d, *J* = 7.5 Hz, 2H), 5.41 (s, 1H), 2.40 (s, 3H), 2.31 (s, 6H), 2.02 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.2, 141.5, 140.5, 136.8, 135.6, 132.5, 131.7, 128.8, 128.7, 128.5, 127.7, 127.3, 125.8, 21.0, 18.0, 17.6 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{27}N_3O_2S$, $[M+H]^+$ 422.1902; found 422.1912.



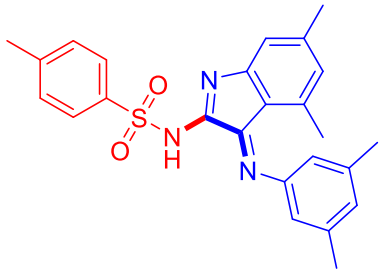
N-(bis((2,6-diethylphenyl)amino)methylene)-4-methylbenzenesulfonamide (4ae)

Yield = 50% (119.4 mg). White solid. M.p. 146.3-147.6 ℃. IR 3320, 3289, 2987, 2971, 1567, 1521, 1376, 1270, 1127, 1106, 1061, 847, 774, 696, 674 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.94 (s, 1H), 7.79 – 7.73 (m, 2H), 7.32 (dd, *J* = 8.3, 6.9 Hz, 1H), 7.22 (d, *J* = 7.6 Hz, 4H), 7.16 (t, *J* = 7.6 Hz, 1H), 7.01 (d, *J* = 7.6 Hz, 2H), 5.37 (s, 1H), 2.77 (dq, *J* = 15.0, 7.5 Hz, 2H), 2.59 (dq, *J* = 15.0, 7.6 Hz, 2H), 2.41 (s, 3H), 2.36 (q, *J* = 7.5 Hz, 4H), 1.25 (t, *J* = 7.5 Hz, 6H), 0.98 (t, *J* = 7.6 Hz, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.8, 142.6, 141.4, 141.3, 140.5, 131.2, 130.4, 129.2, 128.4, 127.9, 126.8, 125.8, 125.8, 24.2, 23.9, 21.0, 14.3, 13.8 ppm. HRMS (ESI) m/z calculated for $C_{28}H_{35}N_3O_2S$, $[M+H]^+$ 478.2528; found 478.2515.



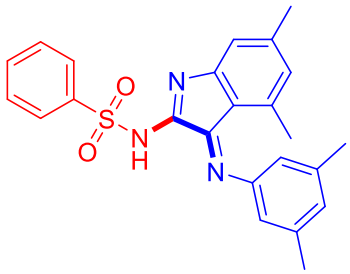
N-(bis(mesitylamino)methylene)-4-methylbenzenesulfonamide (4af)

Yield = 47% (105.7 mg). White solid. M.p. 198.2-199.8 ℃. IR 3320, 3289, 2987, 2971, 1567, 1521, 1376, 1270, 1127, 1106, 1061, 847, 774, 696, 674 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 8.80 (s, 1H), 7.79 – 7.74 (m, 2H), 7.22 (d, *J* = 8.0 Hz, 2H), 6.97 (s, 2H), 6.78 (s, 2H), 5.37 (s, 1H), 2.40 (s, 3H), 2.26 (t, *J* = 13.6 Hz, 12H), 1.98 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 141.3, 140.6, 138.6, 136.9, 136.4, 135.2, 129.8, 129.4, 129.0, 128.5, 128.4, 125.8, 21.0, 20.5, 20.4, 17.9, 17.5 ppm. HRMS (ESI) m/z calculated for $C_{26}H_{31}N_3O_2S$, $[M+H]^+$ 450.2215; found 450.2203.



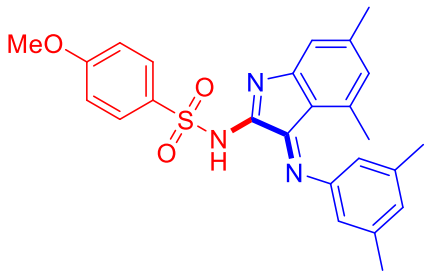
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-methylbenzenesulfonamide (5ag)

Yield = 91% (196.4 mg). Red solid. M.p. 215.2-216.8 ℃. IR 3321, 2919, 2855, 1650, 1584, 1450, 1264, 1132, 1090, 1064, 826, 754, 684, 662 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.57 (s, 1H), 7.46 – 7.35 (m, 2H), 7.17 (d, *J* = 7.9 Hz, 2H), 6.72 (d, *J* = 12.5 Hz, 2H), 6.60 (s, 1H), 6.41 (s, 2H), 2.55 (s, 3H), 2.41 (s, 3H), 2.33 (s, 3H), 2.20 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 149.8, 147.0, 144.5, 143.7, 142.6, 138.3, 137.7, 137.6, 128.5, 126.9, 125.9, 124.9, 116.1, 114.6, 109.2, 21.6, 21.1, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{25}H_{25}N_3O_2S$, $[M+H]^+$ 432.1746; found 432.1752.



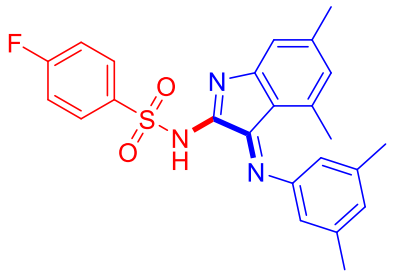
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benzenesulfonamide (5bg)

Yield = 94% (196.2 mg). Red solid. M.p. 210.3-210.6 ℃. IR 3267, 2964, 2918, 1655, 1621, 1585, 1445, 1275, 1139, 1091, 1067, 826, 758, 687, 615 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.50 (s, 1H), 7.56 – 7.46 (m, 3H), 7.42 – 7.34 (m, 2H), 6.75 (s, 1H), 6.71 (s, 1H), 6.60 (s, 1H), 6.41 (s, 2H), 2.55 (s, 3H), 2.35 (s, 3H), 2.20 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.5, 149.8, 147.2, 144.4, 143.8, 140.5, 138.3, 137.6, 131.9, 127.9, 127.0, 125.9, 125.0, 116.1, 114.6, 109.2, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{23}N_3O_2S$, $[M+Na]^+$ 440.1409; found 440.1403.



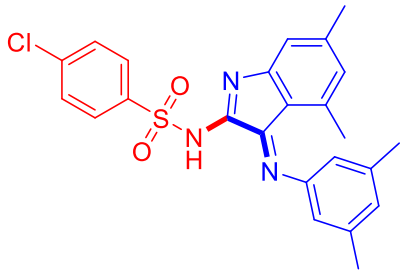
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-methoxybenzenesulfonamide (5cg)

Yield = 96% (214.8 mg). Red solid. M.p. 203.7-204.4 ℃. IR 3301, 2962, 2918, 1620, 1585, 1455, 1271, 1116, 961, 830, 753, 613 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.62 (s, 1H), 7.46 (d, *J* = 8.5 Hz, 2H), 6.84 (d, *J* = 8.4 Hz, 2H), 6.72 (d, *J* = 7.2 Hz, 2H), 6.60 (s, 1H), 6.41 (s, 2H), 3.85 (s, 3H), 2.54 (s, 3H), 2.31 (s, 3H), 2.21 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 162.2, 153.7, 149.9, 146.8, 144.6, 143.7, 138.2, 137.6, 132.5, 128.1, 126.8, 124.9, 116.1, 114.7, 113.1, 109.3, 55.1, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{25}H_{25}N_3O_3S$, $[M+Na]^+$ 470.1514; found 470.1505.



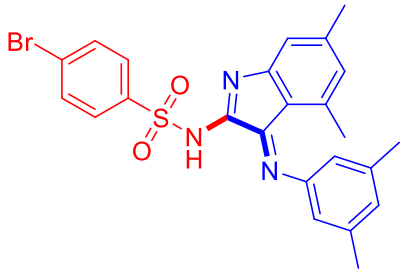
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-fluorobenzenesulfonamide (5dg)

Yield = 97% (211.2 mg). Red solid. M.p. 194.2-196.6 ℃. IR 3305, 2967, 2917, 1620, 1590, 1456, 1285, 1111, 989, 964, 823, 748, 612 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.45 (s, 1H), 7.53 – 7.44 (m, 2H), 7.04 (t, *J* = 8.6 Hz, 2H), 6.74 (d, *J* = 17.7 Hz, 2H), 6.60 (s, 1H), 6.41 (s, 2H), 2.55 (s, 3H), 2.35 (s, 3H), 2.21 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.7, 163.1, 153.5, 149.9, 147.0, 144.4, 143.8, 138.4, 137.7, 136.7 (d, *J* = 3.2 Hz), 128.6 (d, *J* = 9.2 Hz), 127.1, 124.8, 116.1, 115.2, 114.9, 114.5, 109.3, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{22}FN_3O_2S$, $[M+Na]^+$ 458.1314; found 458.1328.



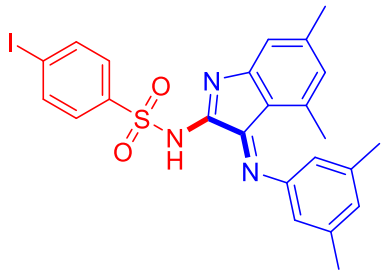
(E)-4-chloro-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benzenesulfonamide (5eg)

Yield = 95% (214.7 mg). Red solid. M.p. 214.1-216.1 ℃. IR 3284, 2920, 1651, 1616, 1584, 1456, 1296, 1115, 961, 823, 749, 729, 691 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.41 (d, *J* = 8.2 Hz, 2H), 7.34 (d, *J* = 8.2 Hz, 2H), 6.74 (d, *J* = 12.5 Hz, 2H), 6.61 (s, 1H), 6.41 (s, 2H), 2.55 (s, 3H), 2.32 (s, 3H), 2.22 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.5, 149.9, 147.1, 144.4, 143.8, 139.1, 138.4, 138.3, 137.7, 128.2, 127.4, 127.1, 124.9, 116.1, 114.5, 109.4, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{22}ClN_3O_2S$, $[M+Na]^+$ 474.1019; found 474.1027.



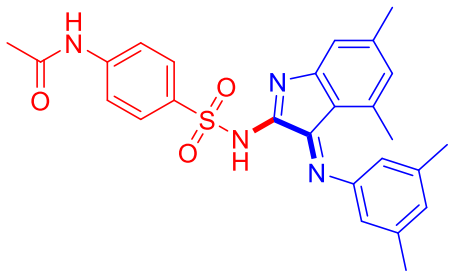
(E)-4-bromo-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benzenesulfonamide (5fg)

Yield = 94% (233.3 mg). Red solid. M.p. 205.9-207.4 ℃. IR 3315, 2972, 2915, 1650, 1617, 1595, 1495, 1286, 1251, 1131, 1064, 1021, 847, 820, 754, 687 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.43 (d, *J* = 6.2 Hz, 1H), 7.53 – 7.47 (m, 2H), 7.33 (d, *J* = 8.5 Hz, 2H), 6.74 (d, *J* = 17.5 Hz, 2H), 6.60 (s, 1H), 6.40 (s, 2H), 2.55 (s, 3H), 2.34 (d, *J* = 2.1 Hz, 3H), 2.21 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.4, 149.9, 147.1, 144.3, 143.8, 139.5, 138.4, 137.7, 131.2, 127.5, 127.1, 126.8, 124.9, 116.1, 114.5, 109.3, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{22}BrN_3O_2S$, $[M+Na]^+$ 518.0514; found 518.0501.



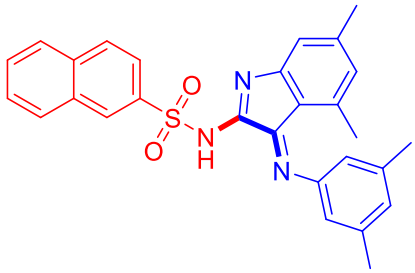
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-iodobenzenesulfonamide (5gg)

Yield = 81% (220.1 mg). Red solid. M.p. 180.2-181.5 ℃. IR 3334, 2972, 2920, 1649, 1587, 1489, 1301, 1267, 1235, 1133, 1063, 820, 754, 686, 664 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.51 (s, 1H), 7.75 – 7.69 (m, 2H), 7.21 – 7.15 (m, 2H), 6.74 (d, *J* = 16.2 Hz, 2H), 6.60 (s, 1H), 6.40 (d, *J* = 1.4 Hz, 2H), 2.55 (s, 3H), 2.33 (s, 3H), 2.21 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.4, 149.9, 147.1, 144.3, 143.8, 140.2, 138.4, 137.7, 137.2, 127.3, 127.1, 124.9, 116.1, 114.5, 109.4, 99.2, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{24}H_{22}IN_3O_2S$, $[M+Na]^+$ 566.0375; found 566.0380.



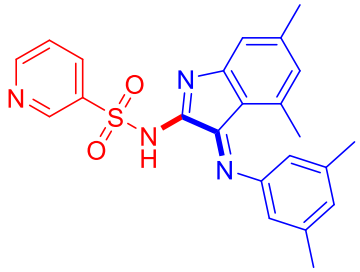
(E)-N-(4-(N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)sulfamoyl)phenyl)acetamide (5hg)

Yield = 96% (227.8 mg). Red solid. M.p. 196.2-197.4 ℃. IR 3327, 2966, 2918, 1650, 1582, 1452, 1299, 1266, 1143, 1065, 816, 756, 741, 623 cm^{-1}. ^{1}H NMR (400 MHz, DMSO-*d*$_6$) δ 11.39 (s, 1H), 10.29 (s, 1H), 7.65 (d, *J* = 8.4 Hz, 2H), 7.28 (d, *J* = 8.4 Hz, 2H), 6.93 (s, 1H), 6.81 – 6.71 (m, 1H), 6.64 (s, 1H), 6.38 (s, 2H), 2.45 (s, 3H), 2.31 (s, 3H), 2.12 (d, *J* = 19.3 Hz, 9H). ^{13}C NMR (101 MHz, DMSO) δ 168.9, 154.7, 150.1, 146.5, 146.2, 143.9, 142.7, 137.5, 137.3, 135.2, 128.9, 126.7, 124.8, 119.1, 117.9, 116.1, 114.8, 110.8, 24.1, 21.7, 20.9, 18.4 ppm. HRMS (ESI) m/z calculated for $C_{26}H_{26}N_4O_3S$, $[M+Na]^+$ 497.1623; found 497.1612.



(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)naphthalene-2-sulfonamide (5ig)

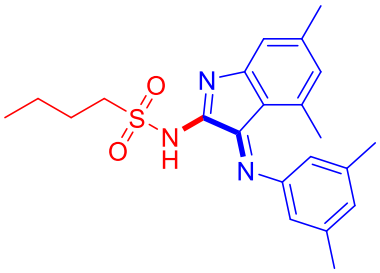
Yield = 94% (219.8 mg). White solid. M.p. 195.6-197.6 ℃. IR 3330, 2955, 2918, 1649, 1584, 1453, 1299, 1267, 1143, 1089, 1064, 817, 751, 676, 655, 632 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.75 (s, 1H), 8.17 (s, 1H), 7.90 – 7.78 (m, 3H), 7.59 (p, *J* = 6.9 Hz, 2H), 7.45 (d, *J* = 8.6 Hz, 1H), 6.73 – 6.58 (m, 3H), 6.39 (s, 2H), 2.52 (s, 3H), 2.26 (s, 3H), 2.08 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 149.7, 147.1, 144.5, 143.7, 138.2, 137.6, 137.5, 134.3, 131.4, 128.8, 128.2, 128.2, 127.3, 127.0, 126.7, 126.7, 125.1, 121.9, 116.1, 114.7, 109.4, 21.5, 20.7, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{28}H_{25}N_3O_2S$, $[M+Na]^+$ 490.1565; found 490.1568.



(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)pyridine-3-sulf

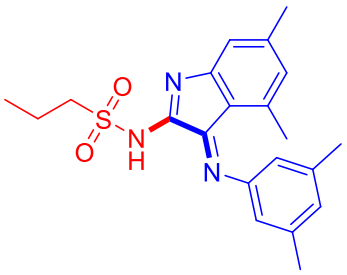
onamide (5jg)

Yield = 93% (194.6 mg). Red solid. M.p. 184.5-186.7 ℃. IR 3323, 2968, 2913, 1650, 1618, 1587, 1454, 1291, 1140, 1089, 991, 816, 759, 732, 621 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.50 (s, 1H), 8.81 – 8.68 (m, 2H), 7.67 (dt, *J* = 8.0, 2.0 Hz, 1H), 7.30 (dd, *J* = 8.0, 4.9 Hz, 1H), 6.75 (d, *J* = 18.1 Hz, 2H), 6.62 (s, 1H), 6.40 (s, 2H), 2.55 (s, 3H), 2.35 (s, 3H), 2.20 (s, 6H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.3, 152.4, 149.8, 147.2, 146.7, 144.1, 144.1, 143.9, 138.5, 137.8, 137.1, 133.7, 127.3, 125.1, 122.6, 116.0, 114.4, 109.4, 109.4, 21.6, 20.8, 18.5 ppm. HRMS (ESI) m/z calculated for $C_{23}H_{22}N_4O_2S$, $[M+Na]^+$ 441.1361; found 441.1367.



(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)butane-1-sulfo namide (5kg)

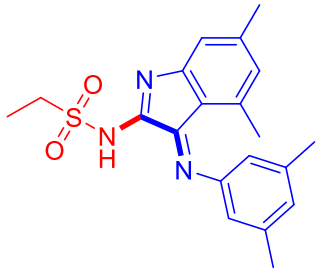
Yield = 88% (174.9 mg). Red solid. M.p. 148.3-150.7 ℃. IR 3337, 2971, 2912, 1650, 1614, 1592, 1455, 1266, 1116, 1065, 958, 874, 816, 758, 686 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.17 (s, 1H), 6.73 (d, *J* = 16.1 Hz, 2H), 6.57 (d, *J* = 3.1 Hz, 1H), 6.48 (s, 2H), 2.79 – 2.71 (m, 2H), 2.56 (s, 3H), 2.35 (s, 3H), 2.29 (s, 6H), 1.39 (tt, *J* = 7.8, 5.8 Hz, 2H), 1.27 (q, *J* = 7.4 Hz, 2H), 0.88 (t, *J* = 7.2 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 150.0, 147.6, 144.5, 143.7, 138.3, 137.5, 126.9, 125.0, 116.1, 114.5, 109.1, 53.7, 24.6, 21.6, 21.0, 20.8, 18.5, 13.0 ppm. HRMS (ESI) m/z calculated for $C_{22}H_{27}N_3O_2S$, $[M+Na]^+$ 420.1722; found 420.1723.



(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)propane-1-sulf onamide (5lg)

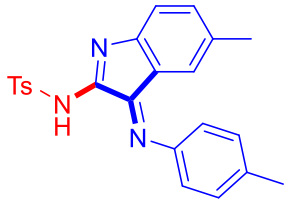
Yield = 77% (147.7 mg). Red solid. M.p. 138.1-140.3 ℃. IR 3352, 2971, 2917, 1712, 1693, 1589, 1524, 1312, 1257, 1134, 1068, 838, 765, 724, 623 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.35 – 9.07 (m, 1H), 6.73 (d, *J* = 13.5 Hz, 2H), 6.57 (d, *J* = 4.7 Hz, 1H), 6.47 (s, 2H), 2.76 – 2.68 (m, 2H), 2.56 (s, 3H), 2.35 (s, 3H), 2.29 (s, 6H), 1.49 – 1.40 (m, 2H), 0.88 (t, *J* = 7.4 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.7, 150.1, 147.6, 144.5, 143.7, 138.3, 137.6, 126.9, 124.8, 116.1, 114.4, 109.1, 55.6, 21.6, 20.8, 18.5, 16.4, 12.2 ppm. HRMS (ESI) m/z calculated for $C_{21}H_{25}N_3O_2S$, $[M+H]^+$

384.1746; found 384.1741.



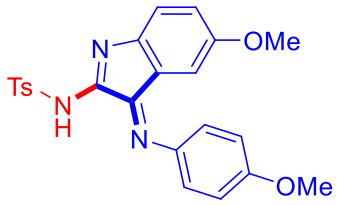
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)ethanesulfonamide (5mg)

Yield = 65% (120.1 mg). Red solid. M.p. 174.9-176.2 ℃. IR 3317, 2969, 2916, 1624, 1585, 1276, 1164, 1141, 1107, 1072, 961, 819, 766, 703, 623 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.20 (s, 1H), 6.73 (d, *J* = 17.3 Hz, 2H), 6.57 (s, 1H), 6.48 (d, *J* = 1.4 Hz, 2H), 2.79 (q, *J* = 7.4 Hz, 2H), 2.56 (s, 3H), 2.35 (s, 3H), 2.29 (s, 6H), 1.04 (t, *J* = 7.3 Hz, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 153.6, 150.0, 147.9, 144.4, 143.8, 138.3, 137.6, 126.9, 125.0, 116.1, 114.5, 109.1, 48.3, 21.6, 20.8, 18.5, 7.2 ppm. HRMS (ESI) m/z calculated for $C_{20}H_{23}N_3O_2S$, $[M+Na]^+$ 392.1409; found 392.1406.



(E)-4-methyl-N-(5-methyl-3-(p-tolylimino)-3H-indol-2-yl)benzenesulfonamide (5ah)

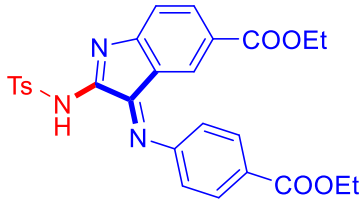
Yield = 87% (175.5 mg). Red solid. M.p. 191.3-192.6 ℃. IR 3326, 2956, 2921, 1656, 1612, 1479, 1281, 1132, 1081, 809, 784, 665 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 10.24 (s, 1H), 8.07 – 7.81 (m, 2H), 7.33 – 6.81 (m, 8H), 6.52 (s, 1H), 2.49 – 2.30 (m, 6H), 2.05 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.2, 155.2, 147.0, 143.3, 143.2, 137.5, 134.8, 134.2, 132.7, 129.3, 129.0, 126.8, 126.1, 117.5, 115.5, 111.7, 21.1, 20.6, 20.5 ppm. HRMS (ESI) m/z calculated for $C_{23}H_{21}N_3O_2S$, $[M+H]^+$ 404.1433; found 404.1446.



(E)-N-(5-methoxy-3-((4-methoxyphenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5ai)

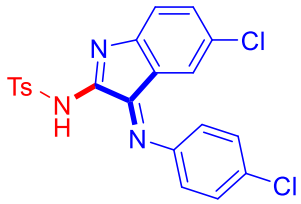
Yield = 92% (200.3 mg). Red solid. M.p. 204.5-205.2 ℃. IR 3295, 2957, 2910, 1606, 1485, 1321, 1285, 1241, 1150, 1083, 1023, 815, 770, 726, 670 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 10.20 (s, 1H), 7.96 (d, *J* = 8.2 Hz, 2H), 7.29 (d, *J* = 8.0 Hz,

2H), 7.00 – 6.92 (m, 5H), 6.83 (dd, *J* = 8.7, 2.6 Hz, 1H), 6.46 (d, *J* = 2.5 Hz, 1H), 3.82 (s, 3H), 3.53 (s, 3H), 2.40 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 157.6, 156.0, 155.4, 155.4, 143.3, 142.2, 138.9, 137.5, 129.0, 126.7, 119.7, 118.8, 116.1, 114.0, 112.5, 111.1, 55.1, 55.0, 21.1 ppm. HRMS (ESI) m/z calculated for $C_{23}H_{21}N_3O_4S$, $[M+H]^+$ 436.1331; found 436.1332.



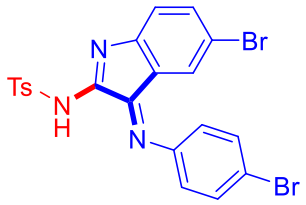
Ethyl-(E)-3-((4-(ethoxycarbonyl)phenyl)imino)-2-((4-methylphenyl)sulfonamido)-3H-indole-5-carboxylate (5ak)

Yield = 21% (54.6 mg). Yellow solid. M.p. 161.5-162.7 ℃. IR 3316, 2987, 2901, 1718, 1612, 1273, 1237, 1083, 1018, 819, 765, 675 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 10.28 (s, 1H), 8.14 (d, *J* = 8.3 Hz, 1H), 8.07 (d, *J* = 8.3 Hz, 1H), 7.94 (d, *J* = 8.1 Hz, 1H), 7.81 (d, *J* = 8.1 Hz, 3H), 7.30 (d, *J* = 8.1 Hz, 3H), 7.12 (d, *J* = 8.4 Hz, 1H), 6.99 (d, *J* = 8.2 Hz, 1H), 4.38 (q, *J* = 7.0 Hz, 3H), 4.16 (q, *J* = 7.1 Hz, 2H), 2.42 (s, 3H), 1.40 (t, *J* = 7.1 Hz, 3H), 1.19 (t, *J* = 7.1 Hz, 2H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 165.4, 164.2, 154.3, 153.3, 148.6, 144.0, 143.1, 138.6, 136.5, 136.1, 130.8, 129.2, 127.6, 127.3, 126.9, 126.1, 126.0, 125.7, 116.8, 114.9, 111.7, 60.7, 60.6, 21.2, 21.0, 13.9, 13.3 ppm. HRMS (ESI) m/z calculated for $C_{27}H_{25}N_3O_6S$, $[M+Na]^+$ 542.1362; found 542.1369.



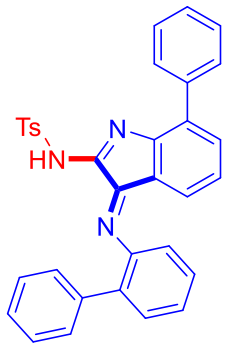
(E)-N-(5-chloro-3-((4-chlorophenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5al)

Yield = 51% (113.3 mg). Yellow solid. M.p. 202.7-204.1 ℃. IR 3329, 2972, 2922, 1633 1611, 1461, 1284, 1133, 1083, 808, 788, 655 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 10.15 (s, 1H), 7.94 (d, *J* = 8.0 Hz, 2H), 7.42 – 7.39 (m, 2H), 7.35 – 7.29 (m, 3H), 7.00 (d, *J* = 8.4 Hz, 1H), 6.93 – 6.86 (m, 2H), 6.69 (d, *J* = 2.0 Hz, 1H), 2.43 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.5, 154.2, 147.2, 143.9, 143.8, 136.8, 133.9, 131.1, 129.3, 129.2, 128.6, 126.8, 126.1, 125.6, 118.7, 116.1, 113.0, 21.2 ppm. HRMS (ESI) m/z calculated for $C_{21}H_{15}Cl_2N_3O_2S$, $[M+Na]^+$ 466.0160; found 466.0153.



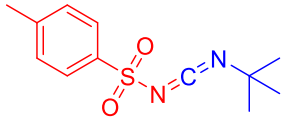
(E)-N-(5-bromo-3-((4-bromophenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5am)

Yield = 25% (66.5 mg). Yellow solid. M.p. 151.3-152.2 ℃. IR 3291, 2987, 2900, 1650, 1611, 1482, 1288, 1146, 1081, 814, 780, 669 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 10.16 (s, 1H), 7.93 (d, *J* = 7.9 Hz, 2H), 7.55 (d, *J* = 8.2 Hz, 2H), 7.48 – 7.43 (m, 1H), 7.32 (d, *J* = 8.0 Hz, 2H), 6.94 (d, *J* = 8.4 Hz, 1H), 6.89 – 6.76 (m, 3H), 2.43 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 155.2, 154.0, 147.7, 144.3, 143.9, 136.7, 132.2, 129.2, 128.9, 128.5, 126.9, 126.1, 119.4, 119.1, 118.8, 116.6, 115.8, 113.3, 21.2 ppm. HRMS (ESI) m/z calculated for $C_{21}H_{15}Br_2N_3O_2S$, $[M+Na]^+$ 553.9149; found 553.9138.



(E)-N-(3-([1,1'-biphenyl]-2-ylimino)-7-phenyl-3H-indol-2-yl)-4-methylbenzenesulfonamide (5an)

Yield = 78% (205.8 mg). Red solid. M.p. 183.6-184.4 ℃. IR 3362, 2988, 2971, 2901, 1654, 1618, 1588, 1423, 1298, 1133, 1081, 812, 830, 745, 702, 667 cm^{-1}. ^{1}H NMR (400 MHz, Chloroform-*d*) δ 9.96 (s, 1H), 7.85 (d, *J* = 8.3 Hz, 2H), 7.55 – 7.48 (m, 3H), 7.45 (d, *J* = 6.4 Hz, 1H), 7.41 (d, *J* = 7.0 Hz, 3H), 7.38 – 7.33 (m, 4H), 7.31 (d, *J* = 3.4 Hz, 2H), 7.21 – 7.18 (m, 3H), 6.93 (d, *J* = 7.6 Hz, 1H), 6.87 (t, *J* = 7.8 Hz, 1H), 6.58 (d, *J* = 7.7 Hz, 1H), 2.43 (s, 3H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 156.5, 154.5, 147.6, 143.3, 142.0, 138.0, 137.4, 135.0, 133.9, 130.3, 130.1, 129.2, 129.0, 128.7, 128.2, 128.0, 127.5, 127.2, 126.6, 126.6, 125.6, 125.5, 124.7, 123.7, 116.9, 116.1, 21.2 ppm. HRMS (ESI) m/z calculated for $C_{33}H_{25}N_3O_2S$, $[M+Na]^+$ 550.1565; found 550.1559.

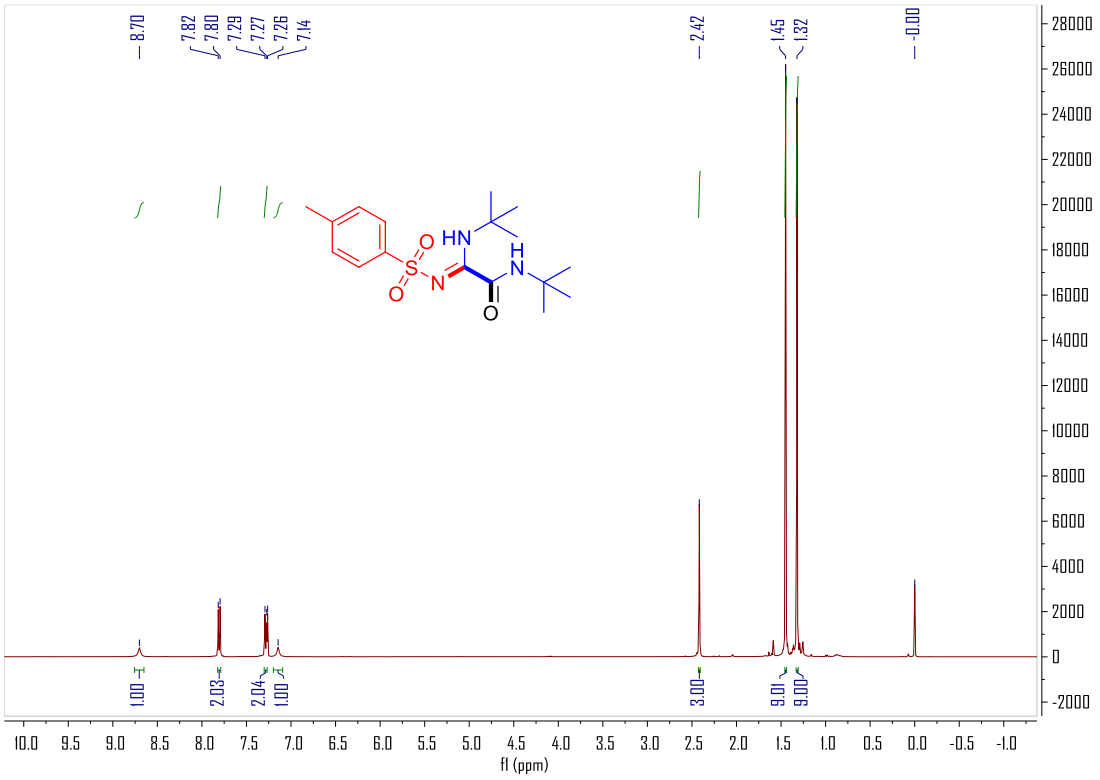


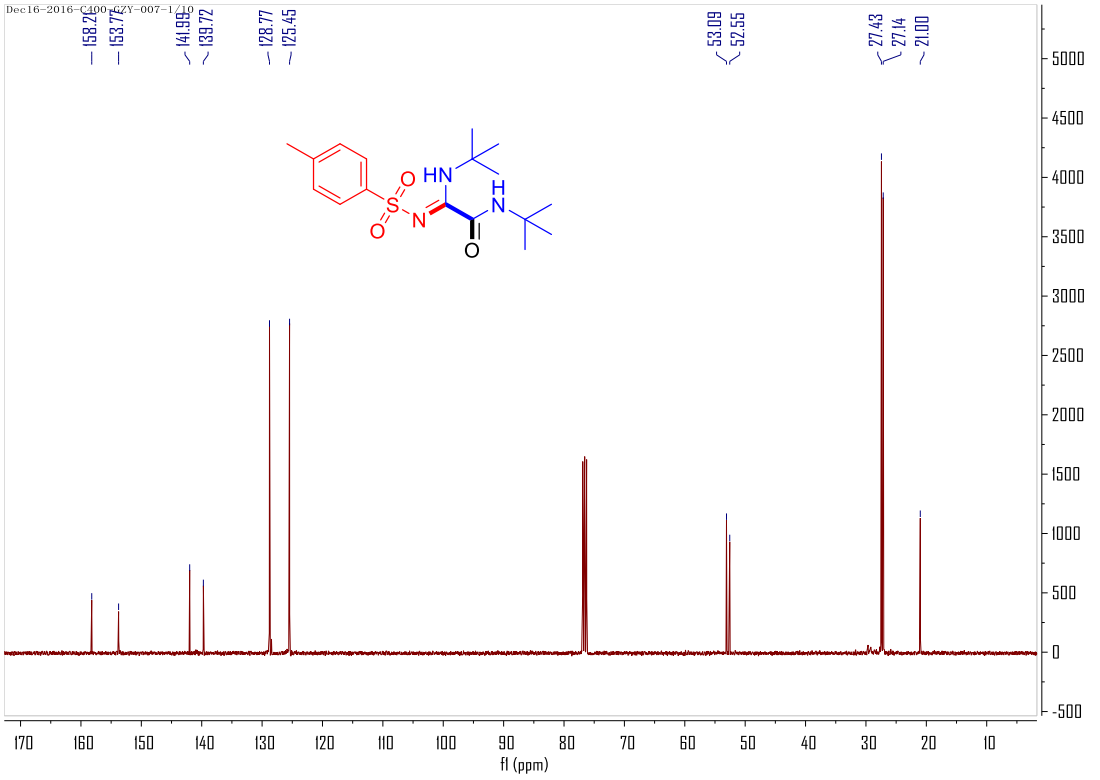
N-((tert-butylimino)methylene)-4-methylbenzenesulfonamide 6

^{1}H NMR (400 MHz, Chloroform-*d*) δ 7.81 (dd, *J* = 8.4, 1.9 Hz, 2H), 7.32 (d, *J* = 7.9 Hz, 2H), 2.42 (s, 3H), 1.37 (s, 9H). ^{13}C NMR (101 MHz, $CDCl_3$) δ 143.7, 137.8, 129.2, 126.2, 121.9, 59.3, 30.5, 21.1 ppm.

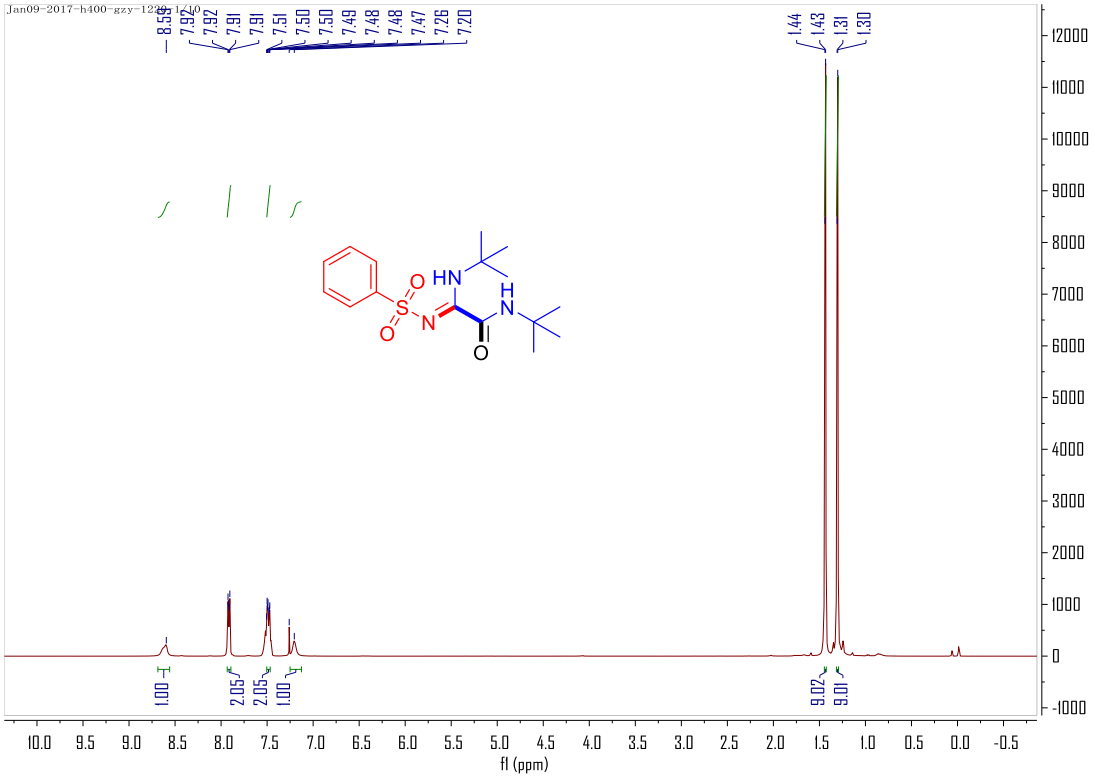
Copies of ^{1}H and ^{13}C NMR Spectra for Compounds 3aa-6

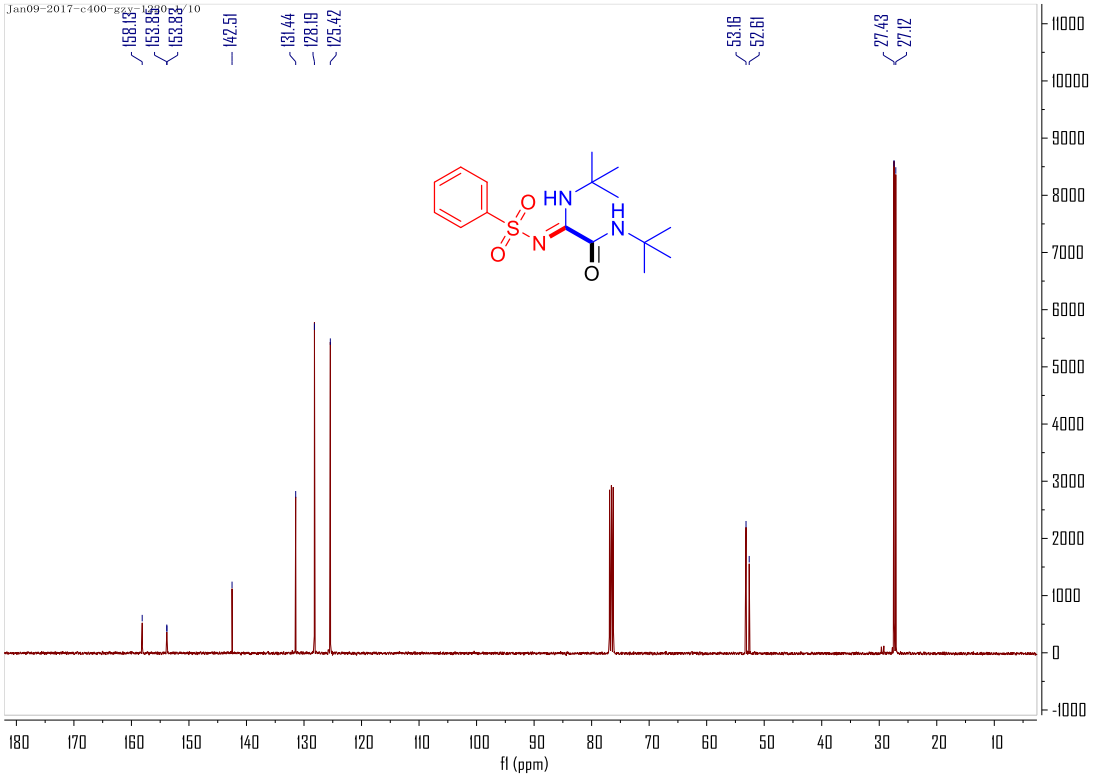
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(tosylimino)acetamide (3aa)



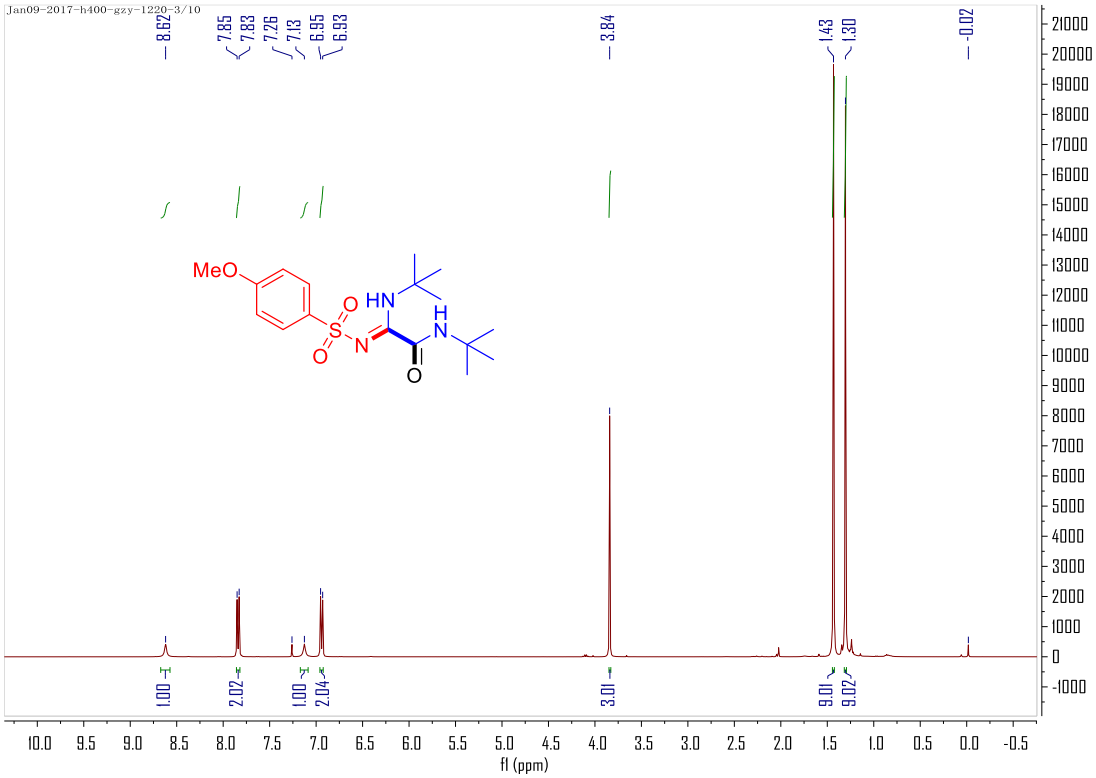


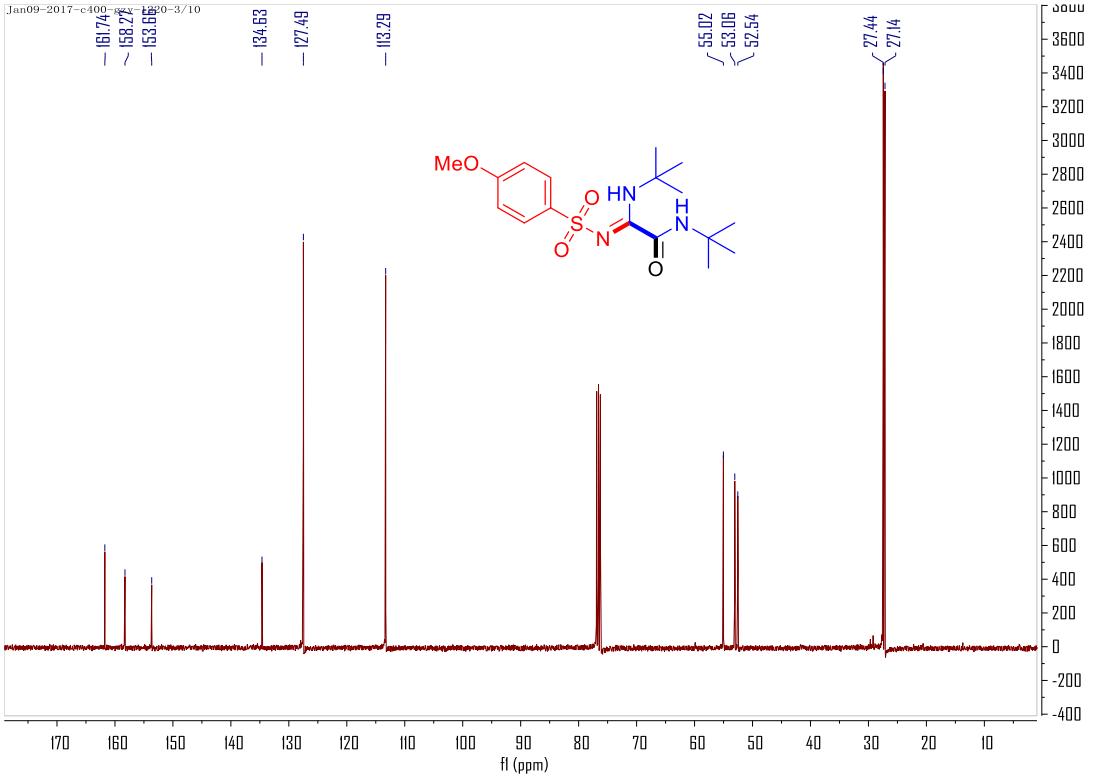
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((phenylsulfonyl)imino)acetamide (3ba)



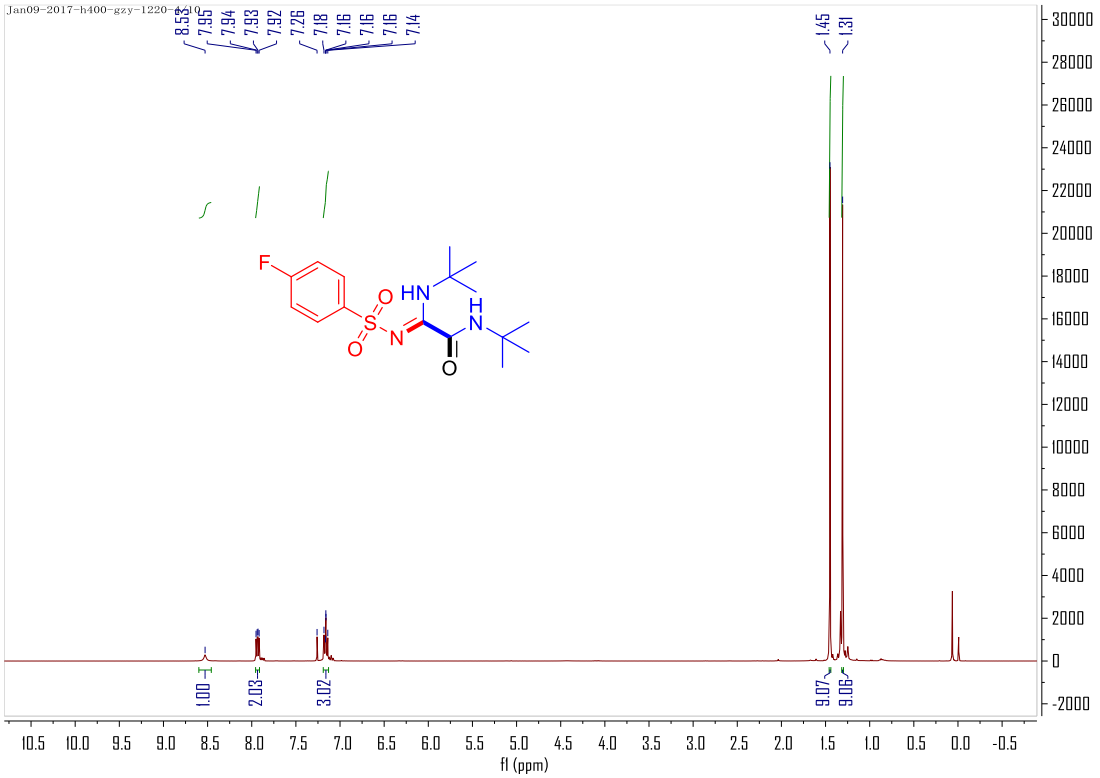


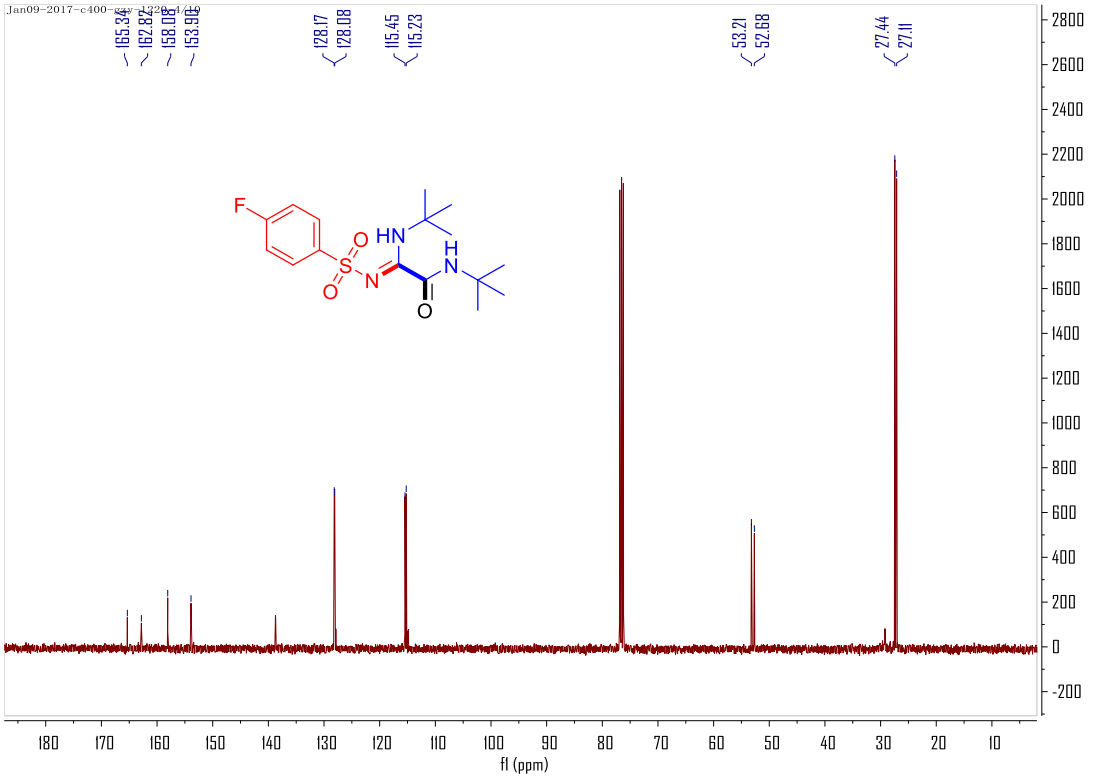
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-methoxyphenyl)sulfonyl)imino)acetamide (3ca)



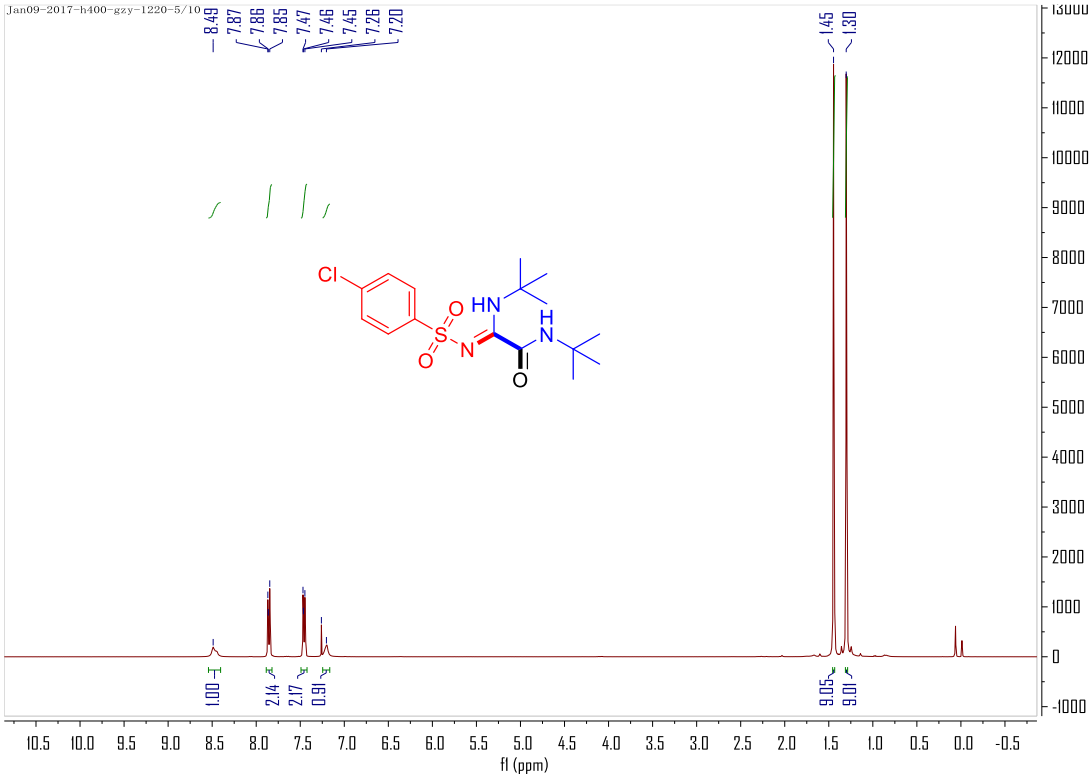


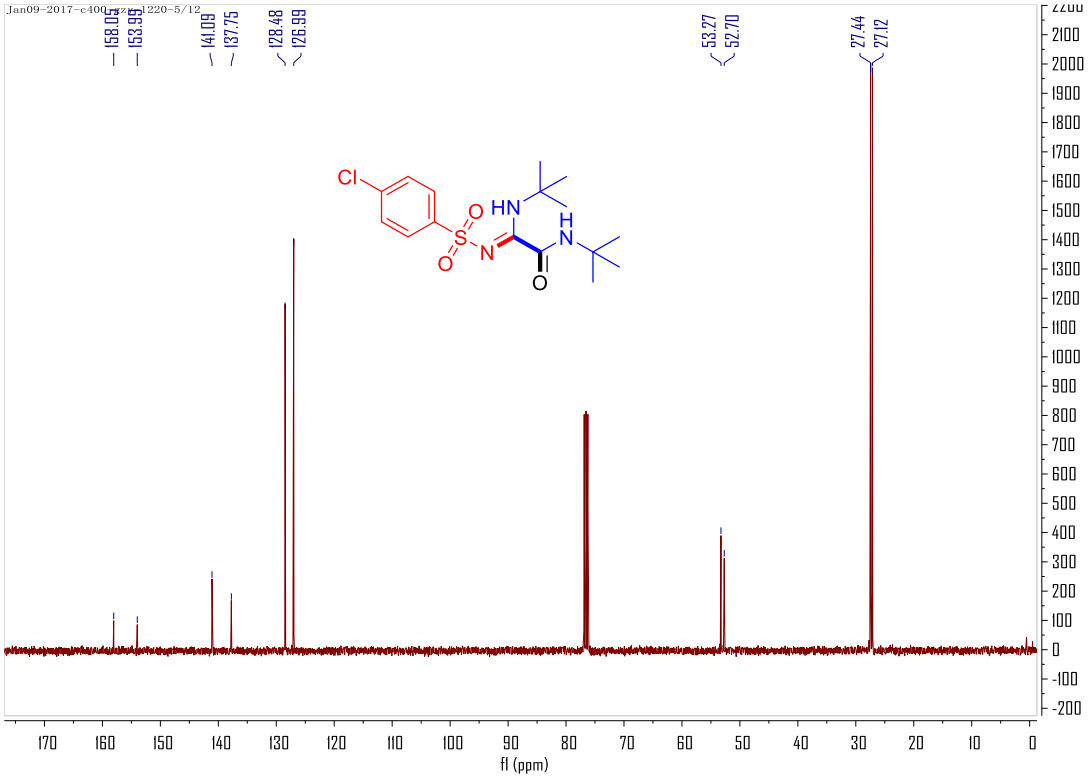
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-fluorophenyl)sulfonyl)imino)acetamide (3da)



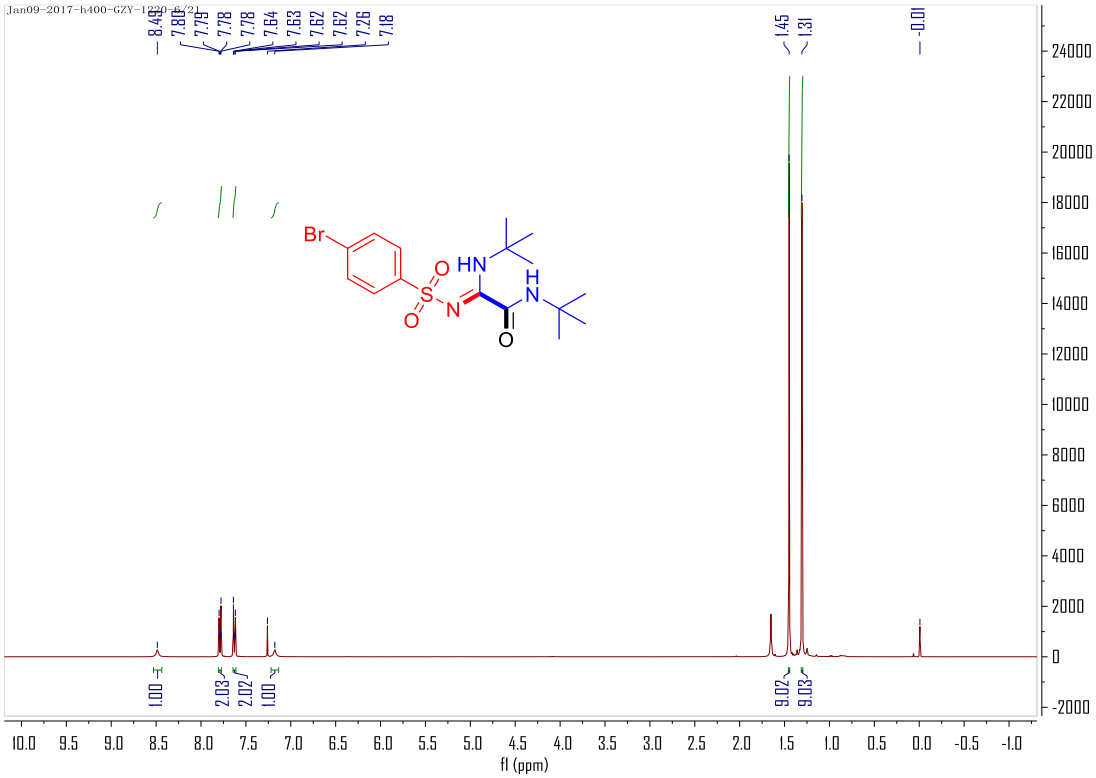


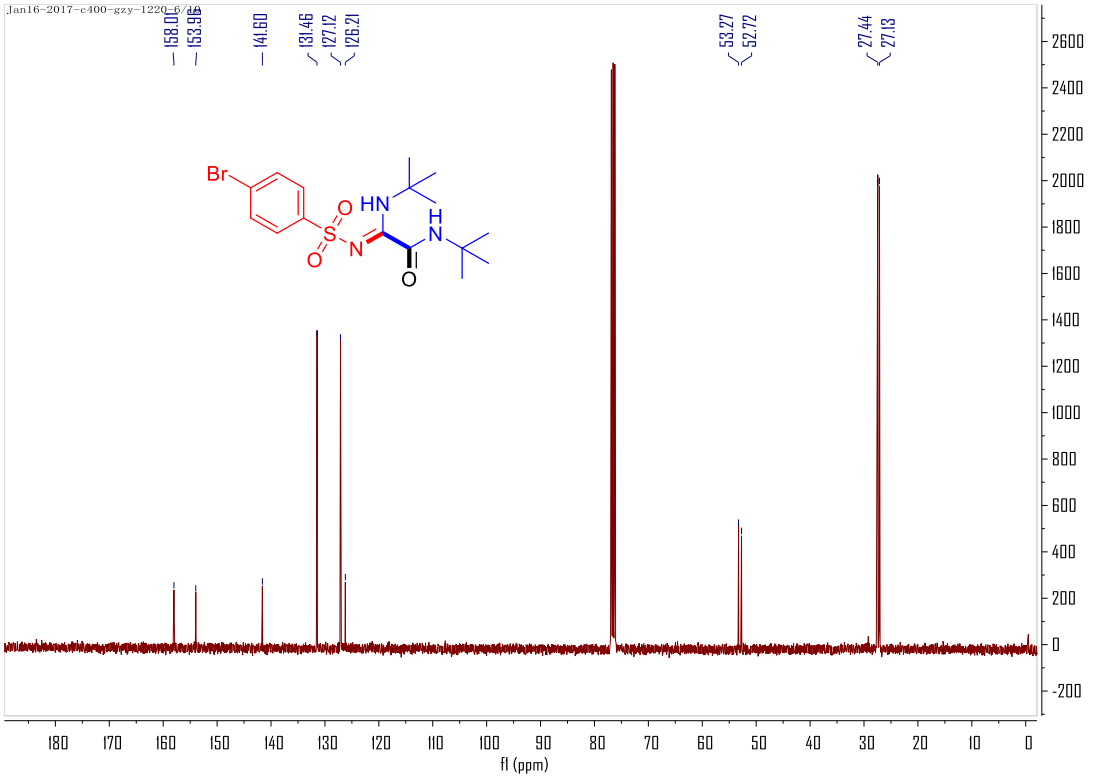
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-chlorophenyl)sulfonyl)imino)acetamide (3ea)



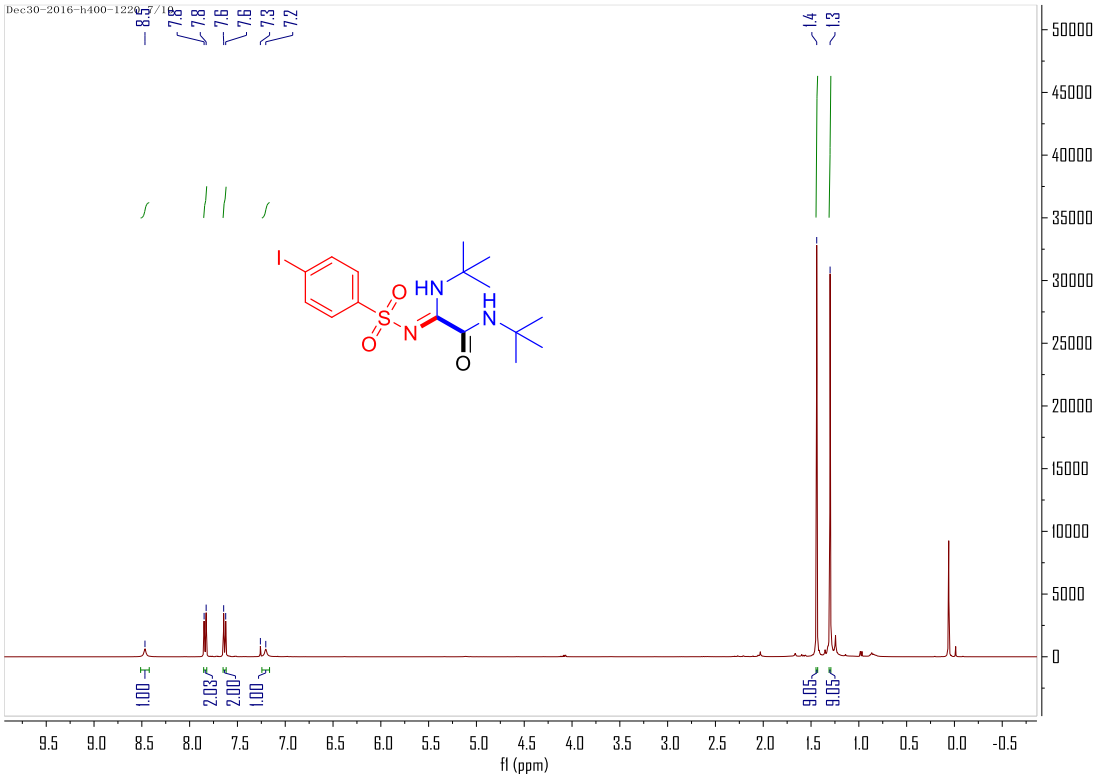


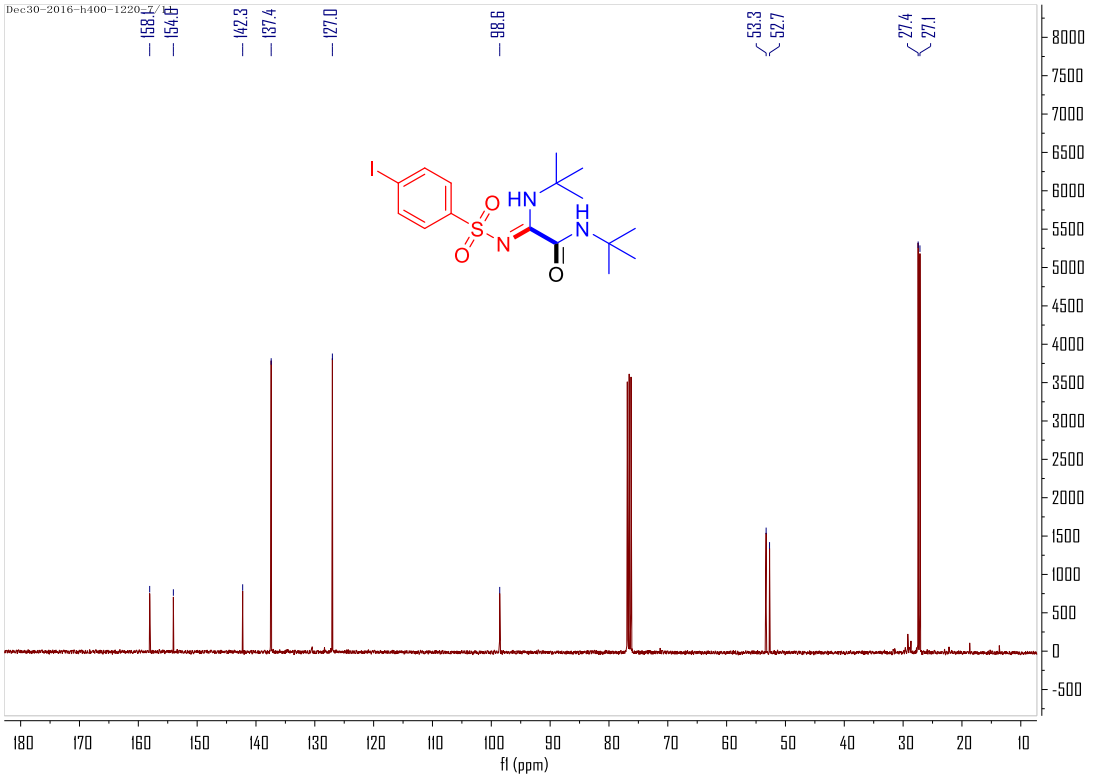
(Z)-2-(((4-bromophenyl)sulfonyl)imino)-N-(tert-butyl)-2-(tert-butylamino)acetamide (3fa)



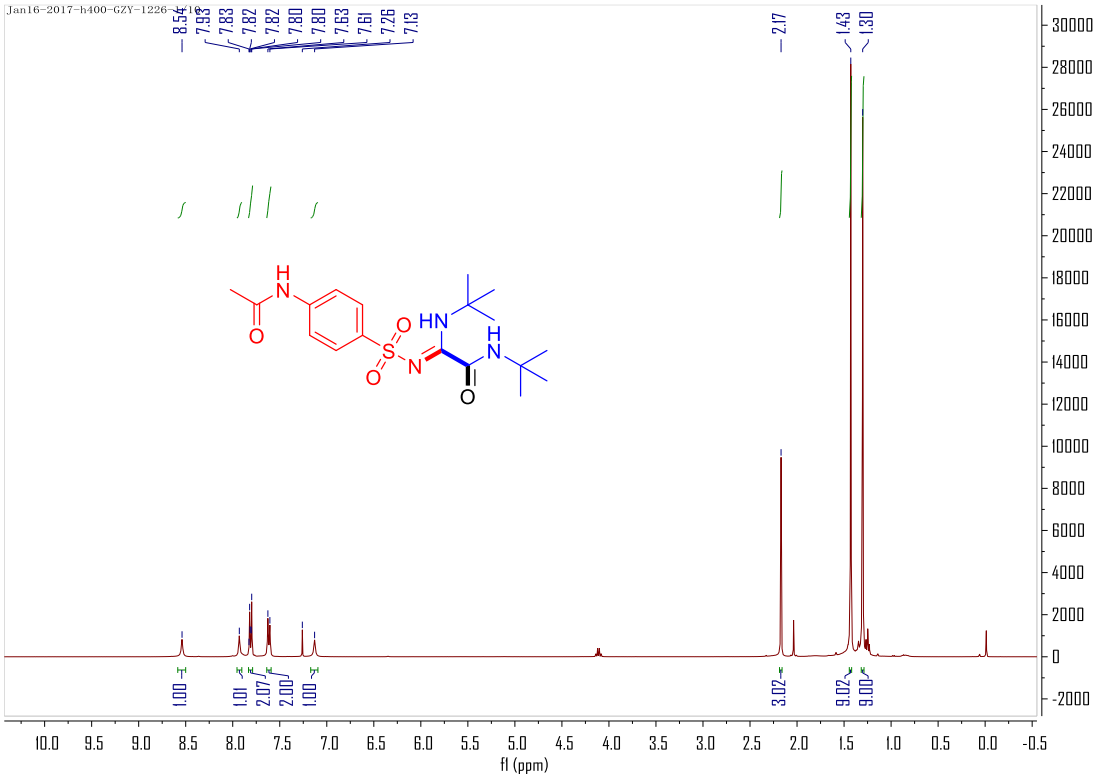


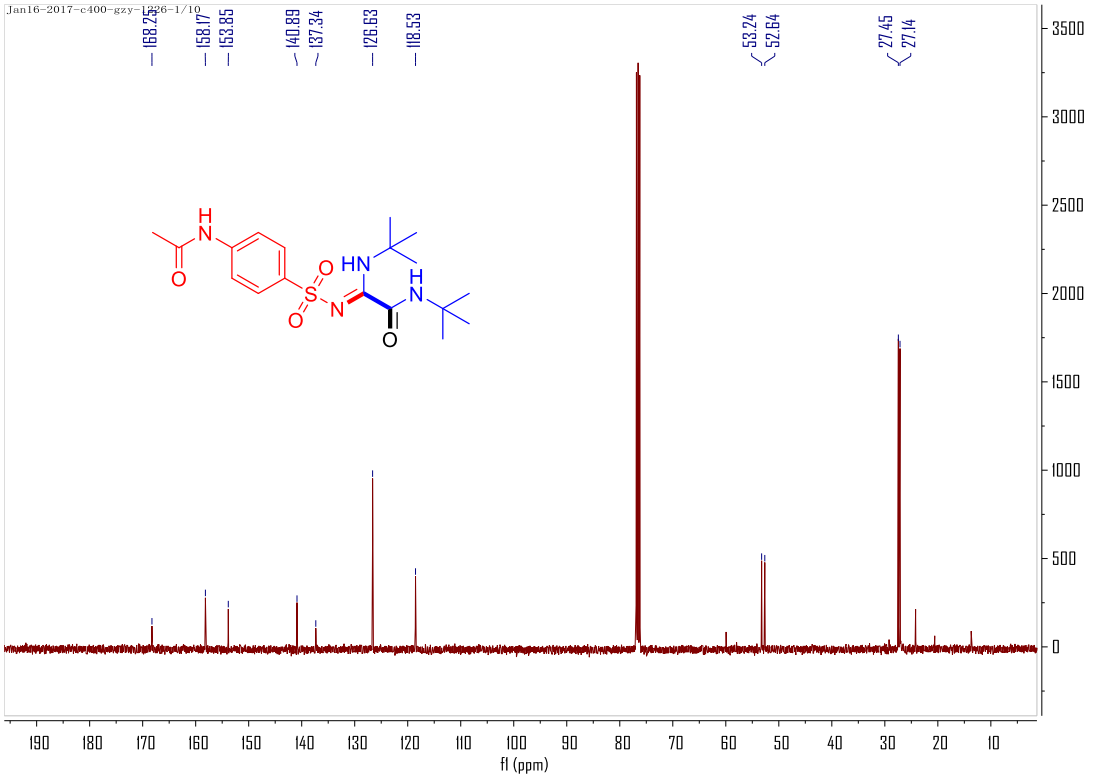
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-(((4-iodophenyl)sulfonyl)imino)acetamide (3ga)



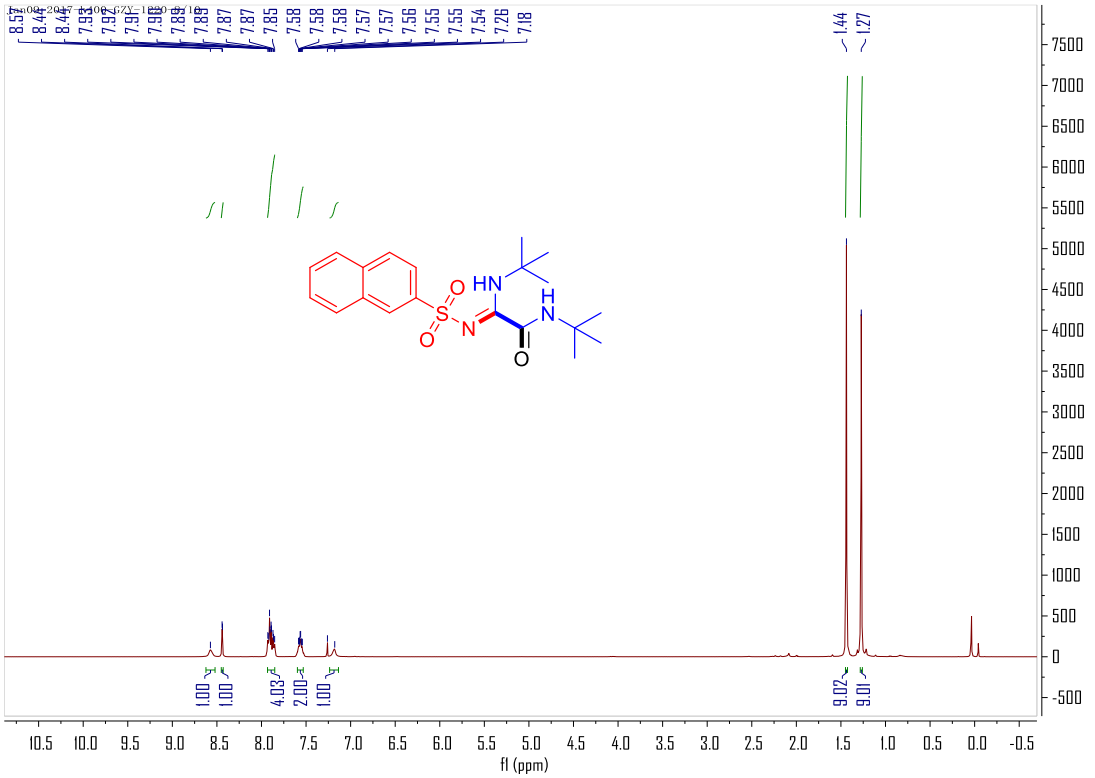


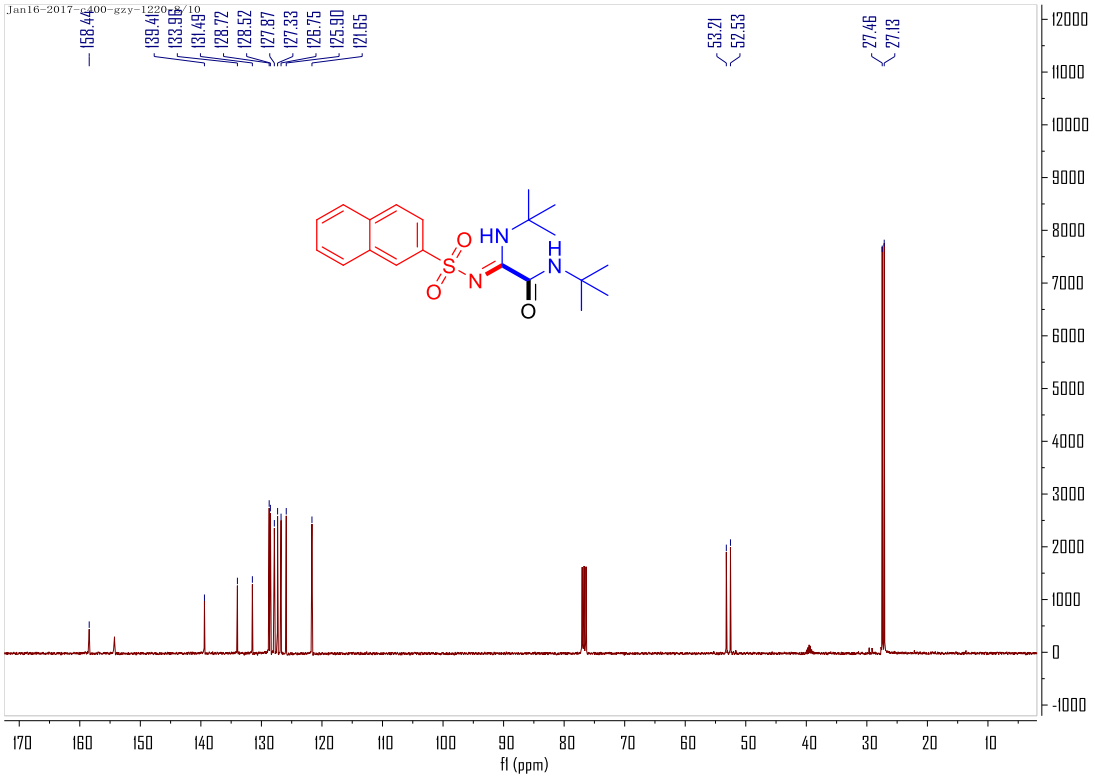
(Z)-2-(((4-acetamidophenyl)sulfonyl)imino)-N-(tert-butyl)-2-(tert-butylamino)acetamide (3ha)



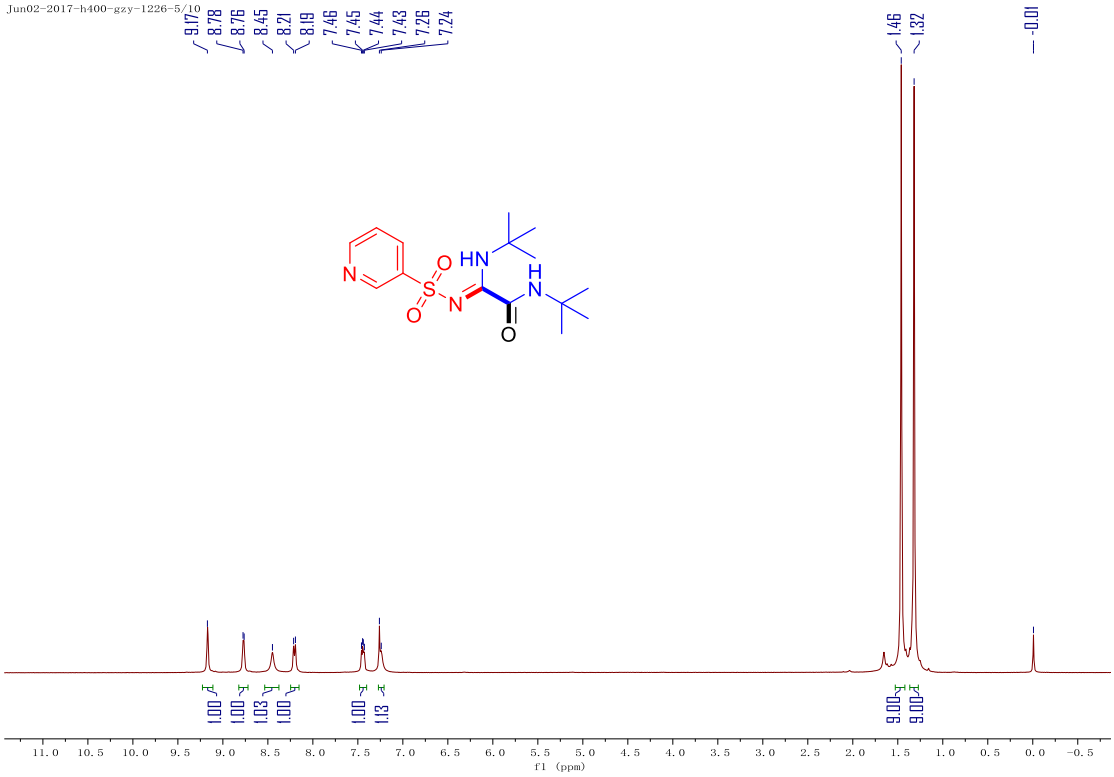


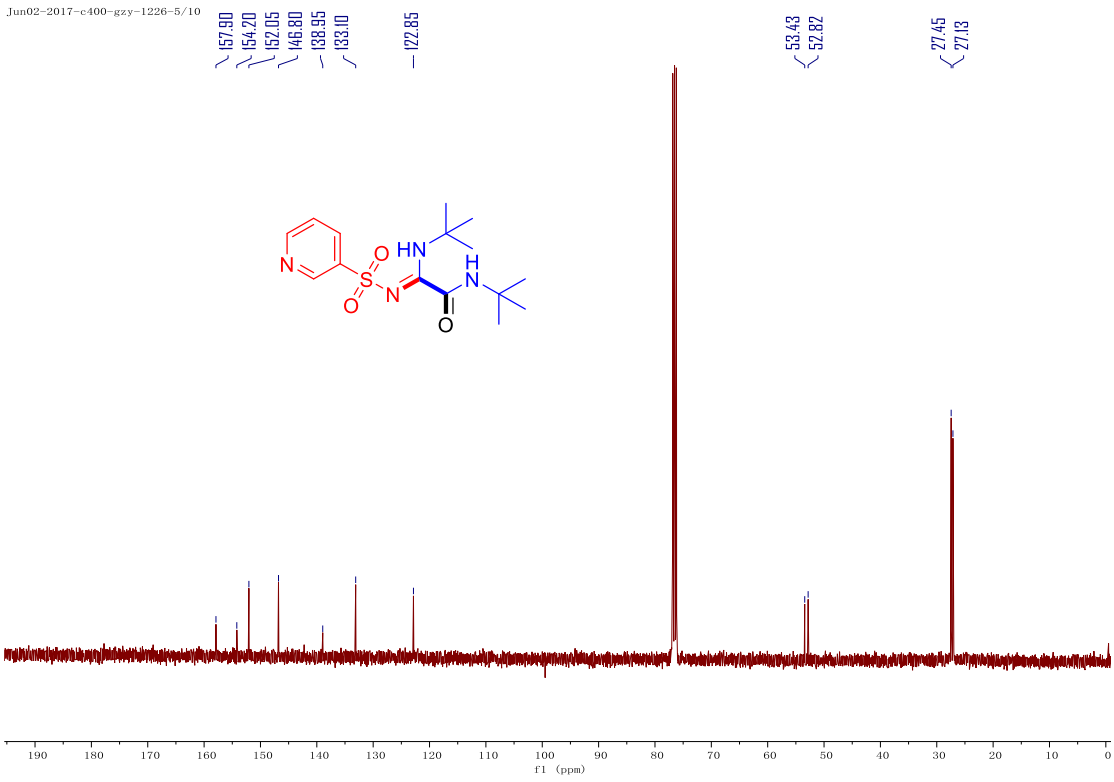
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((naphthalen-2-ylsulfonyl)imino)acetamide (3ia)



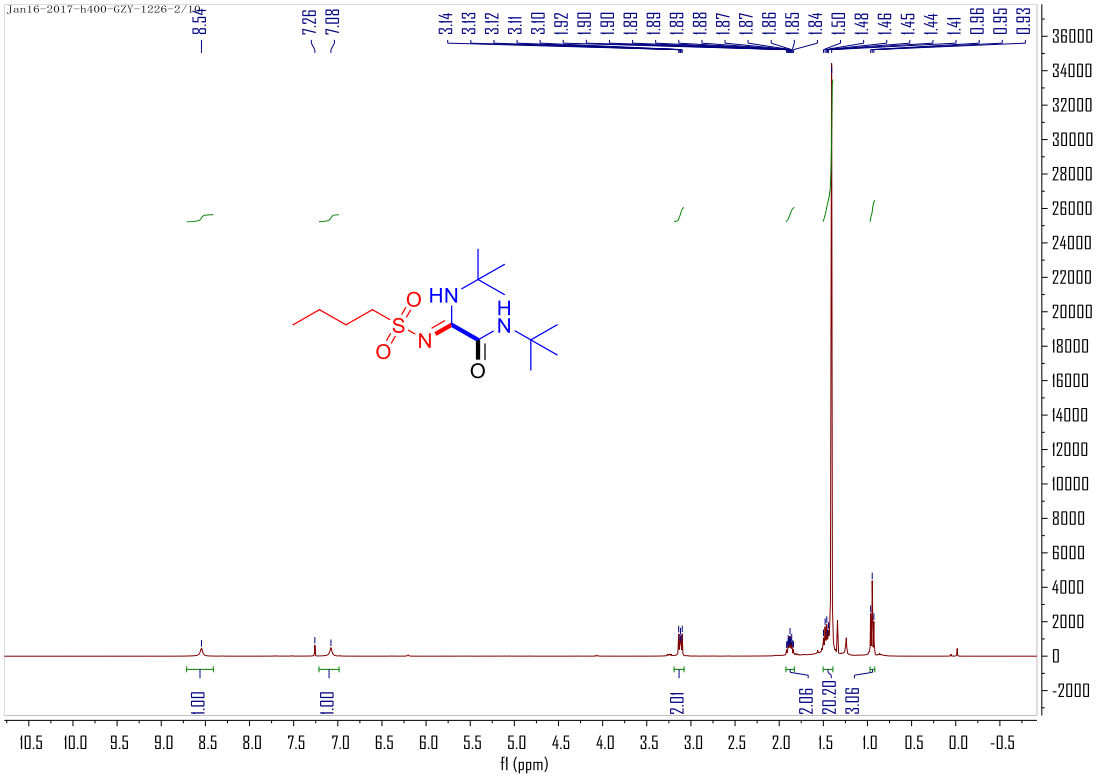


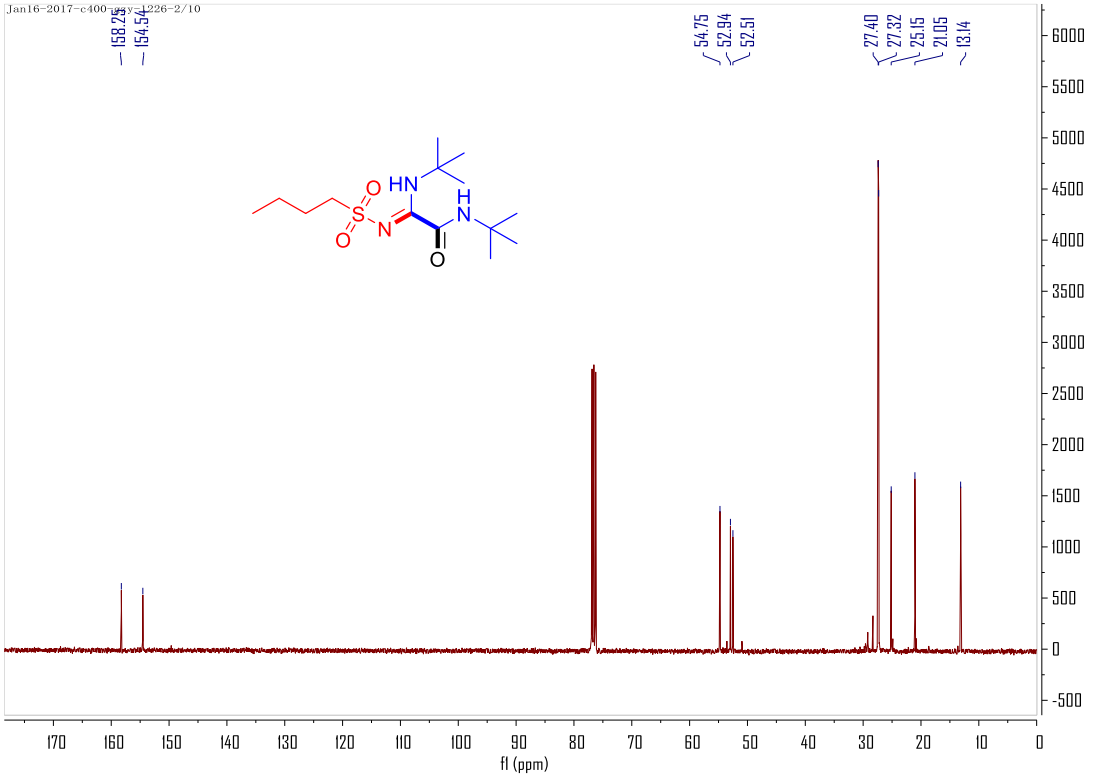
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((pyridin-3-ylsulfonyl)imino)acetamide (3ja)



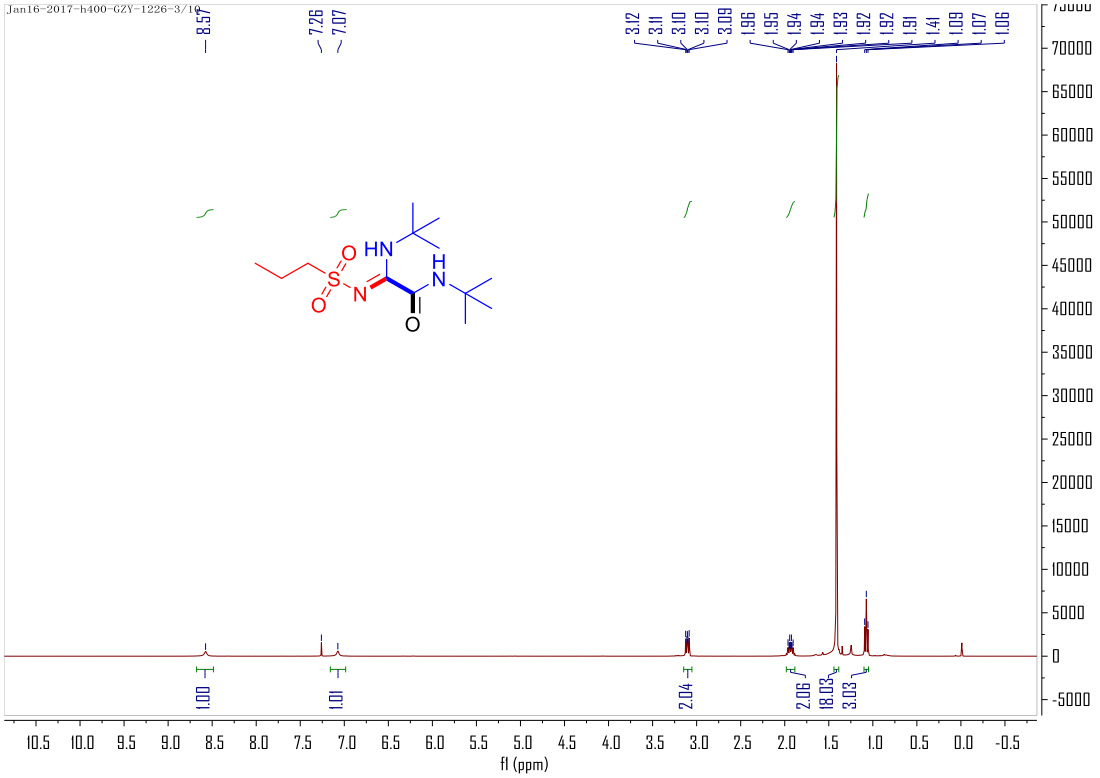


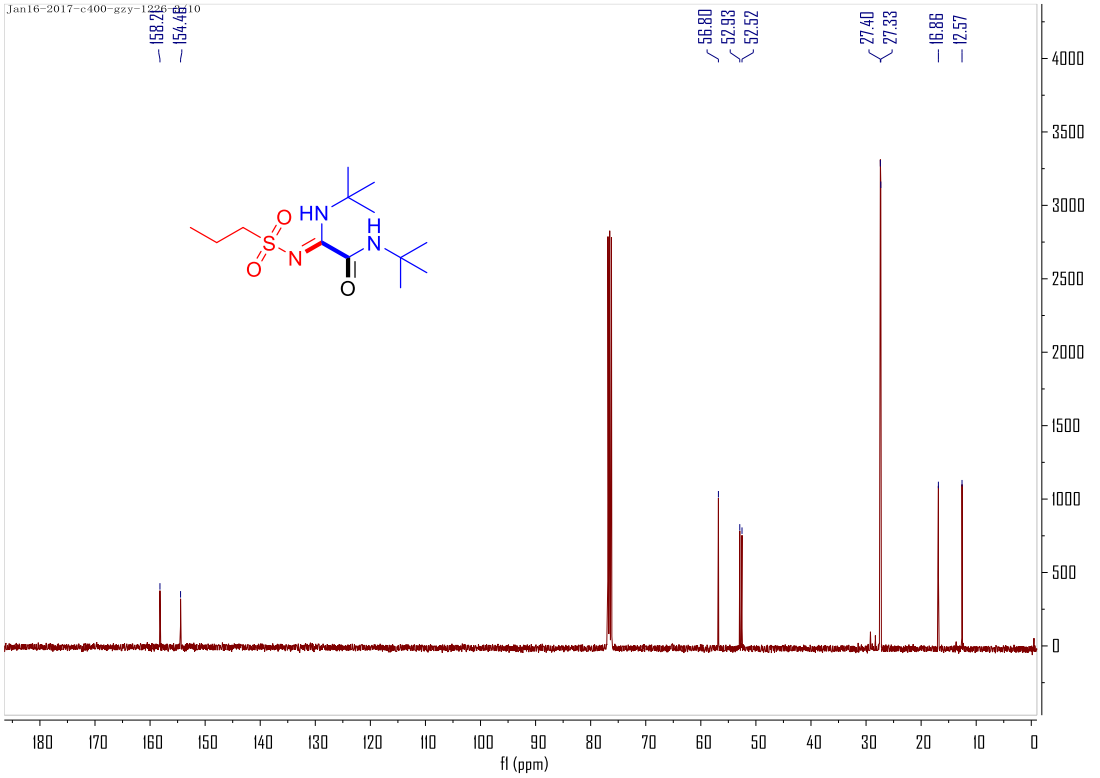
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((butylsulfonyl)imino)acetamide (3ka)



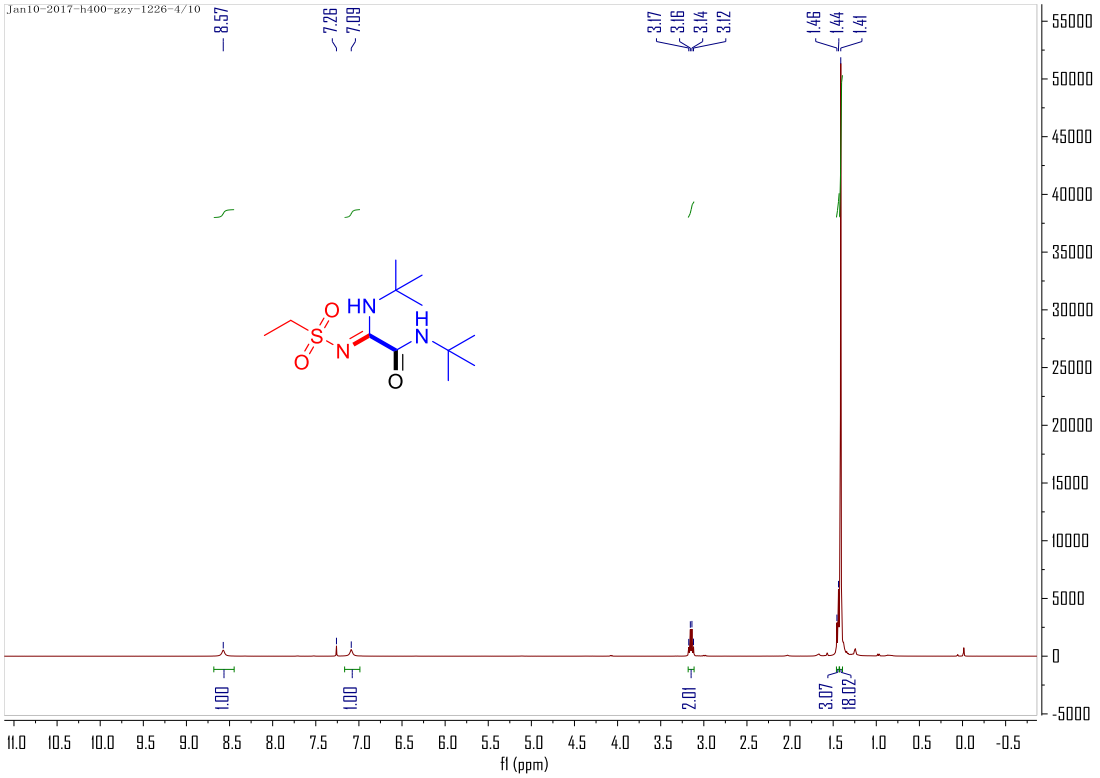


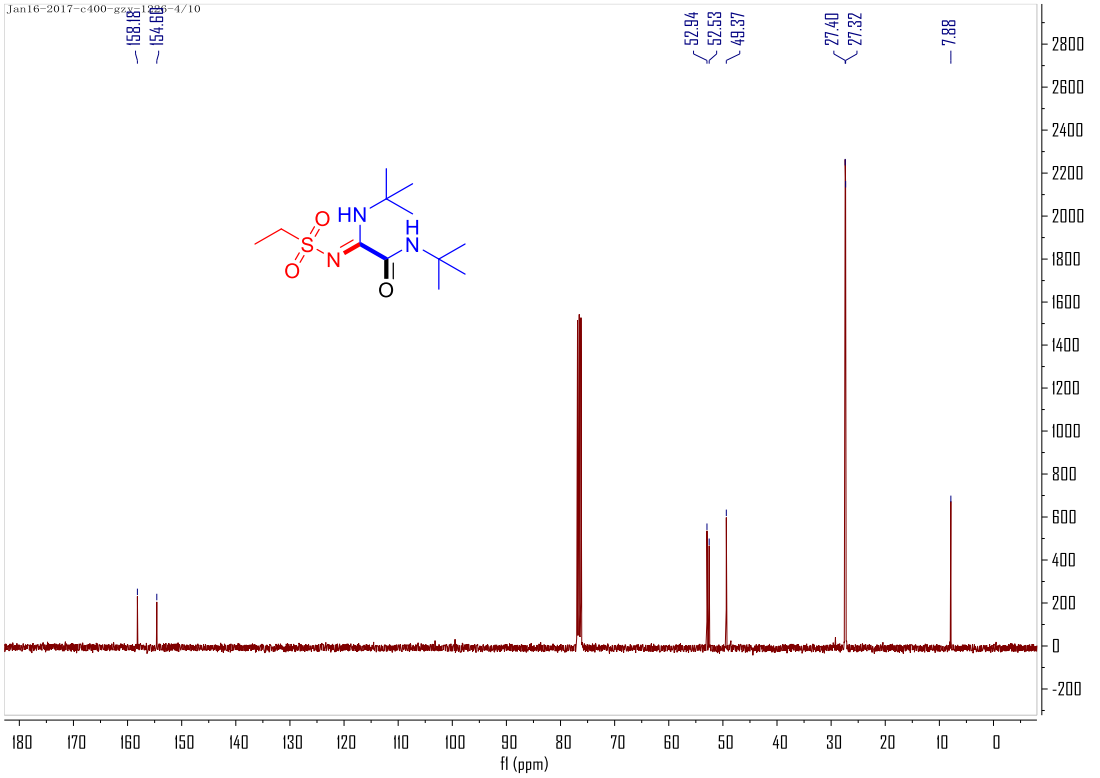
(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((propylsulfonyl)imino)acetamide (3la)



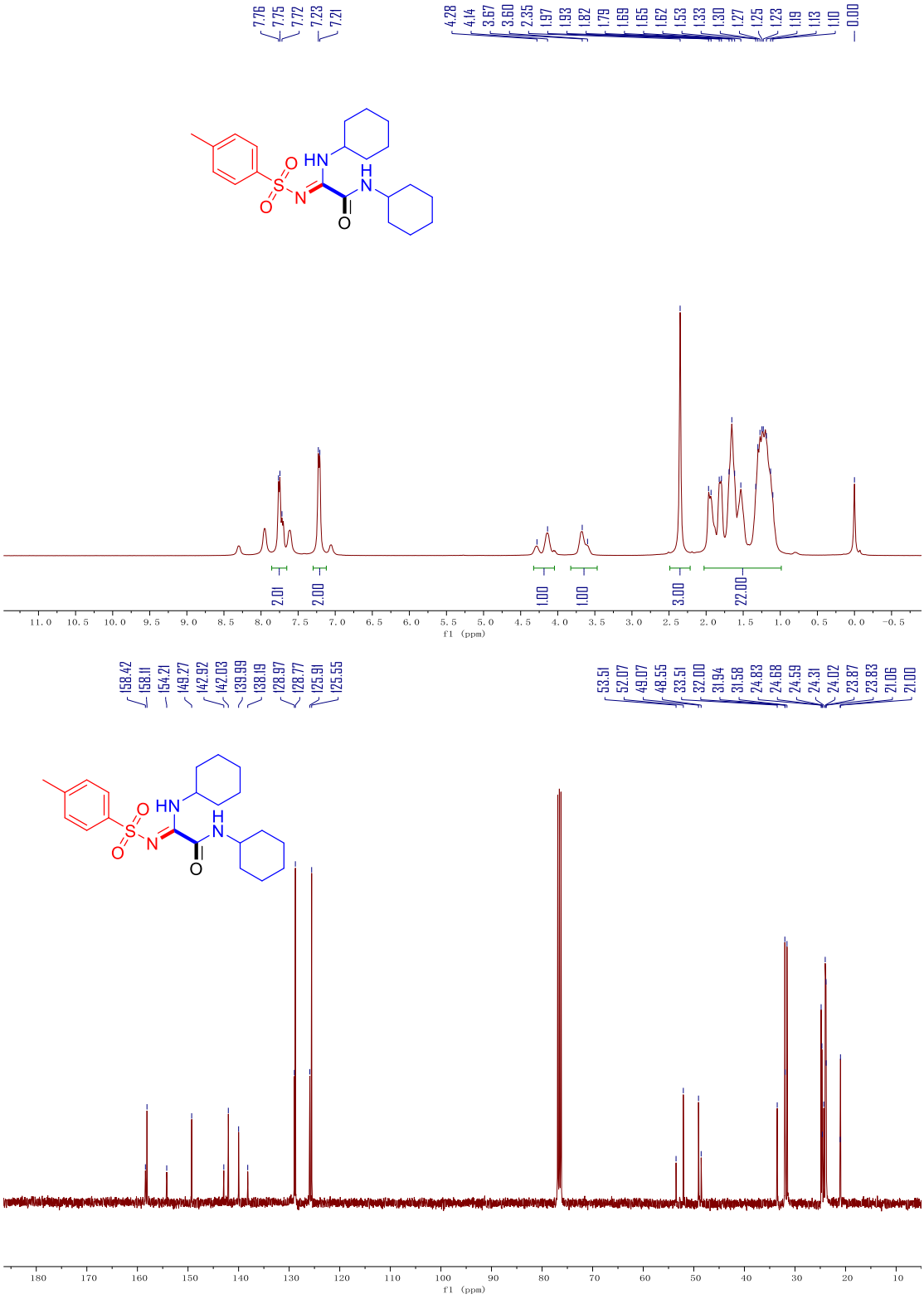


(Z)-N-(tert-butyl)-2-(tert-butylamino)-2-((ethylsulfonyl)imino)acetamide (3ma)

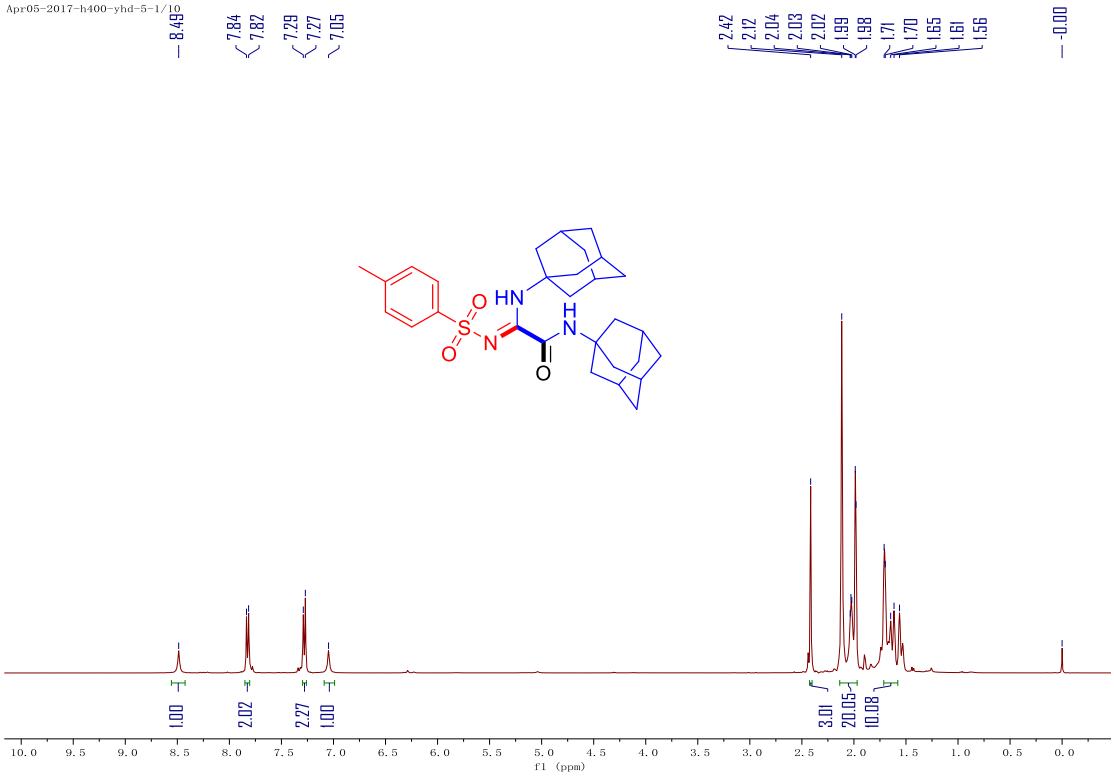


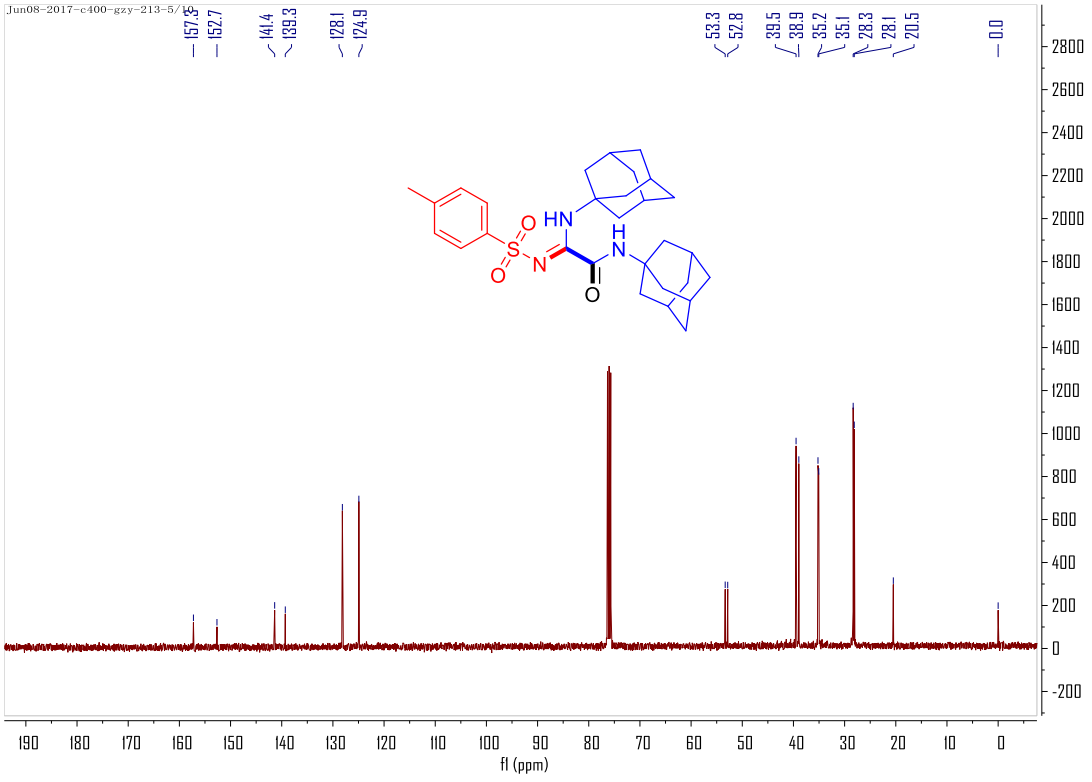


(Z)-N-cyclohexyl-2-(cyclohexylamino)-2-(tosylimino)acetamide (3ab)

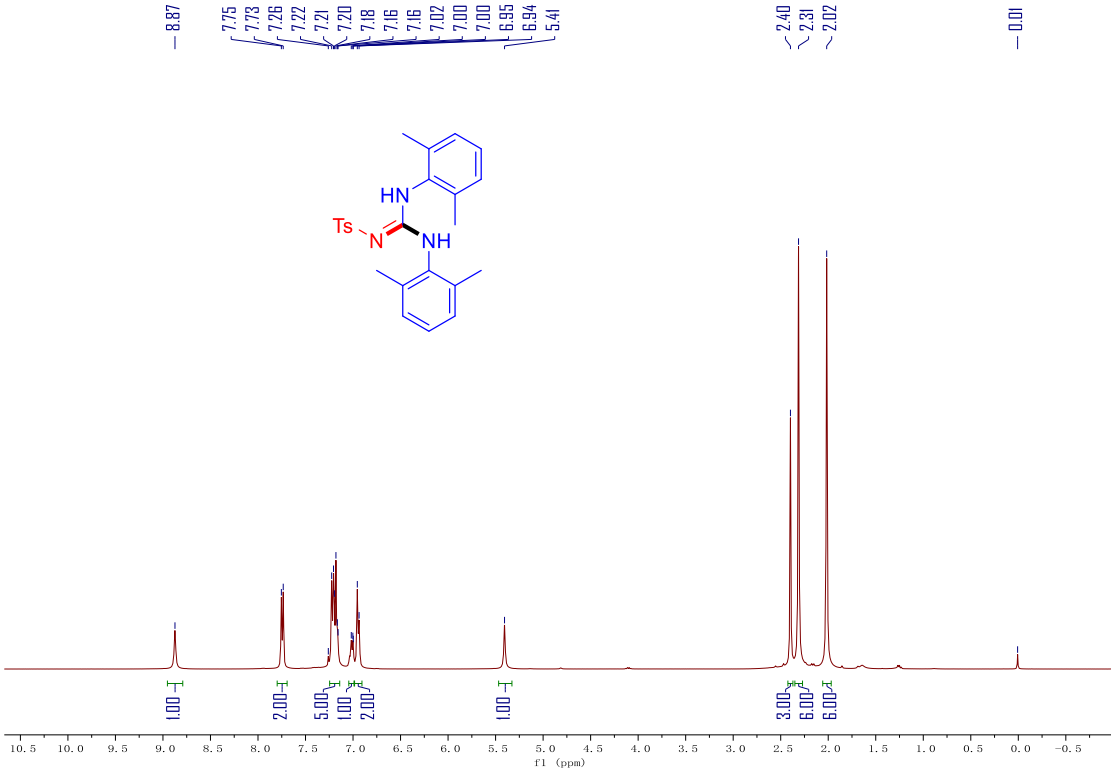


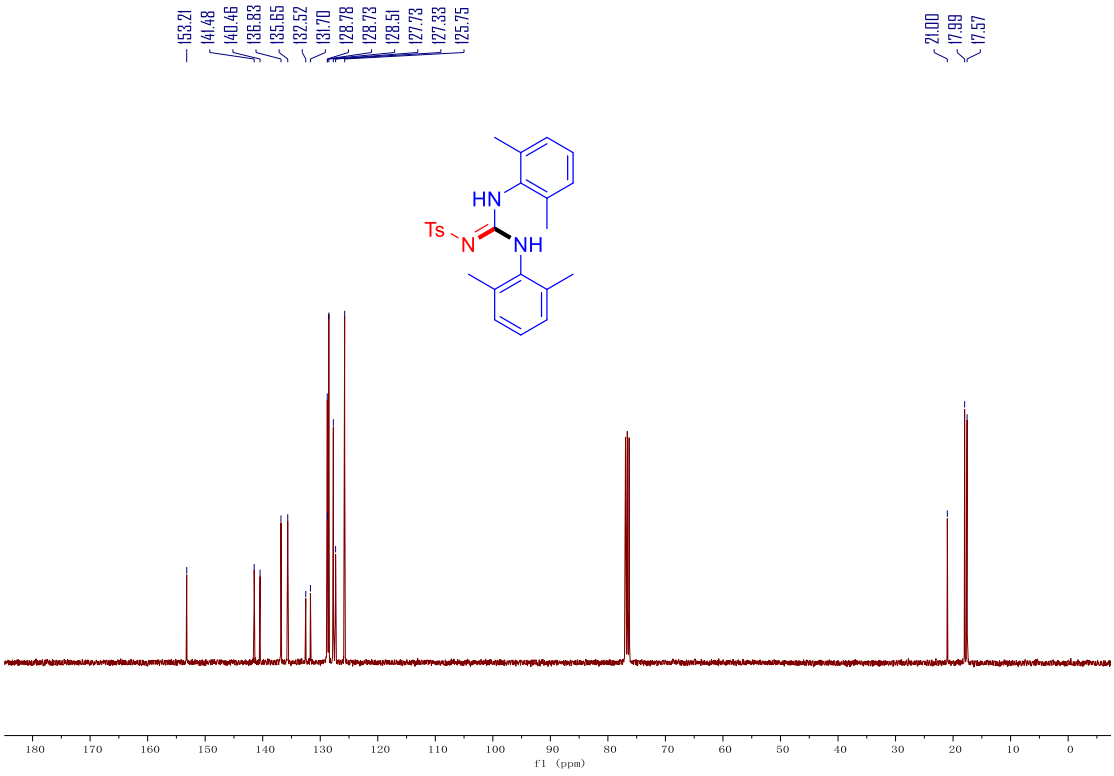
(Z)-N-((1s,3S)-adamantan-1-yl)-2-(((3S,5S,7S)-adamantan-1-yl)amino)-2-(tosylimino)acetamide (3ac)



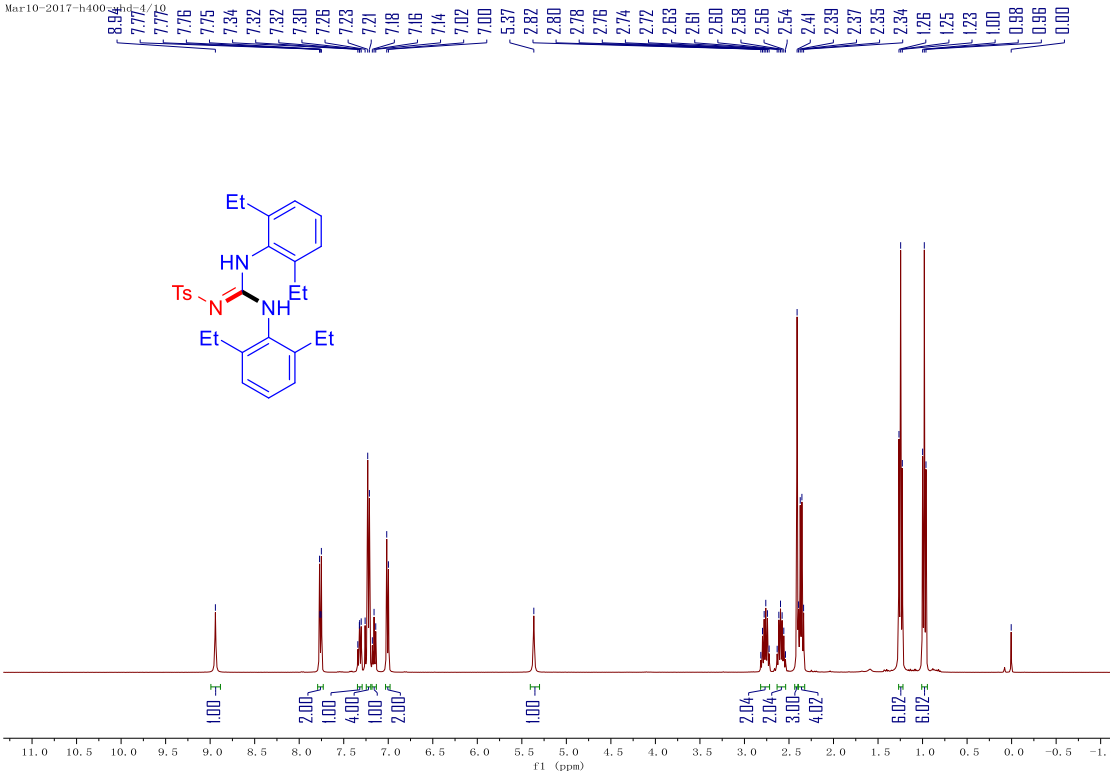


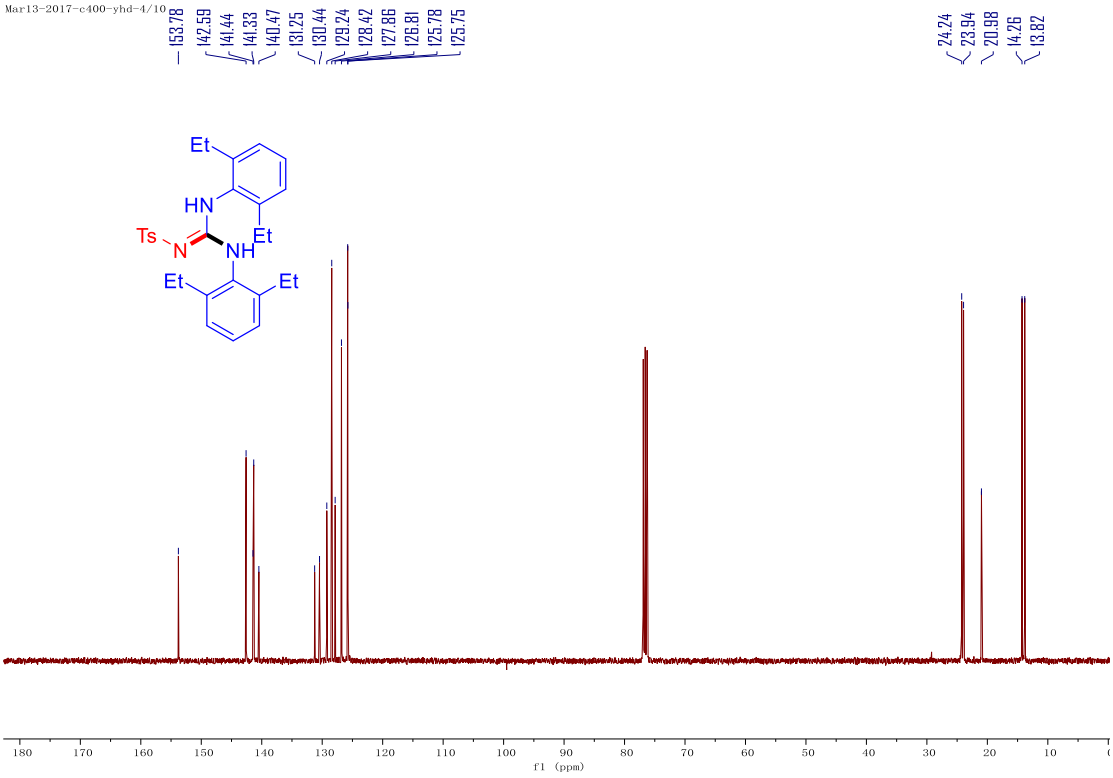
N-(bis((2,6-dimethylphenyl)amino)methylene)-4-methylbenzenesulfonamide (4ad)



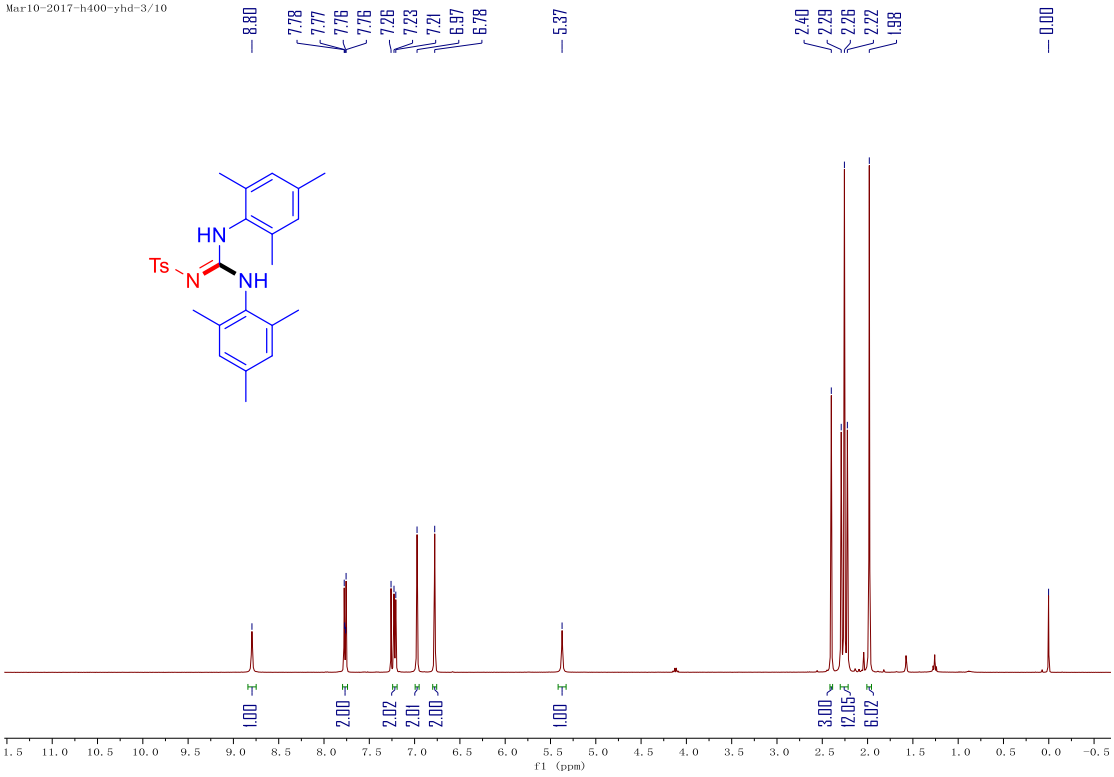


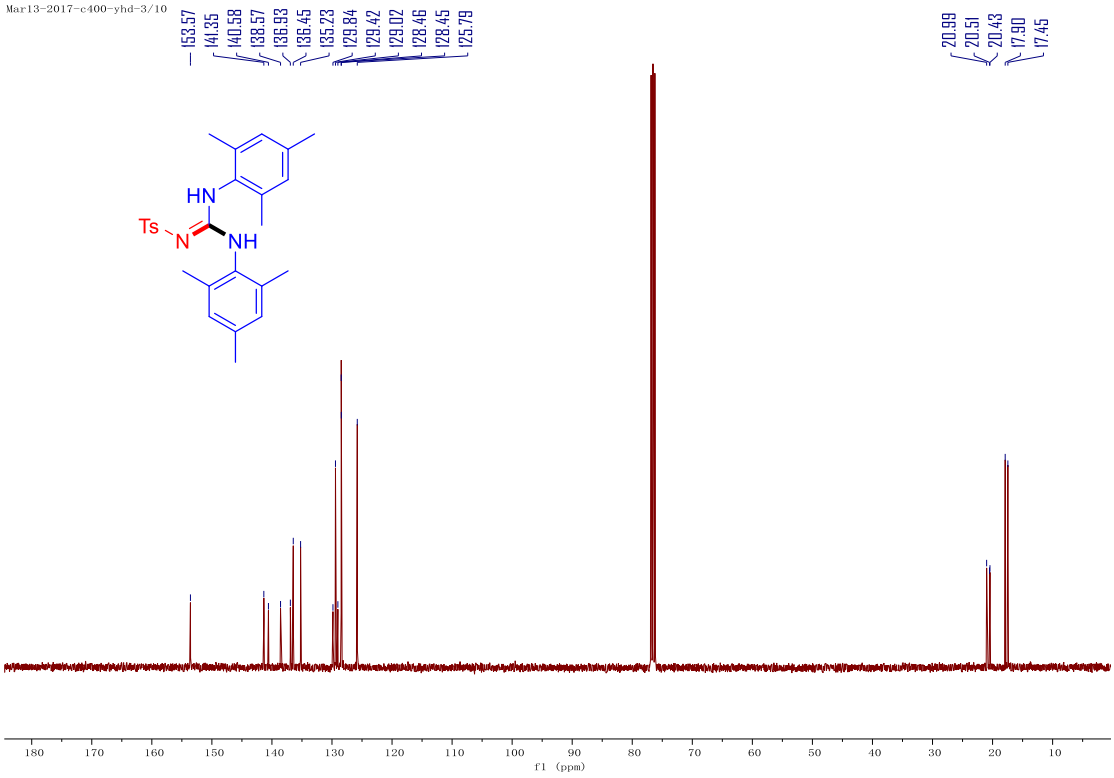
N-(bis((2,6-diethylphenyl)amino)methylene)-4-methylbenzenesulfonamide (4ae)



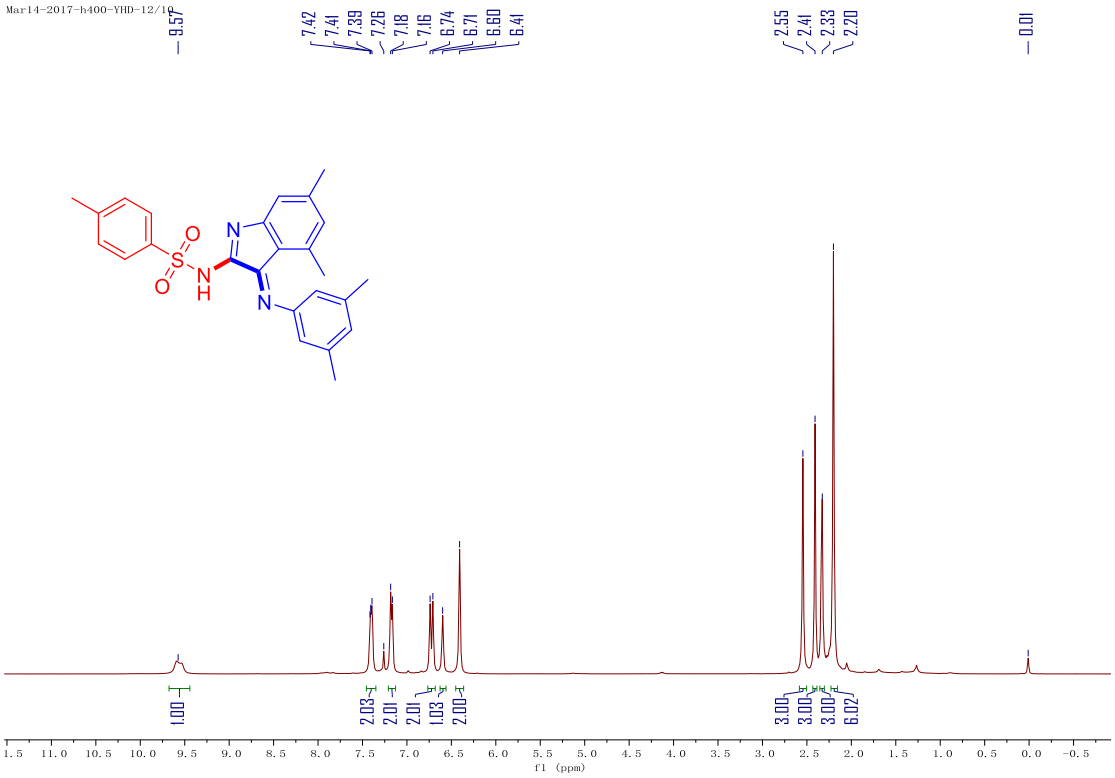


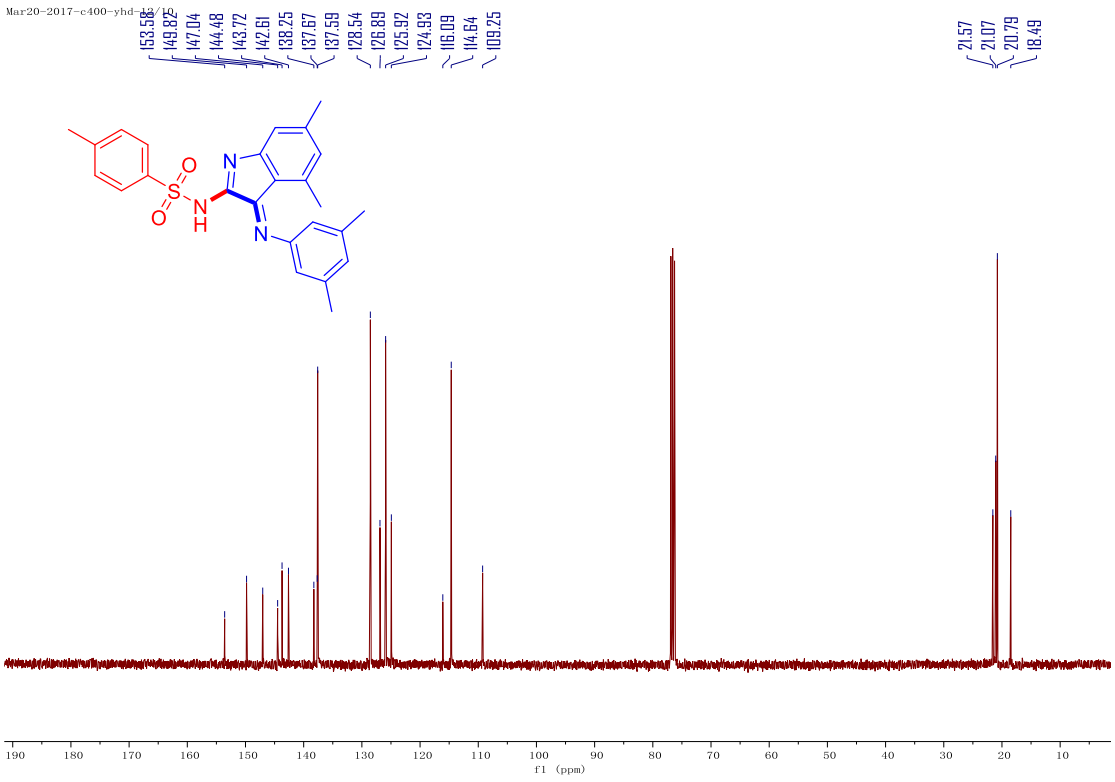
N-(bis(mesitylamino)methylene)-4-methylbenzenesulfonamide (4af)



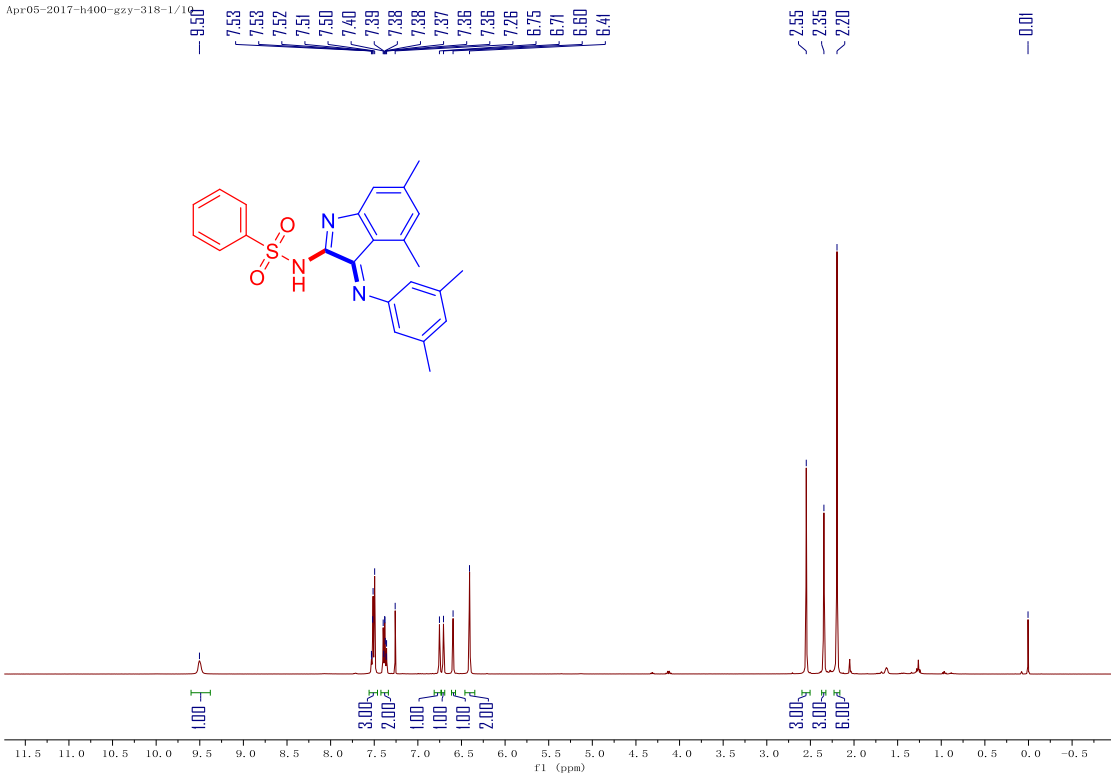


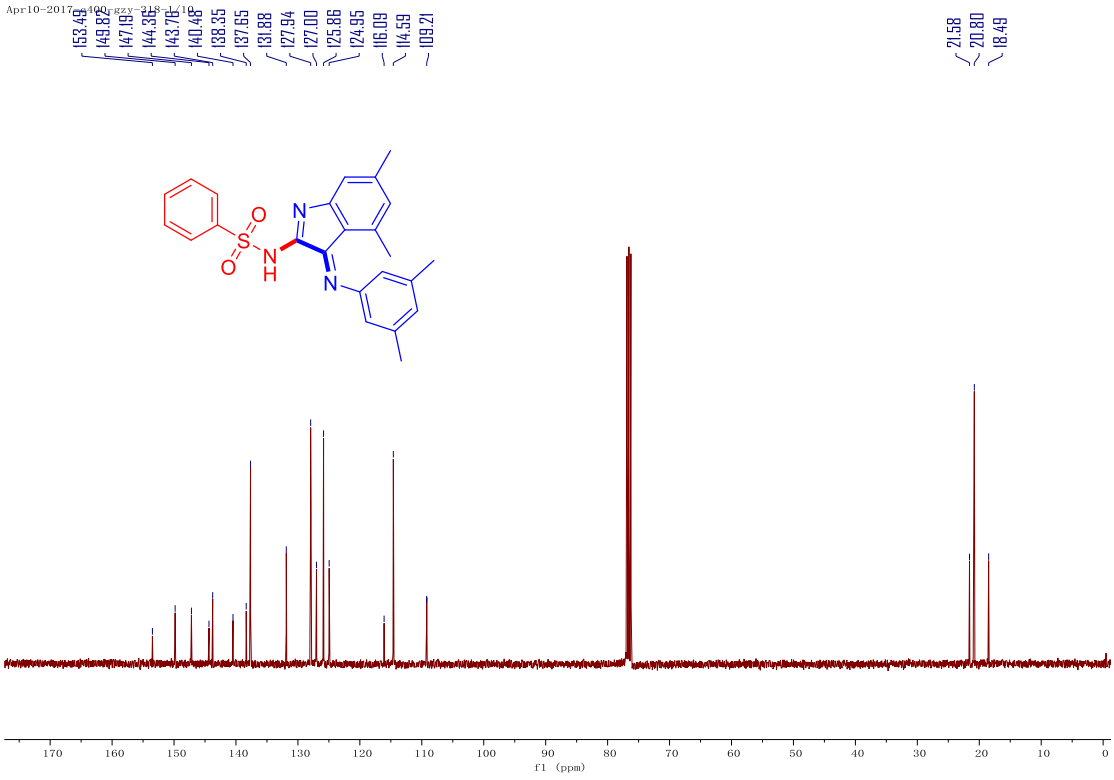
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-methylbenzenesulfonamide (5ag)



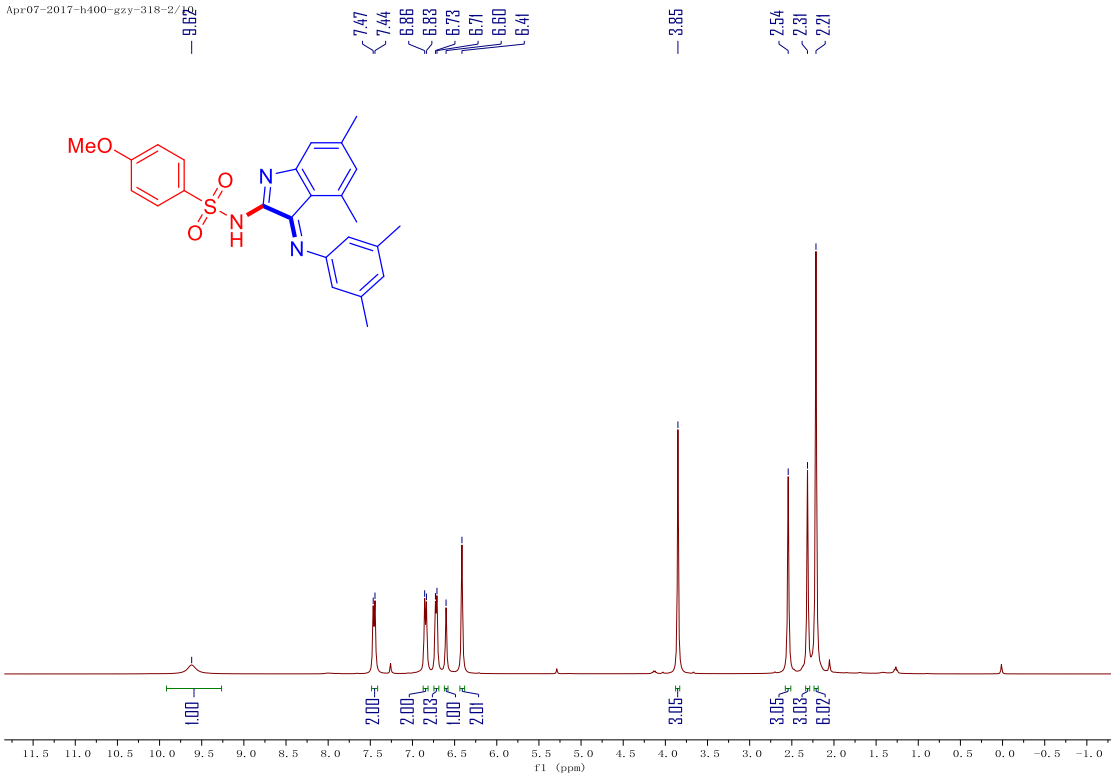


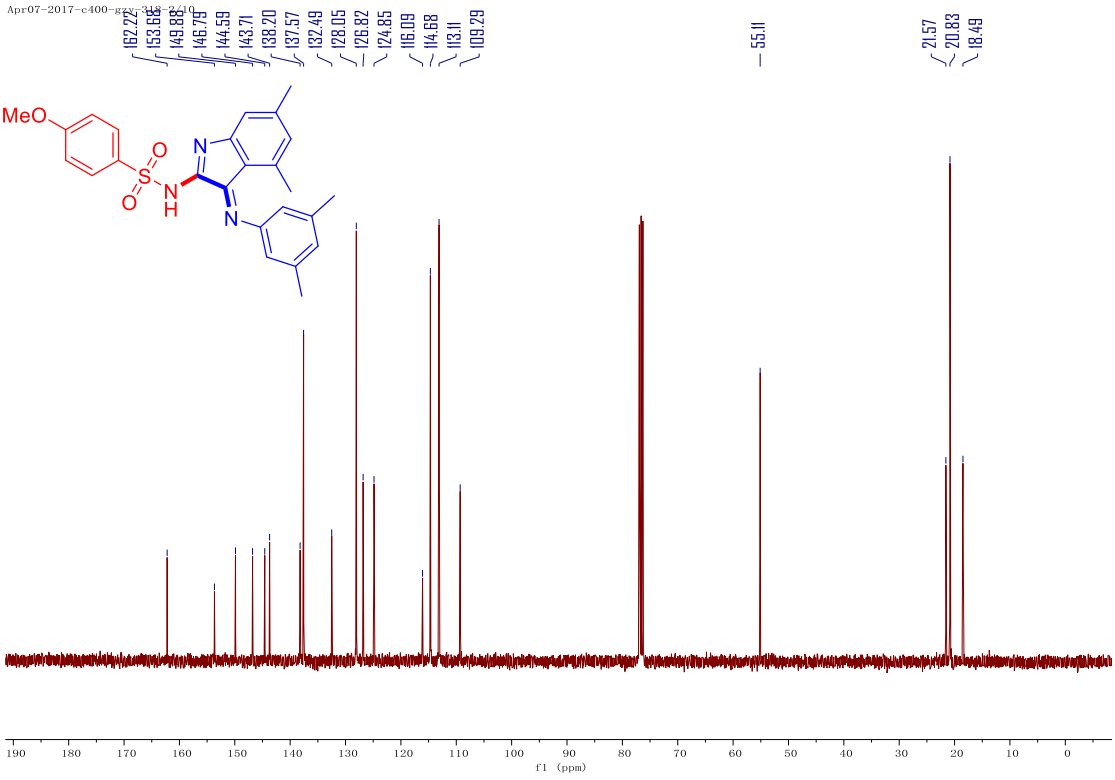
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benzenesulfonamide (5bg)



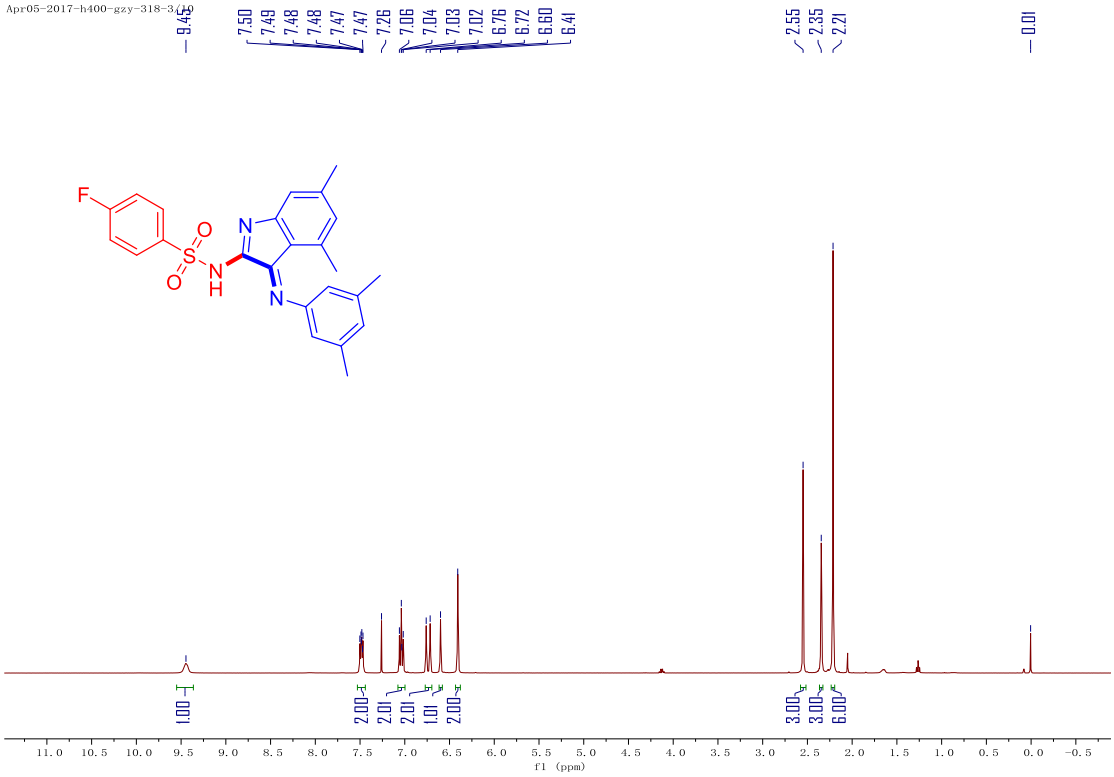


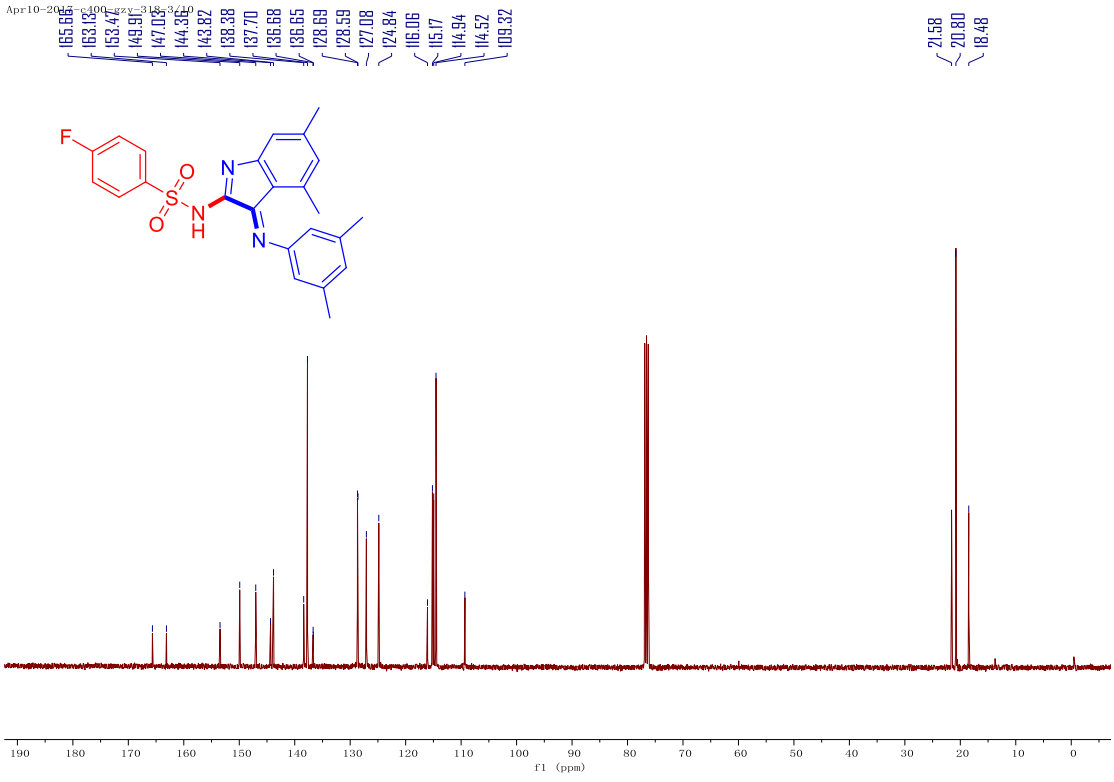
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-methoxybenzenesulfonamide (5cg)



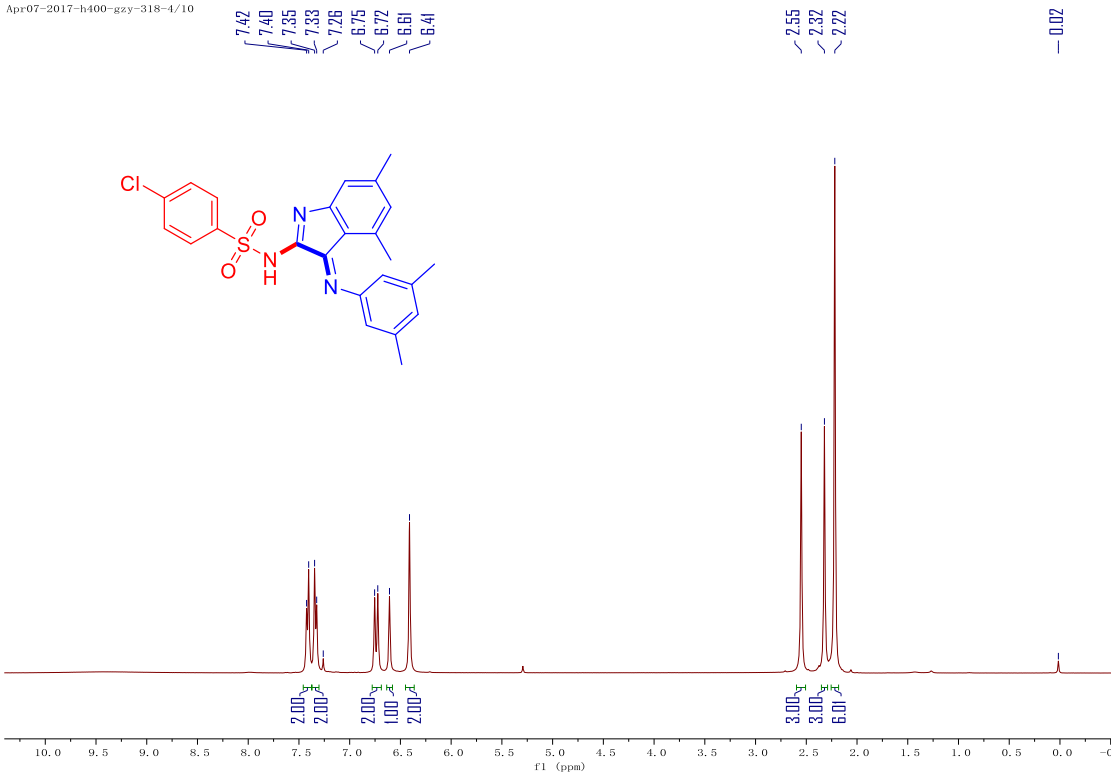


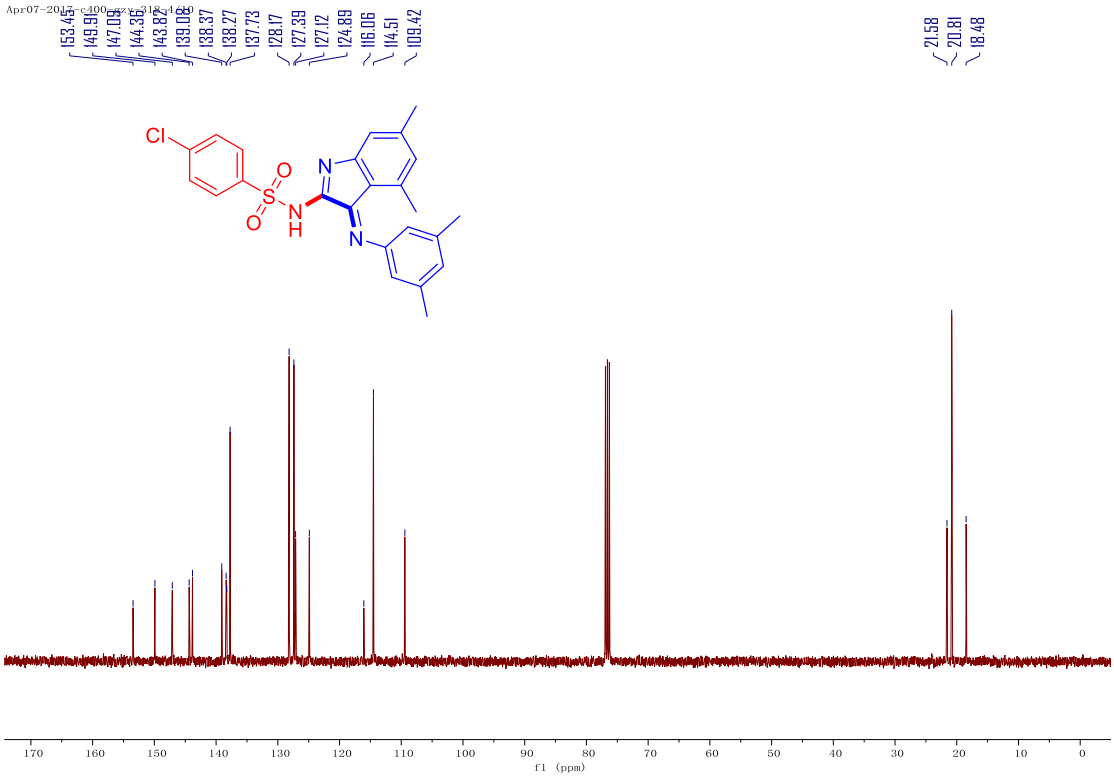
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-fluorobenze nesulfonamide (5dg)



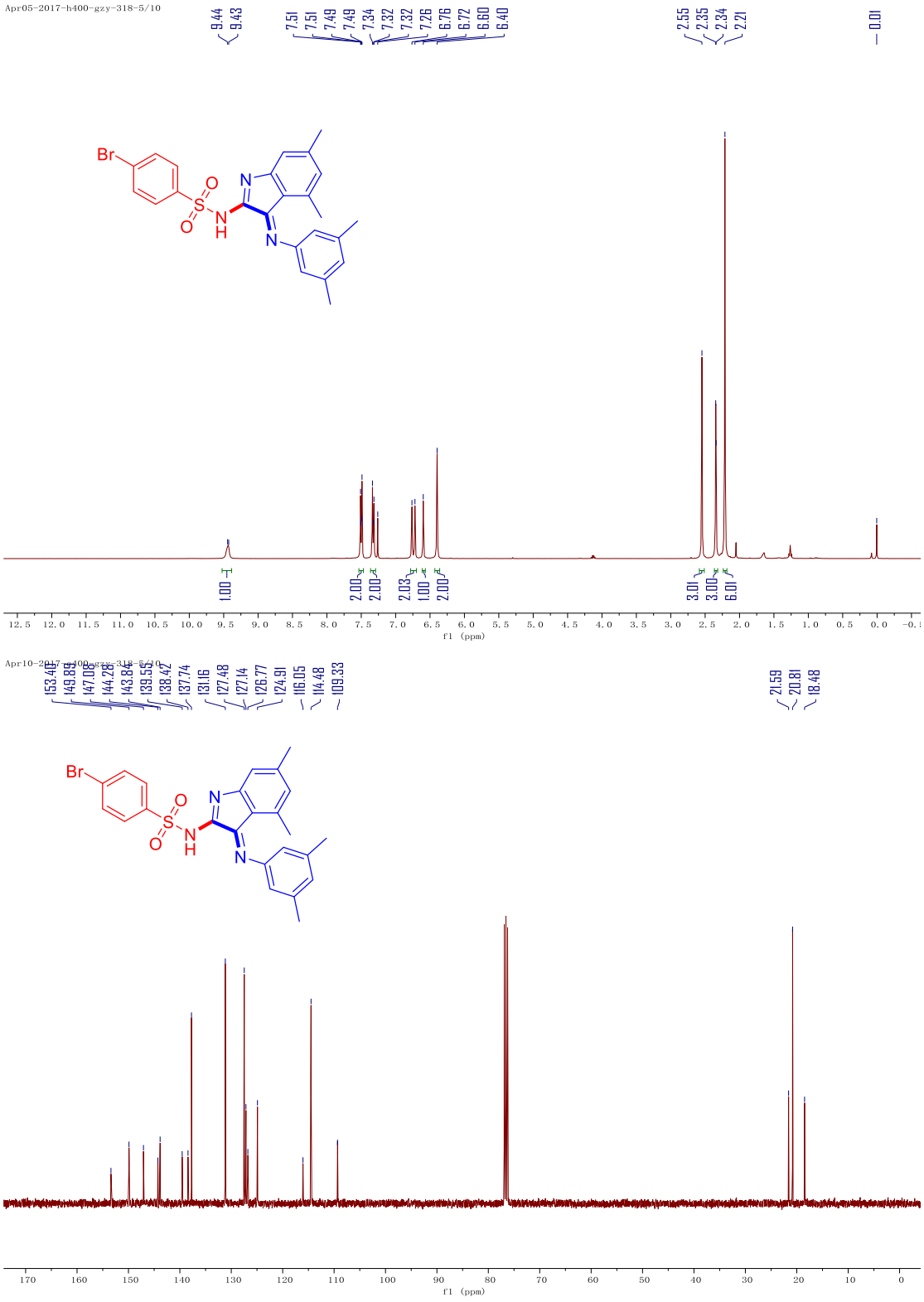


(E)-4-chloro-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benze nesulfonamide (5eg)

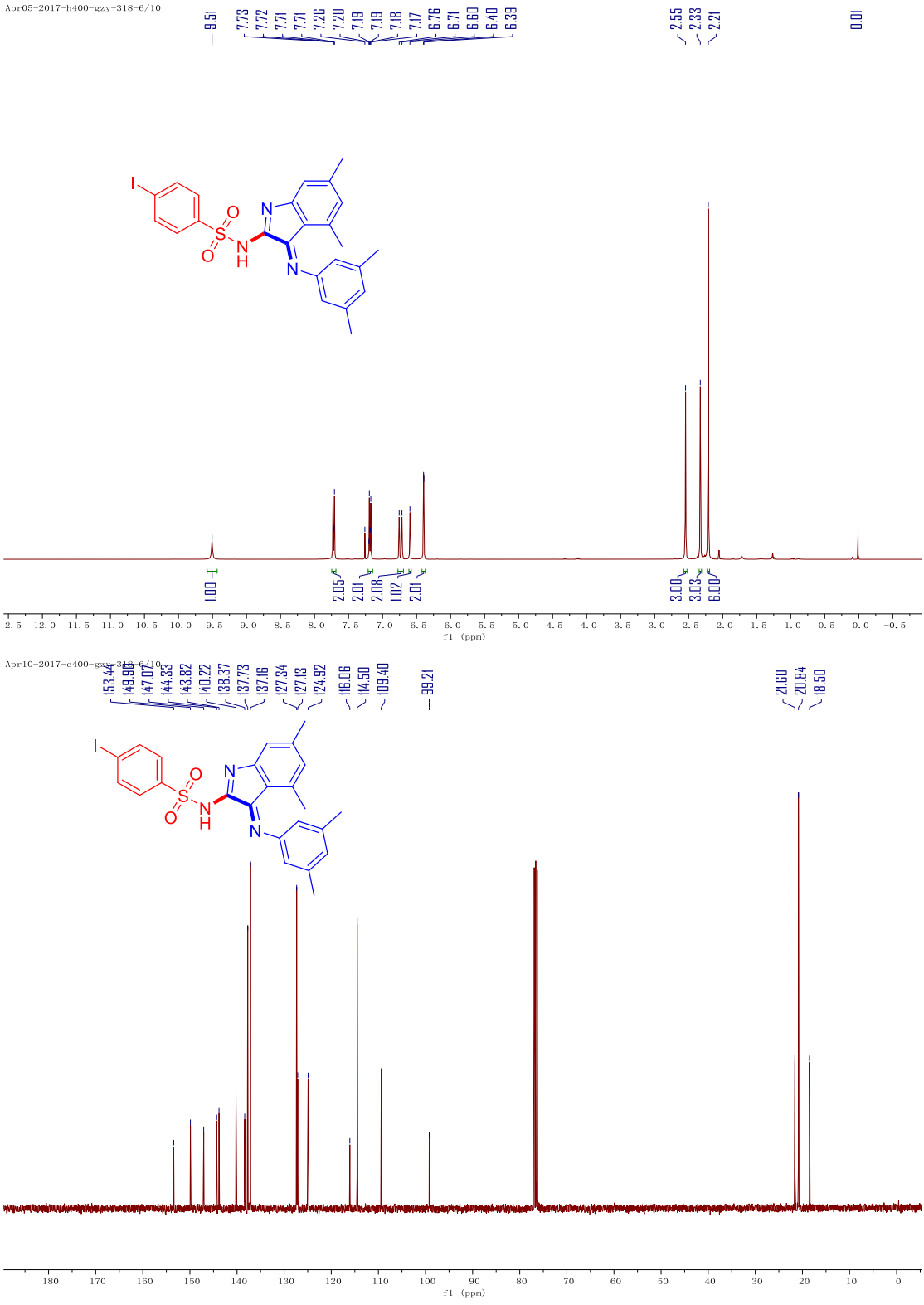




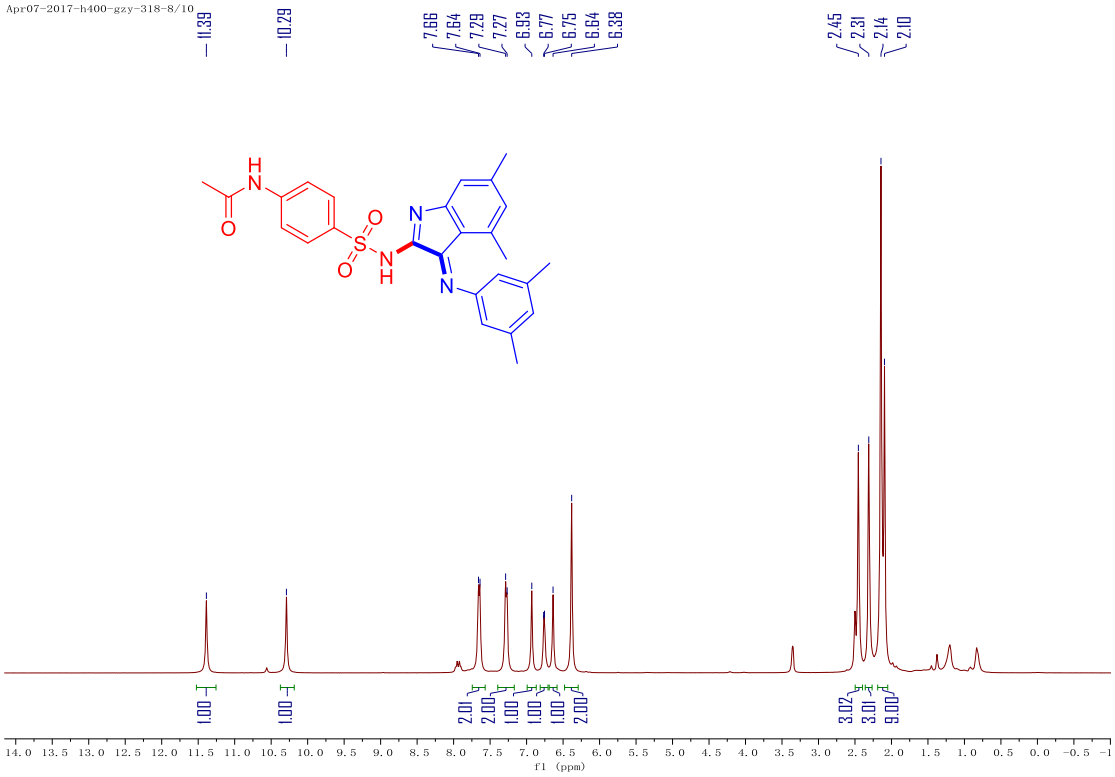
(E)-4-bromo-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)benzenesulfonamide (5fg)

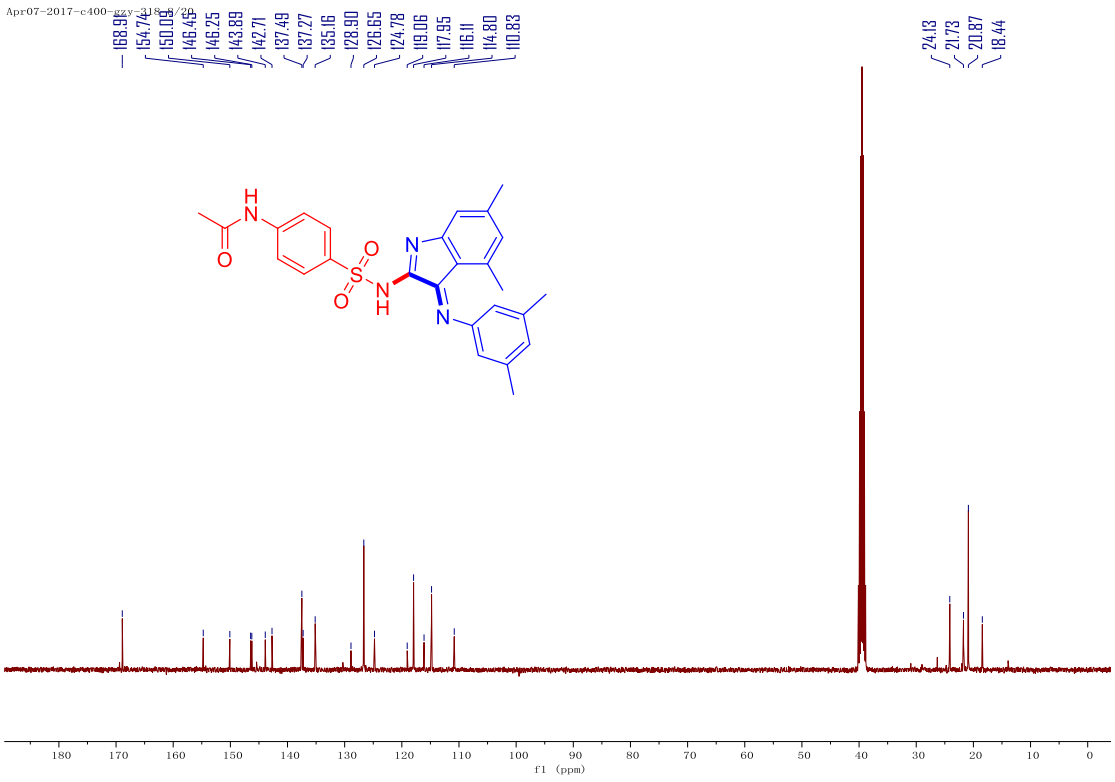


(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)-4-iodobenzene sulfonamide (5gg)

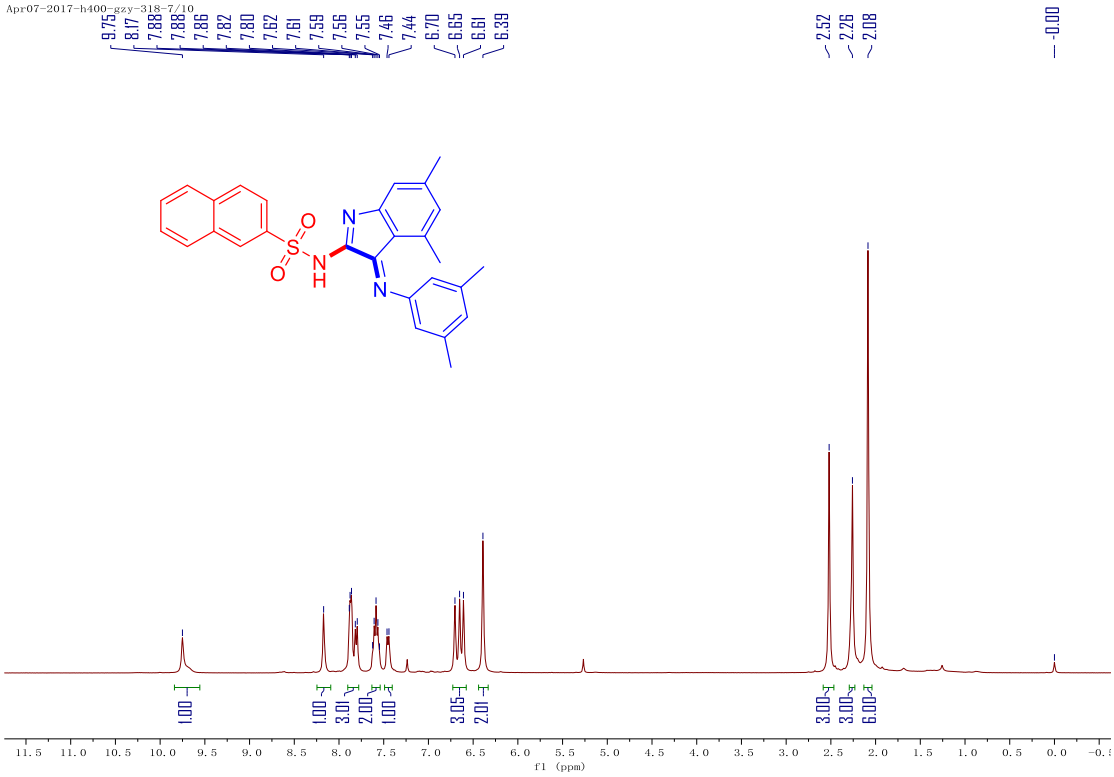


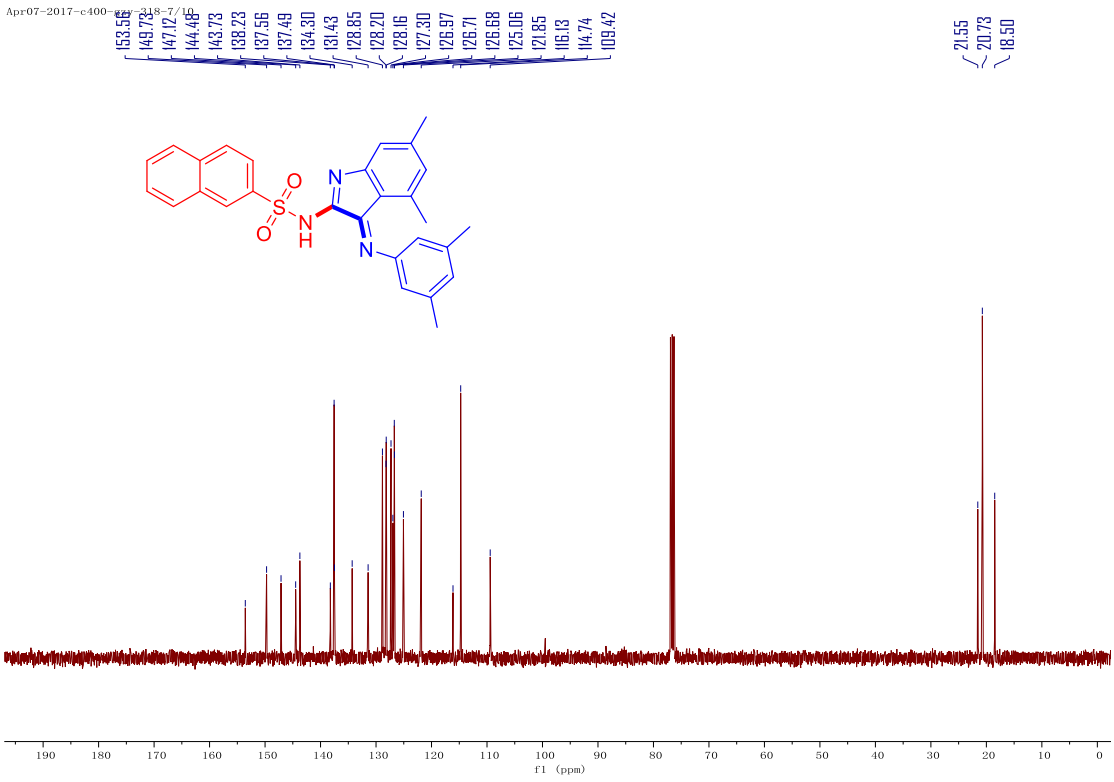
(E)-N-(4-(N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)sulfamoyl)phenyl)acetamide (5hg)



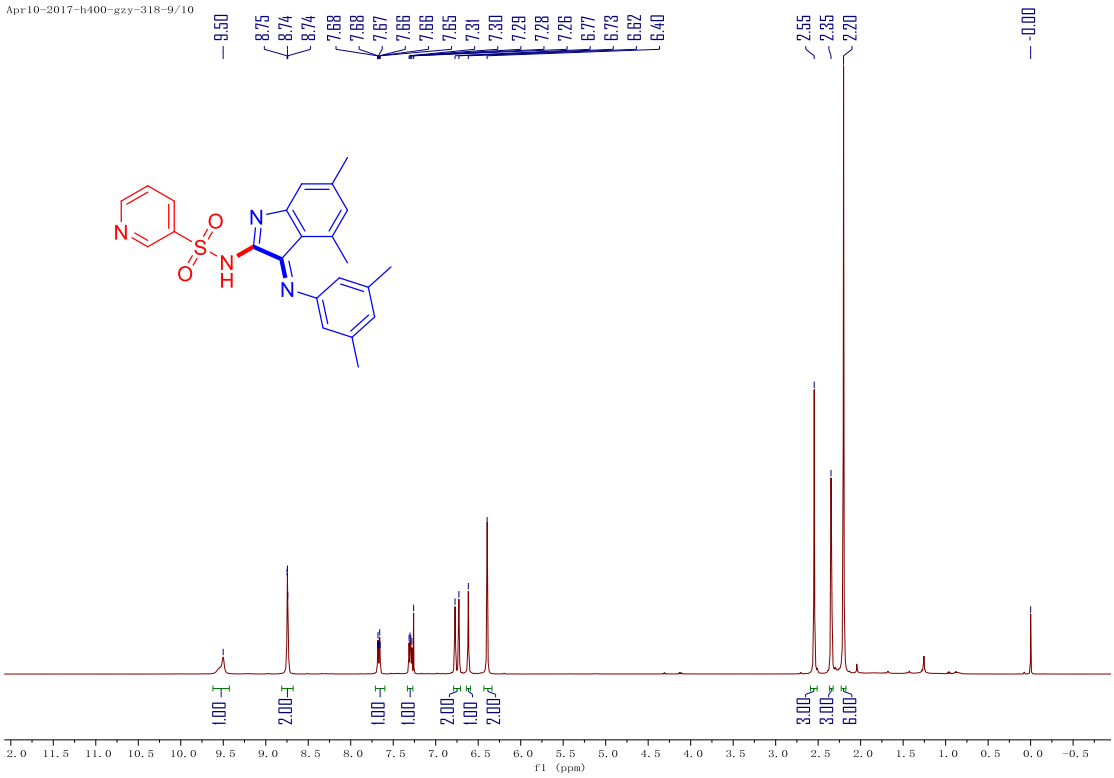


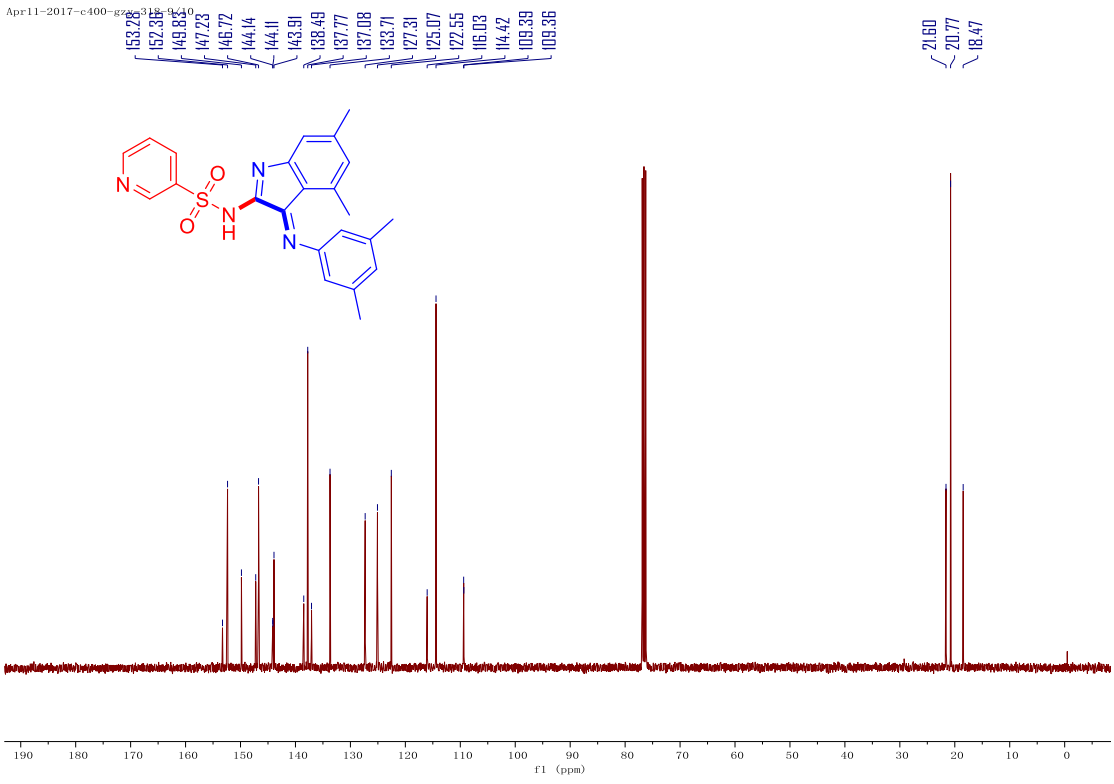
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)naphthalene-2-sulfonamide (5ig)



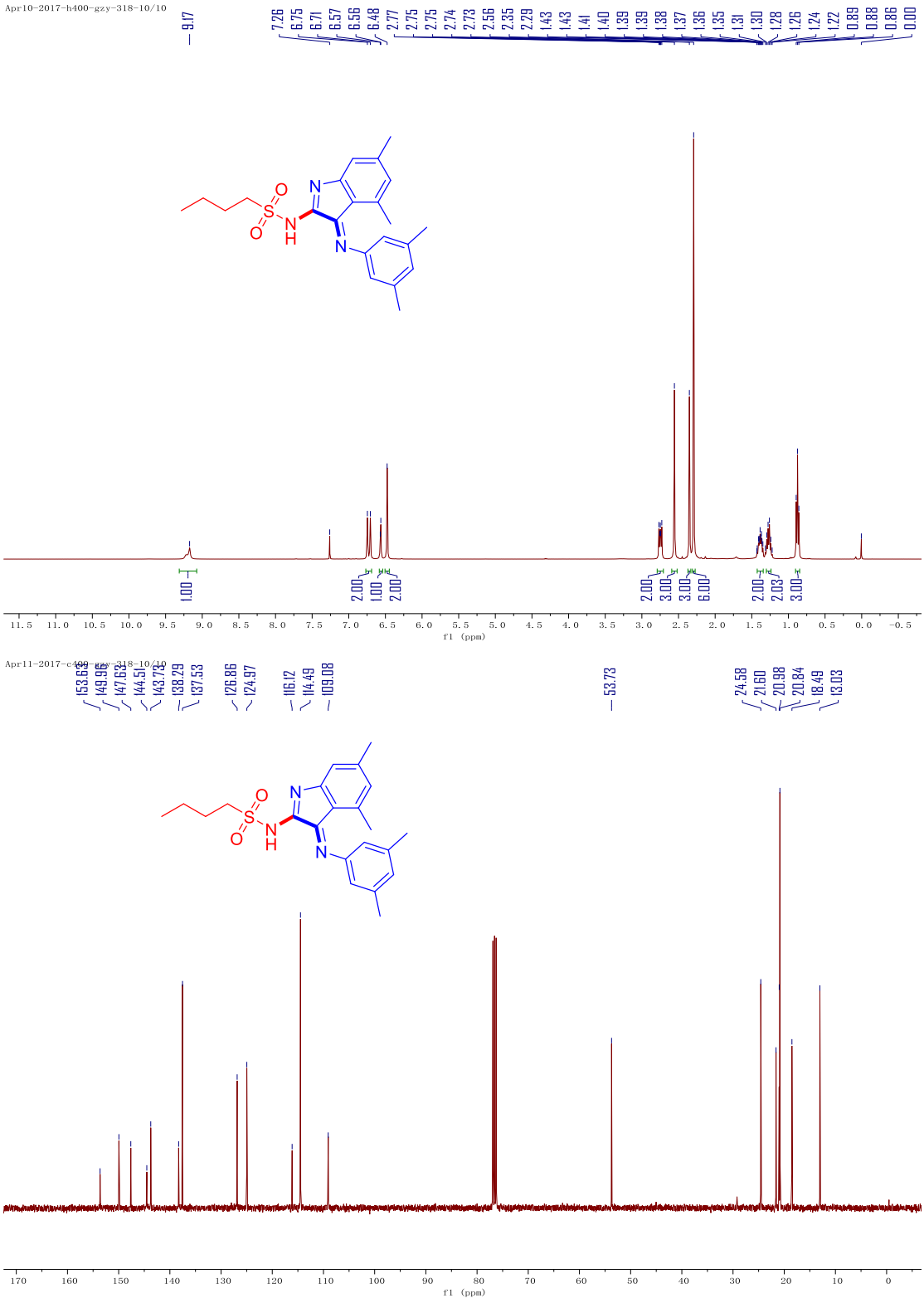


(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)pyridine-3-sulfonamide (5jg)

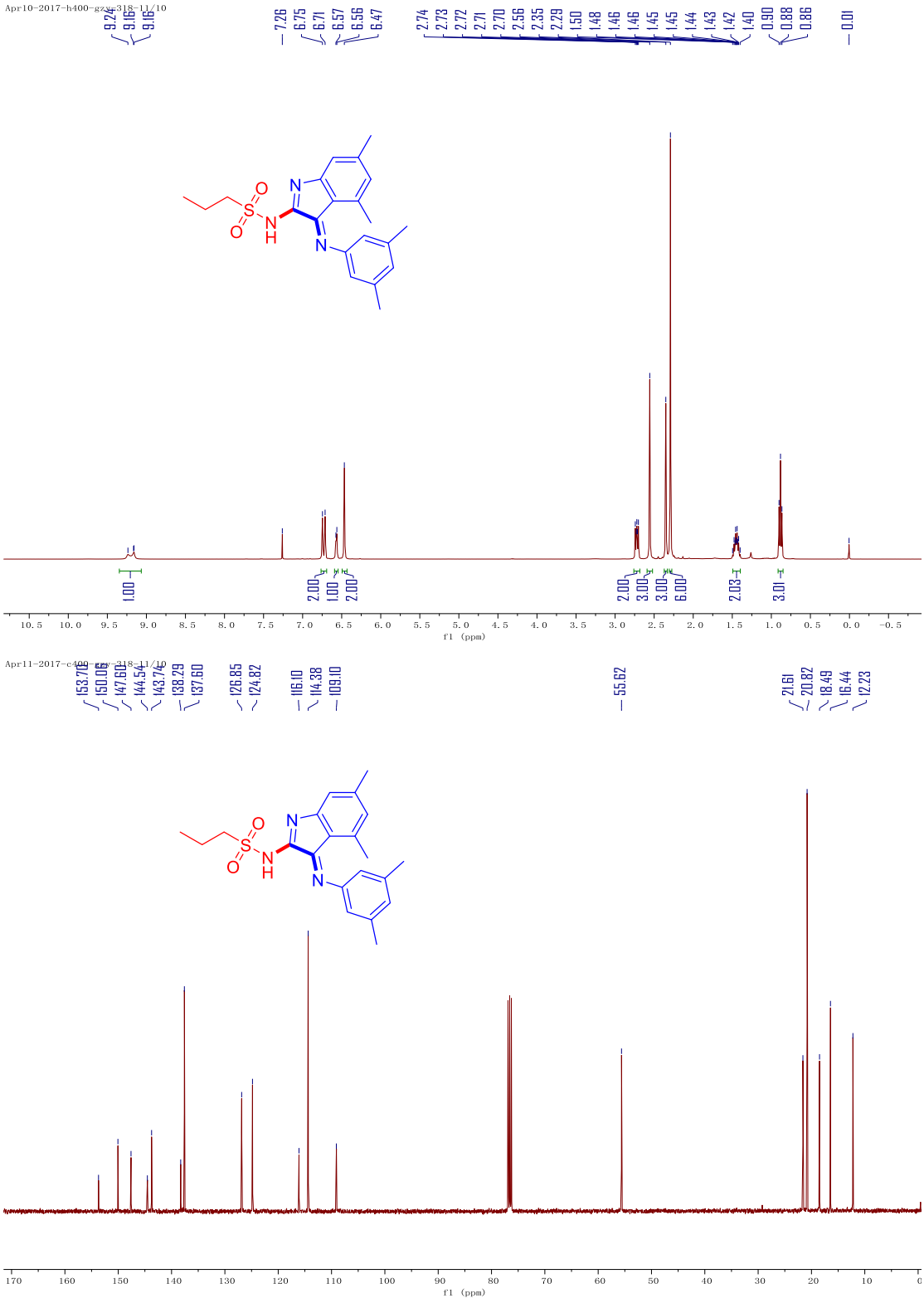




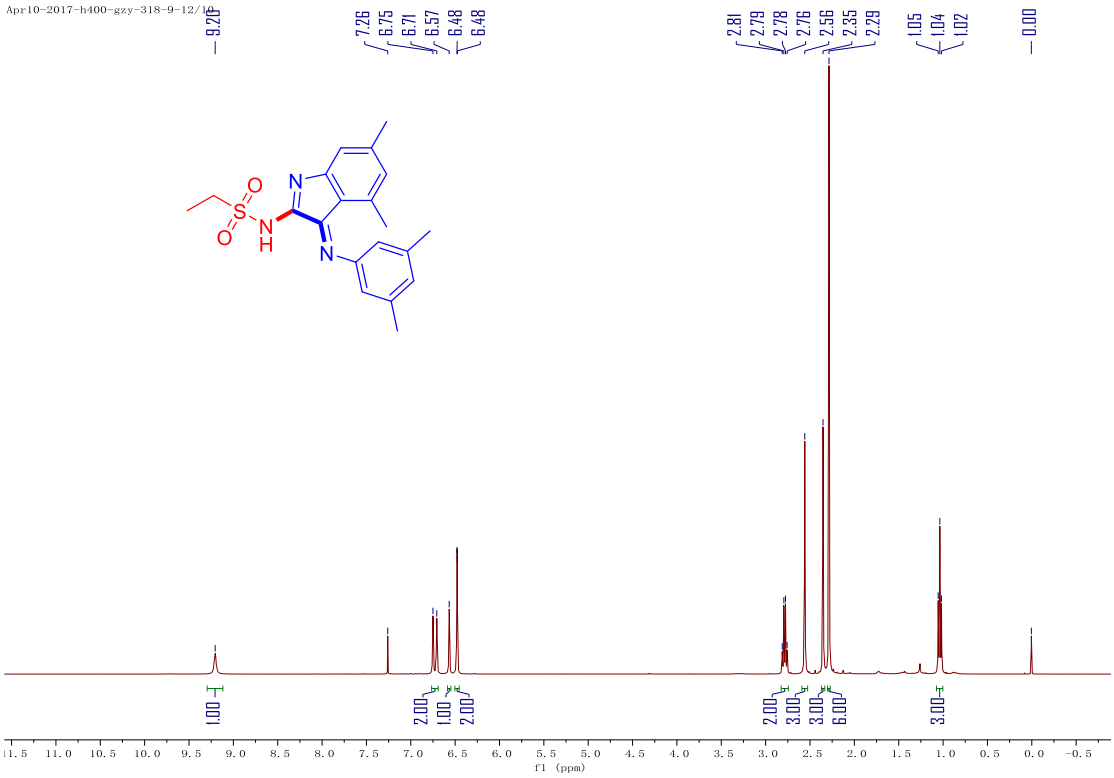
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)butane-1-sulfonamide (5kg)

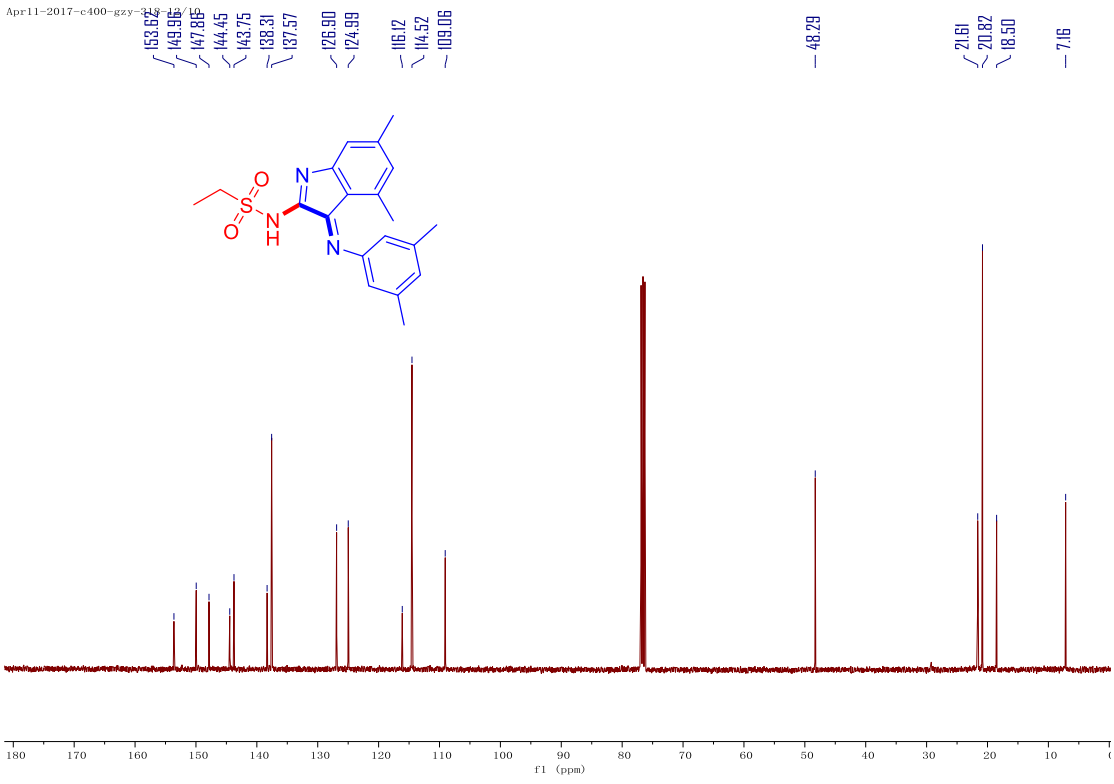


(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)propane-1-sulfonamide (5lg)

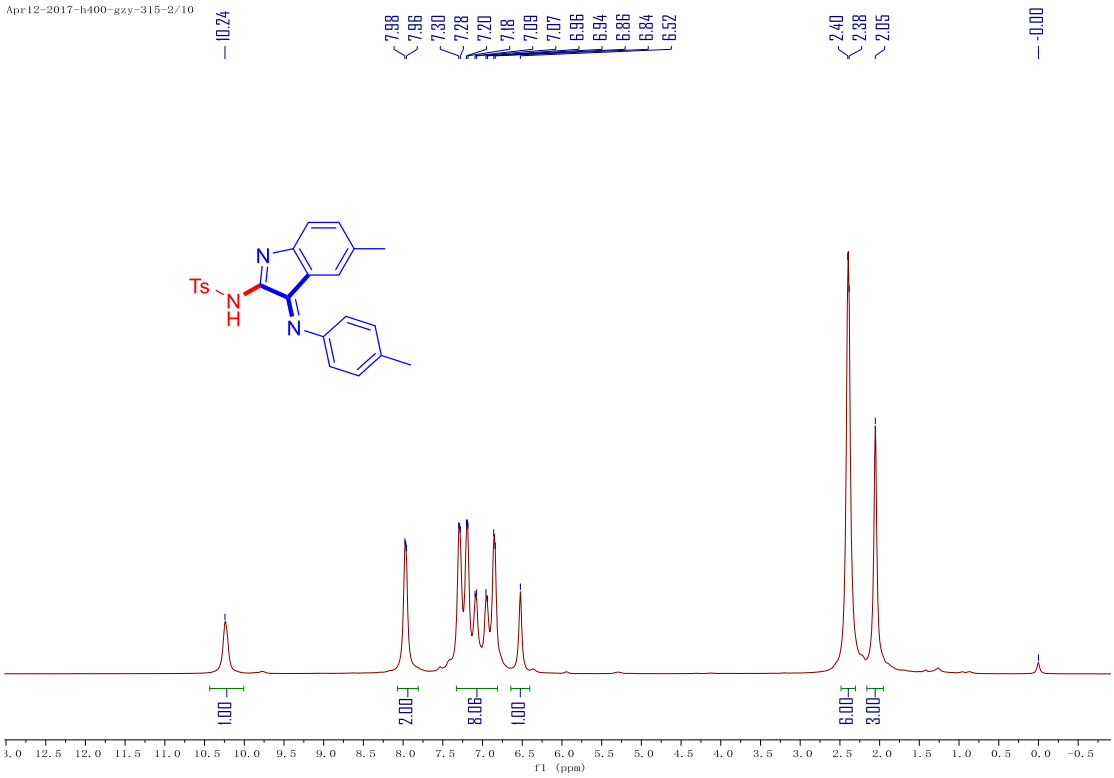


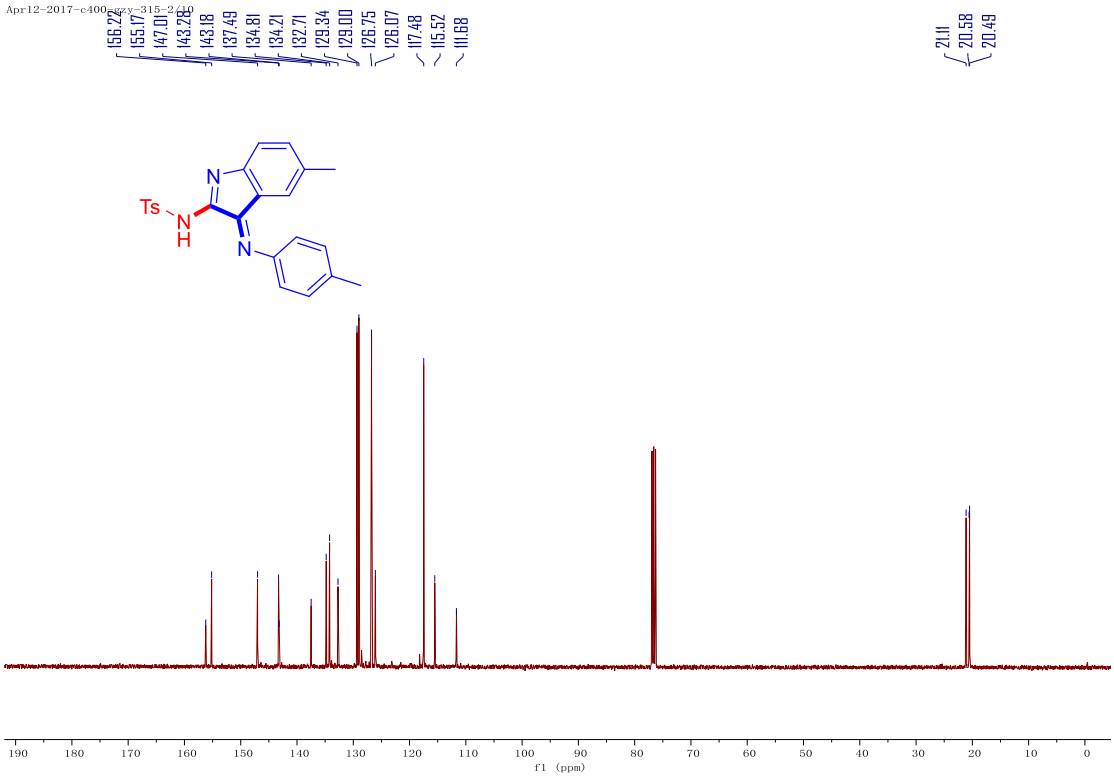
(E)-N-(3-((3,5-dimethylphenyl)imino)-4,6-dimethyl-3H-indol-2-yl)ethanesulfonamide (5mg)



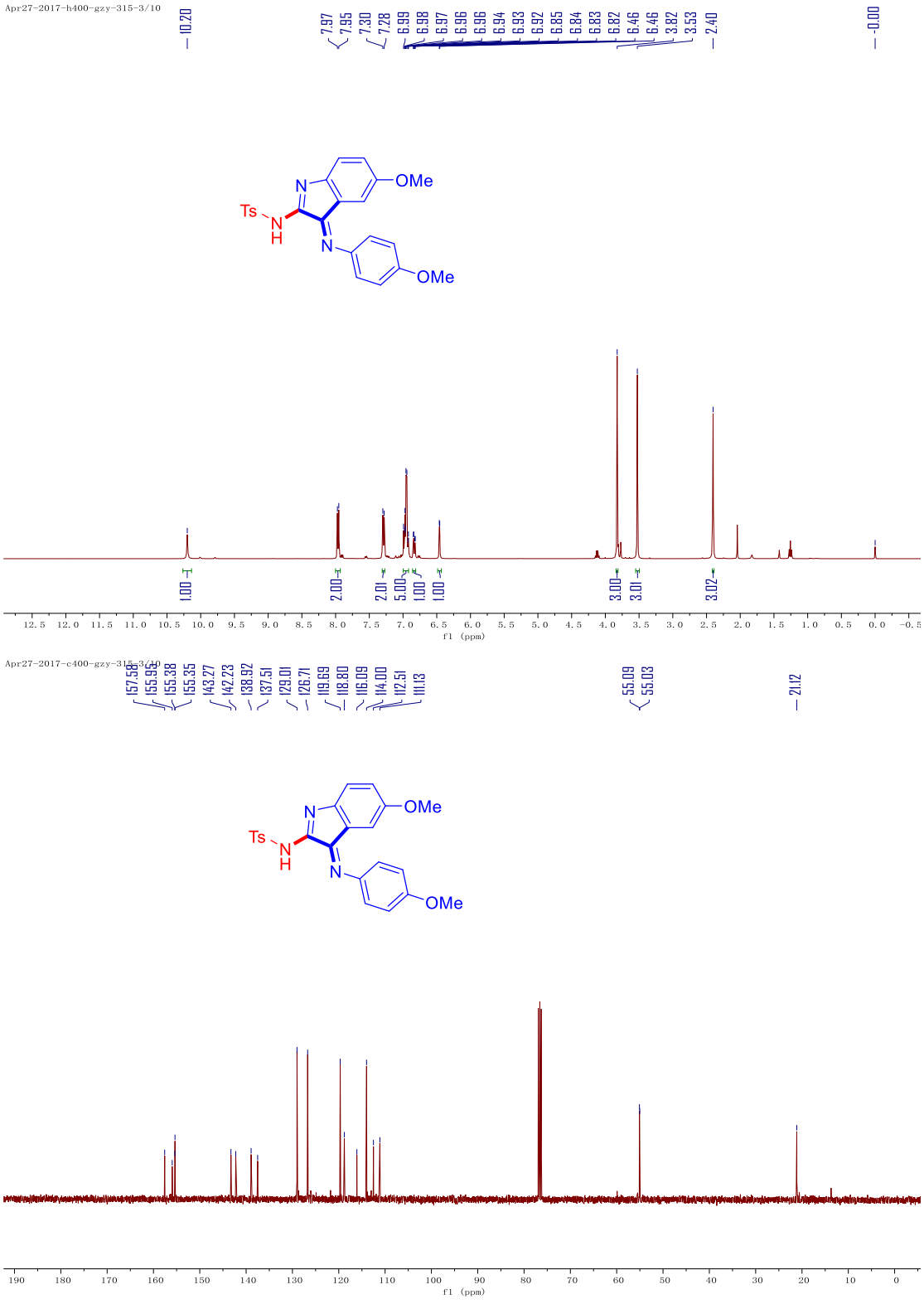


(E)-4-methyl-N-(5-methyl-3-(p-tolylimino)-3H-indol-2-yl)benzenesulfonamide (5ah)

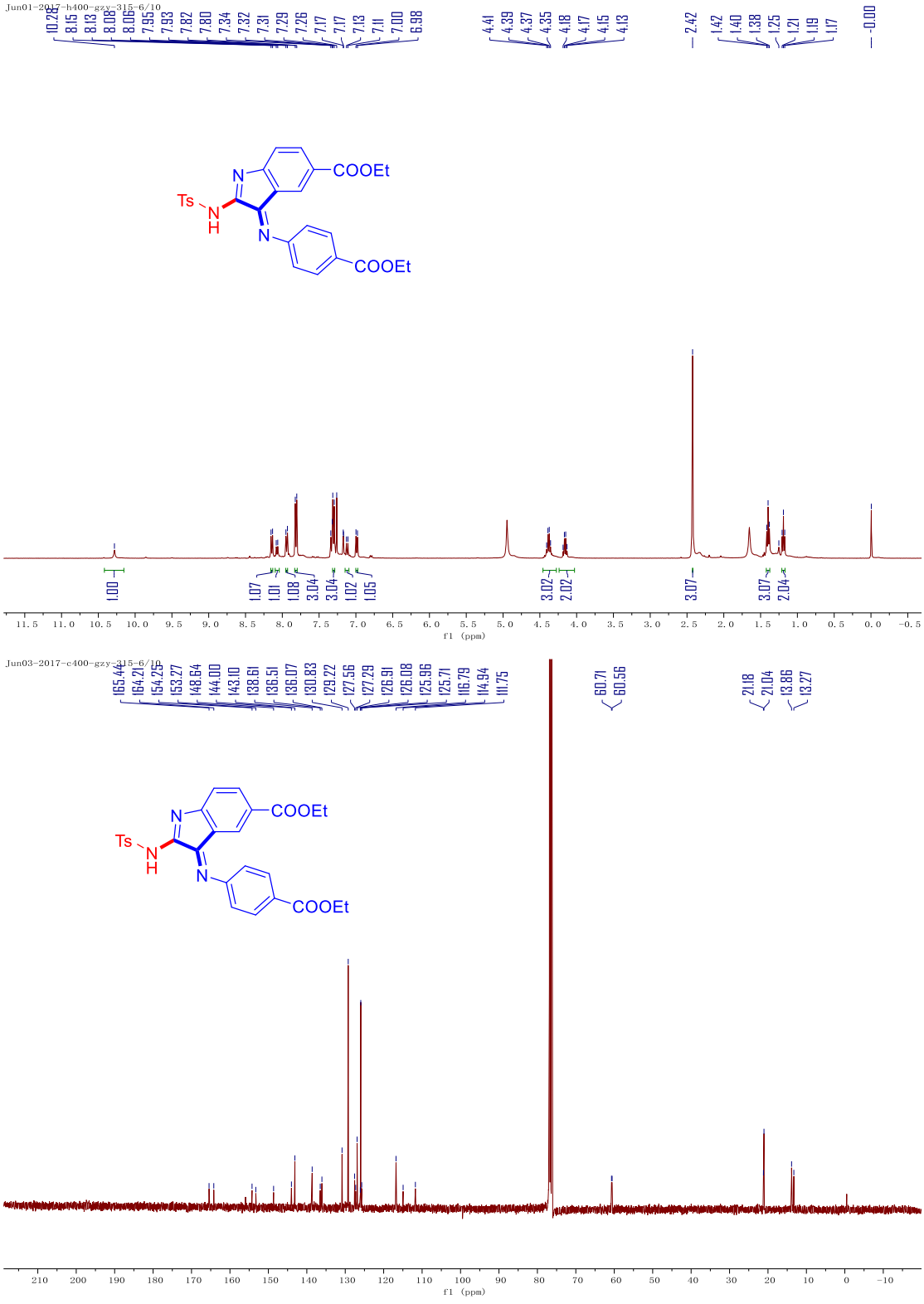




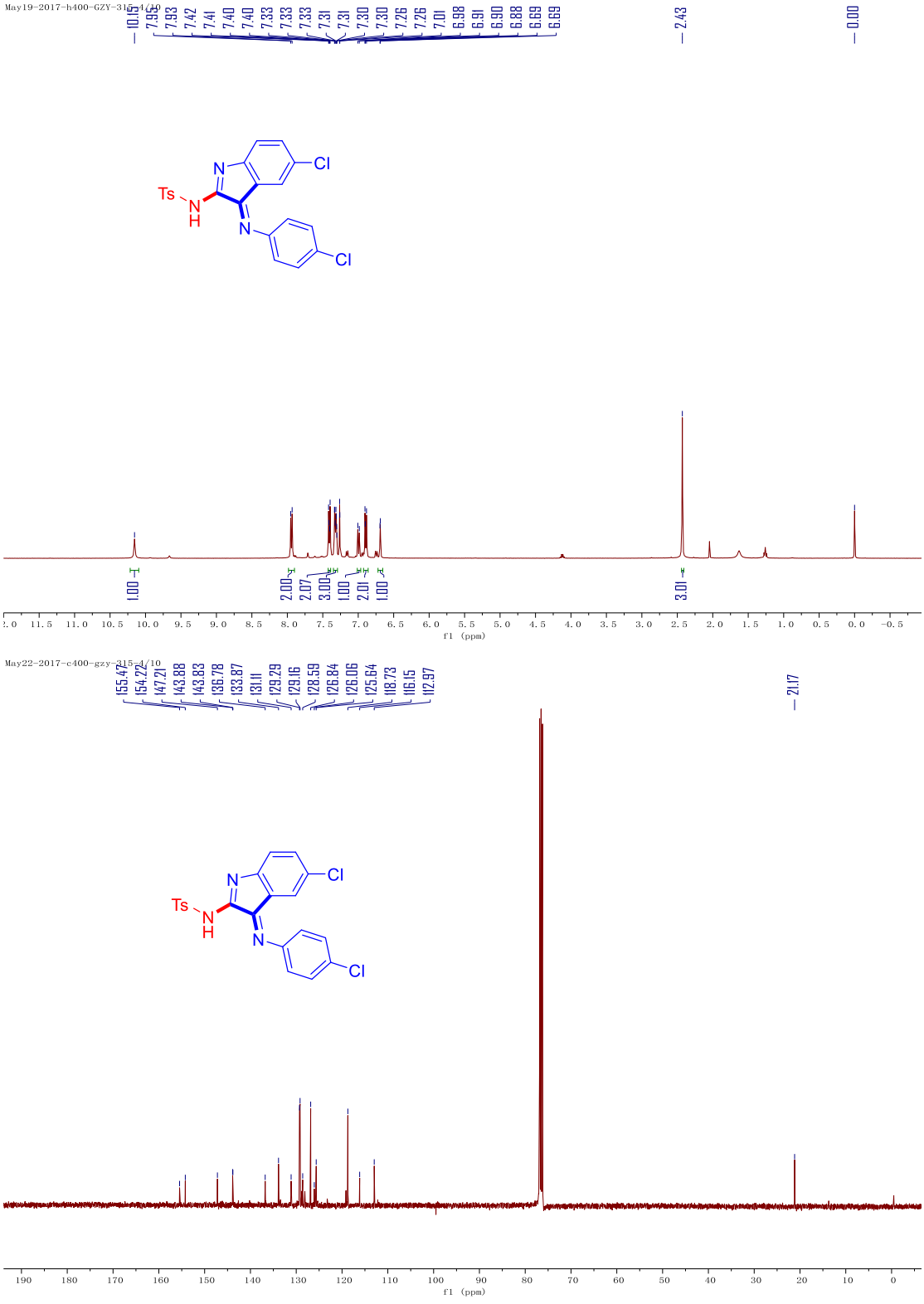
(E)-N-(5-methoxy-3-((4-methoxyphenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5ai)



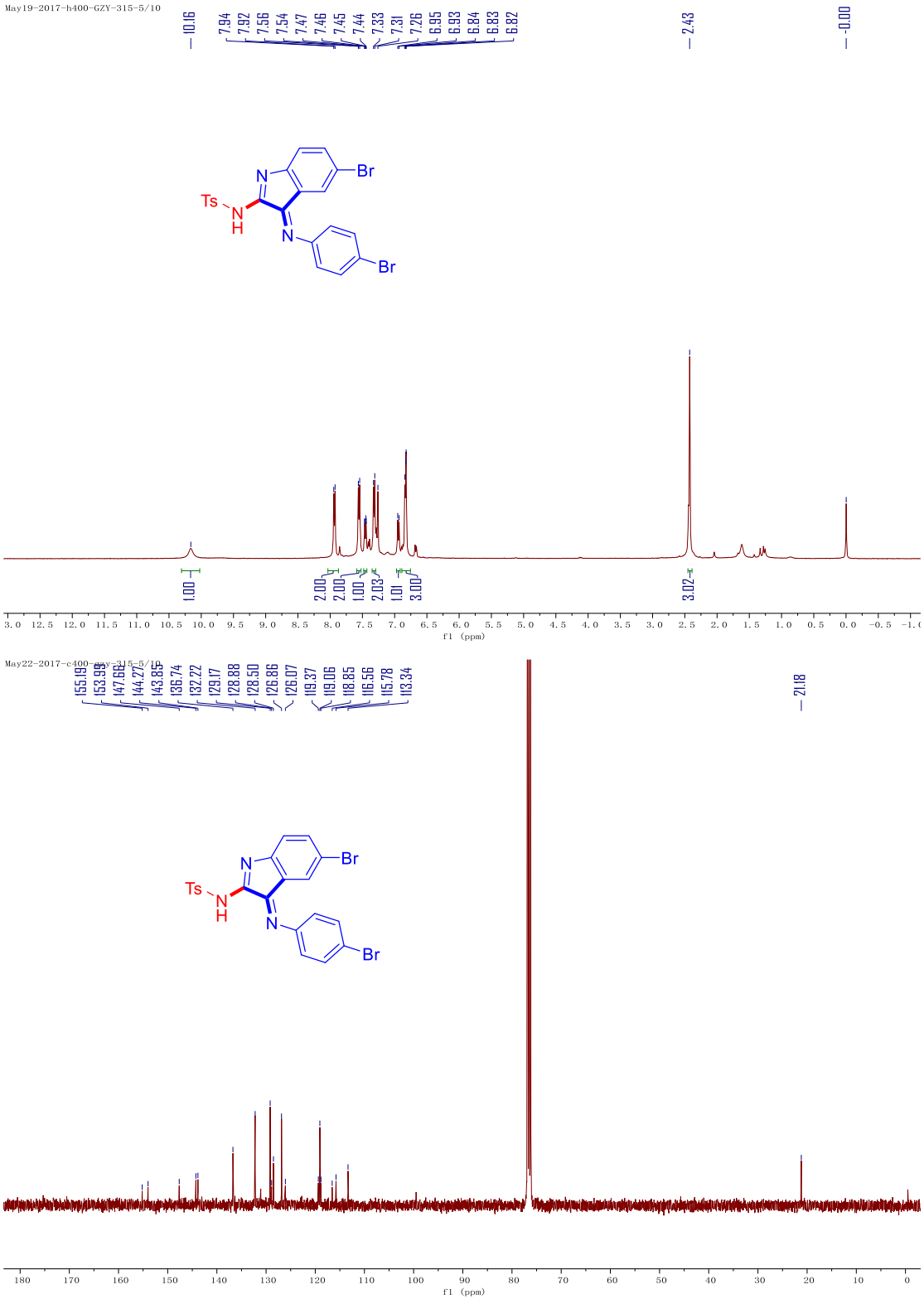
Ethyl-(E)-3-((4-(ethoxycarbonyl)phenyl)imino)-2-((4-methylphenyl)sulfonamido)-3H-indole-5-carboxylate (5ak)



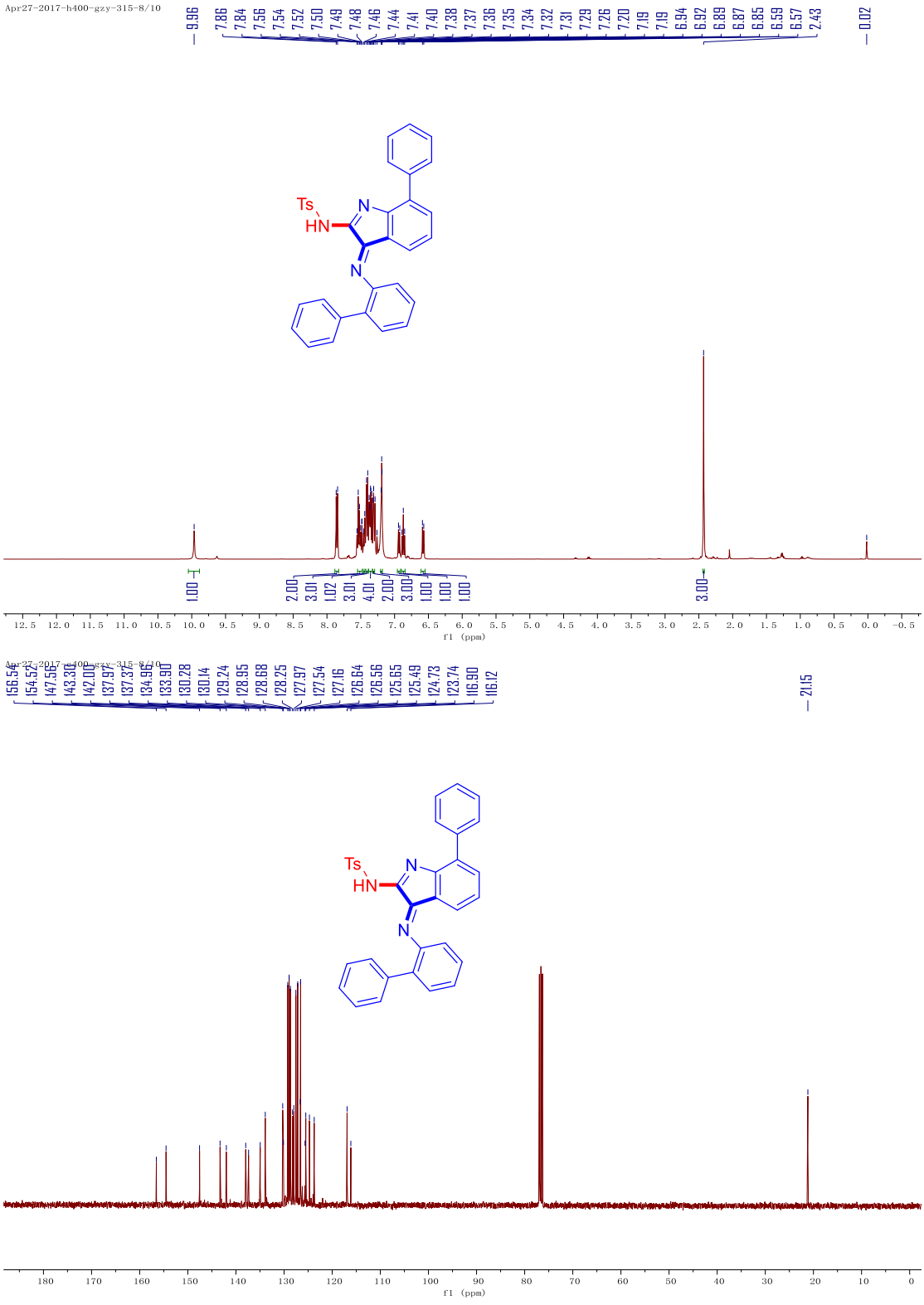
(E)-N-(5-chloro-3-((4-chlorophenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5al)



(E)-N-(5-bromo-3-((4-bromophenyl)imino)-3H-indol-2-yl)-4-methylbenzenesulfonamide (5am)



(E)-N-(3-([1,1'-biphenyl]-2-ylimino)-7-phenyl-3H-indol-2-yl)-4-methylbenzenesulfonamide (5an)



N-((tert-butylimino)methylene)-4-methylbenzenesulfonamide 6