Supporting Information

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Efficient one-pot three-component synthesis of 2*H*-indazole [2,1-*b*] phthalazine-1,6,11(13*H*)-triones at room temperature

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S.1. Experimental Section

S.1.1. General

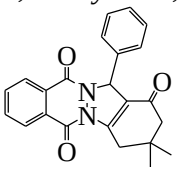
The progress of reaction was monitored by TLC. ^{1}H NMR and ^{13}C NMR spectra of 2*H*- indazole [2, 1-*b*] phthalazine-1,6,11(13*H*)-triones were recorded with TMS as an internal standard using a Agilent technologies 400 MHz spectrometer in DMSO-d_6.Chemical shifts *(d)* are in ppm and coupling constant (*J*) are express in hertz (Hz). Mass spectra were taken on a Macro mass spectrometer (Waters) by electro-spray method (ES). IR spectra were recorded on a Bruker spctrophometer using KBr discs, and the absorption band are expressed. Melting point, were determined in open capillaries Veego Melting Point Apparatus.

S.1.2. Experimental Procedure

Mixture of aldehyde (1.2 mmol), phthalhydrazide (1 mmol) and dimedone (1 mmol), and catalyst TBAB (10 mol%), Cs_2CO_3 (10 mol%) was stirred for the specified time as mentioned in Table 2 (in main text), at room temperature in ethanol (5 ml). After completion TLC, the reaction mixture was washed with diethyl ether (3x15 ml) and the organic layer was evaporated on rotary evaporator to obtained crude product which was purified by recrystallization in aqueous ethanol (25%).

S.1.3. Spectral Data of Compounds

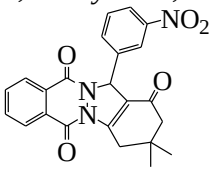
*3,4-Dihydro-3,3-dimethyl-13-phenyl-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4a**)*



4a

Yellow powder: m. p: 205-206 ^{o}C; IR (KBr, cm^{-1}): 2955, 2375, 1669, 1570; ^{1}H NMR: (400 MHz, DMSO-d_6): δ = 1.21 (s, 6H), 2.33 (s, 2H), 3.22 -3.47 (AB System, *J* = 18.10 Hz, 2H), 6.44 (s, 1H), 7.23 - 8.35 (m, 9H); ^{13}CNMR: (400 MHz,DMSO-d_6): δ= 28.3, 28.7, 34.8, 38.1, 50.9, 64.8, 118.7, 127.0, 127.9, 128.6, 129.1, 129.4, 129.5, 133.9, 134.5, 136.4, 150.8, 154.2, 156.0, 192.1; MS: *m/z*: = 372 (M^+).

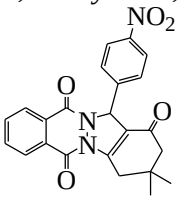
*3,4-Dihydro-3,3-dimethyl-13-(3-nitrophenyl)-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4b**)*



4b

Yellow powder: m. p: 268-270 ^{o}C; IR (KBr, cm^{-1}): 2972, 1682, 1663, 1625; ^{1}H NMR: (400 MHz, DMSO-d_6): δ = 1.23 (s, 6H), 2.34 (s, 2H), 3.23-3.45 (AB System, *J* = 18.9 Hz, 2H), 6.53 (s, 1H), 7.54-8.40 (m, 8H); ^{13}CNMR: (100 MHz, DMSO-d_6): δ = 28.4, 28.9, 35.7, 38.4, 51.8, 63.1, 118.1, 122.5, 124.7, 128.2, 128.8, 129.1, 129.7, 132.9, 133.2, 134.4, 138.7, 148.5, 150.8, 154.3, 155.9, 192.1; MS: *m/z* = 417 (M^+).

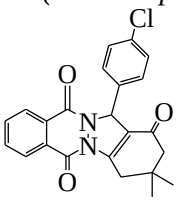
*3,4-Dihydro-3,3-dimethyl-13-(4-nitrophenyl)-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4c**)*



4c

Yellow powder: m. p: 222-224 ºC; IR (KBr, cm^{-1}): 2972, 2957, 1693, 1661; ^{1}H NMR: (400 MHz, DMSO-d_6): δ = 1.18 (s, 3H), 1.26 (s, 3H), 2.34 (s, 2H), 3.24-3.45 (AB system, *J* = 19.2 Hz, 2H), 6.53 (s, 1H), 7.27 and 8.15 (dd, 4H, *J* = 11.1 Hz), 7.87-7.90 (m, 2H), 8.25-8.38 (m, 2H); ^{13}CNMR: (100MHz, DMSO-d_6): δ = 27.4, 28.5, 33.5, 37.1, 51.8, 63.1, 114.3, 121.0, 125.7, 127.0, 128.7, 128.9, 129.5, 132.9, 133.8, 142.4, 145.9, 152.6, 153.5, 154.9, 192.9; MS: *m/z* = 417 (M^+).

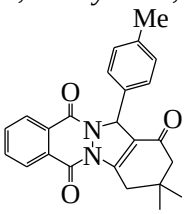
*13-(4-Chlorophenyl)-3,4-dihydro-3,3-dimethyl-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4d**)*



4d

Yellow powder; m. p: 262-264 ºC; IR (KBr, cm^{-1}): 2957, 2931, 1688, 1654, 1622; ^{1}H NMR (400 MHz, DMSO-d_6): δ = 1.22 (s, 6H), 2.33 (s, 2H), 3.22-3.44 (AB system, *J* = 19.1 Hz, 2H), 6.41 (s, 1H, CHN), 7.28-7.38 (m, 4H), 7.84-8.38 (m, 4H); ^{13}CNMR: (100 MHz, DMSO-d_6): δ = 27.4, 28.2, 33.7, 36.0, 51.9, 63.3, 114.6, 122.0, 126.1, 127.7, 128.1, 128.7, 128.9, 129.8, 129.9, 130.1, 131.5, 132.5, 134.4, 149.8, 151.3, 154.0, 156.1, 192.2; MS: *m/z* = 404 (M^+).

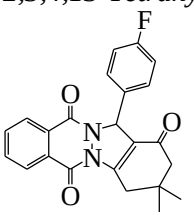
*3,4-Dihydro-3,3-dimethyl-13-p-tolyl-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4e**)*



4e

Yellow powder; m. p: 226-228 ºC; IR (KBr, cm^{-1}): 2958, 1667, 1631; ^{1}H NMR: (400 MHz, DMSO-d_6): δ = 1.21 (s, 6H), 2.20 (s, 3H), 2.33 (s, 2H), 3.21-3.45 (AB system, *J* =18.9 Hz, 2H), 6.43 (s, 1H), 7.12-7.32 (dd, *J* =7.8 Hz, 4H) 7.83-8.36 (m, 4H); ^{13}CNMR: (100 MHz, DMSO-d_6): δ = 21.3, 28.4, 28.6, 34.6, 38.1, 50.9, 64.7, 118.7, 127.1, 127.7, 128.9, 129.1, 129.4, 133.4, 134.4, 138.3, 148.5, 150.7, 154.1, 156.1, 192.1; MS: *m/z* = 386 (M^+).

*2,3,4,13-Tetrahydro-3,3-dimethyl-13-(4-fluorophenyl)-indazolo[2,1-b]phthalazine1,6,11-trione (**4f**)*

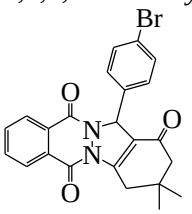


4f

Yellow powder; m. p: 219-220 ºC; IR (KBr, cm^{-1}): 2958, 2867, 1664, 1655, 1626; 1473, 1309; ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.24 (s, 6H), 2.36 (s, 2H), 3.26-3.43 (AB system, *J* = 19.1 Hz, 2H), 6.46 (s, 1H), 7.02-7.06 (m, 2H), 7.40-7.44 (m, 2H), 7.86-7.89 (m, 2H), 8.27-8.39 (m, 2H); ^{13}C NMR (100 MHz,

$CDCl_3$) δ = 28.8, 29.1, 35.1, 38.4, 51.3, 64.7, 116.0, 116.2, 118.6, 128.1, 128.4, 129.3, 129.4, 132.6, 134.0, 135.0, 151.4, 154.8, 156.4, 162.1, 164.1, 192.5.

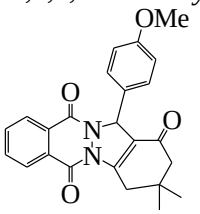
*2,3,4,13-Tetrahydro-3,3-dimethyl-13-(4-bromophenyl)-indazolo[1,2-b]phthalazine1,6,11-trione (**4g**)*



4g

White powder; m.p: 264-266 °C; IR (KBr, cm^{-1}): 2957, 1656, 1623, 1543, 1471, 1308, 1267; ^1H NMR (400 MHz, $CDCl_3$) δ = 1.23 (s, 6H), 2.36 (s, 2H), 3.26-3.42 (AB system, *J* = 19.0 Hz, 2H), 6.42 (s, 1H), 7.29-7.40 (m, 4H), 7.80-8.29 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.5, 28.7, 34.7, 38.0, 50.9, 64.4, 118.0, 122.8, 127.8, 128.1, 128.8, 128.9, 129.0, 131.9, 133.7, 134.7, 135.5, 151.1, 154.4, 156.0, 192.1.

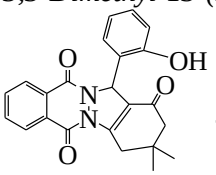
*2,3,4,13-Tetrahydro-3,3-dimethyl-13-(4-methoxyphenyl)-indazolo[2,1-b]phthalazine-1,6,11-trione (**4h**)*



4h

Yellow powder; m.p: 218-220 °C; IR (KBr, cm^{-1}): 2957, 1665, 1627, 1602, 1511, 1467, 1427, 1360, 1314, 1266, 1243, 1170, 1101, 1029, 842, 799, 701; ^1H NMR (400 MHz, $CDCl_3$) δ = 1.23 (s, 3 H), 1.24 (s, 3 H), 2.33 (s, 2 H), 3.26-3.42 (AB System, *J* = 18.9 Hz 2H), 3.75 (s, 3H), 6.42 (s, 1H), 6.84-7.35 (m, 4H), 7.82-7.85 (m, 2H), 8.27-8.35 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.4, 28.7, 34.6, 38.1, 50.9, 55.1, 64.5, 114.1, 118.5, 127.6, 127.9, 128.3, 128.5, 128.9, 129.1, 133.4, 134.9, 150.7, 154.2, 156.0, 159.6, 192.2; MS: *m/z* = 402 (M^+).

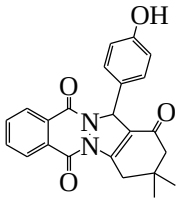
*3,3-Dimethyl-13-(2-hydroxyphenyl)-3,4-dihydro-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4i**)*



4i

Yellow solid; m.p: 184-186 °C; IR (KBr, cm^{-1}): 2897, 1661, 1492, 1378, 1328, 1262, 1082, 791; ^1H NMR (400 MHz, $CDCl_3$) δ = 0.97 (s, 3H, CH_3), 1.03 (s, 3H), 2.32 (s, 2H), 3.26-3.37 (AB System, *J* = 18.0 Hz, 2H), 6.33 (s, 1H), 6.97-7.56 (m, 4H), 7.83-7.85 (m, 2H), 8.25-8.34 (m, 2H), 10.98 (s, 1H, OH); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 26.4, 27.3, 41.5, 43.3, 52.2, 111.1, 115.8, 120.6, 124.5, 127.5, 128.1, 128.7, 131.7, 133.4, 137.1, 150.8, 161.5, 169.3, 196.1, 201.1.

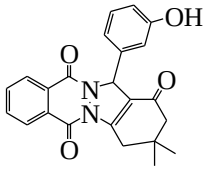
*3,4-Dihydro-3,3-dimethyl-13-(4-hydroxyphenyl)-2H-indazolo[2,1-b]phthalazine-1,6,11(13H)-trione (**4j**)*



4j

White solid; m.p: 258-260 ^{o}C; IR (KBr, cm^{-1}): 3443, 2956, 1660, 1626, 1467, 1361, 1313, 1273; ^{1}H NMR (400 MHz, DMSO-d_6) δ = 1.10 (s, CH_3), 1.11 (s, CH_3), 2.24 (s, CH_2), 3.22-3.36 (AB System, *J* = 19.0 Hz 2H), 3.36 (s, OH), 6.22 (s, CH), 6.84 (d, 2H, *J* = 8.4 Hz), 7.33 (d, 2CH, *J* = 8.4 Hz), 7.93 (t, 2CH, *J* = 7.6 Hz), 8.07 (d, 1H, *J* = 7.2 Hz), 8.23 (d, 1H, *J* = 7.2 Hz).

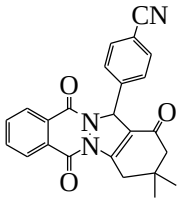
*13-(3-Hydroxyphenyl)-3,3-dimethyl-3,4-dihydro-1H-indazolo [1,2-b]phthalazine-1,6,11(2H,13H)-trione (**4k**)*



4k

Yellow powder; m. p. 268-27 ^{0}C; IR (KBr, cm^{-1}): 3357, 2954, 2895, 1663; ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.21 (s, 6H), 2.32 (s, 2H), 3.21-3.44 (AB System, *J* = 18.9 Hz, 2H), 5.97 (s, 1H, OH), 6.41 (s, 1H), 6.71-7.19 (m, 4H), 7.84-7.90 (m, 2H), 8.27-8.38 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.5, 28.6, 34.6, 38.0, 50.9, 64.7, 114.6, 115.9, 118.5, 118.6, 127.7, 128.0 (2), 128.9, 129.9, 133.6, 134.6, 137.9, 151.0, 154.0, 156.1, 192.3; MS: *m/z* 388 (M^+).

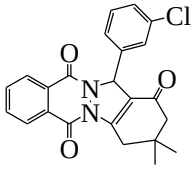
*13-(4-Cyanophenyl)-3,3-dimethyl-3,4-dihydro-2H-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4l**)*



4l

Yellow powder; m.p: 226-228 ^{0}C; IR (KBr, cm^{-1}): 2961, 2227, 1667, 1623, 1473; ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.23 (s, 6H), 2.35 (s, 2H), 3.24-3.41 (AB System, *J* = 18.9 Hz, 2H), 6.47 (s, 1H), 7.29-7.66 (m, 4H), 7.89-8.40 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.4, 28.7, 34.7, 38.0, 50.8, 64.4, 112.5, 117.4, 118.45, 127.79, 127.9, 128.2, 128.7, 128.9, 132.6, 133.9, 134.8, 141.6, 151.6, 154.5, 155.9, 192.1

*2,3,4,13-Tetrahydro-3,3-dimethyl-13-(3-chlorophenyl)-indazolo[2,1-b]phthalazine-1,6,11-trione (**4m**)*

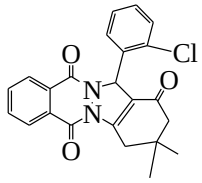


4m

Light yellow powder; m.p: 204-206 ^{o}C; IR (KBr, cm^{-1}): 2952, 1659, 1620, 1467, 1363, 1307, 1268, 789; ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.21 (s, 6H), 2.34 (s, 2H), 3.21-3.41 (AB System, *J* = 19.1 Hz, 2H), 6.40

(s, 1H), 7.24-7.38 (m, 4H), 7.86 (dd, 2H, *J* = 3.6 Hz), 8.27 (dd, 1H, *J* = 3.6, Hz), 8.36 (t, 1H, *J* = 4.5 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.5, 28.6, 34.7, 38.0, 50.9, 64.3, 117.9, 125.8, 127.0, 127.7, 128.1, 128.9, 129.0, 130.0, 133.7, 134.6, 138.5, 151.2, 154.4, 156.0, 192.1.

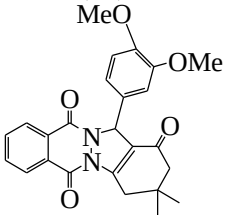
*2,3,4,13-Tetrahydro-3,3-dimethyl-13-(2-chlorophenyl)-indazolo[2,1-b]phthalazine1,6,11-trione (**4n**)*



4n

Yellow powder; m.p: 266-268 °C; IR (KBr, cm^{-1}): 2957, 1661, 1622, 1467, 1472, 1359, 1311, 1267, 791; ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.23 (s, 6H), 2.34 (s, 2H), 3.26-3.42 (AB System, *J* = 19.0 Hz, 2H), 6.70 (s, 1H), 7.24-7.50 (m, 4H), 7.87-8.39 (m, 4H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.8, 29.2, 35.0, 38.4, 51.3, 64.4, 116.7, 127.6, 128.1, 128.4, 129.1, 129.4, 130.2, 130.9, 132.0, 133.0, 133.9, 134.9, 152.2, 154.6, 156.6, 192.4.

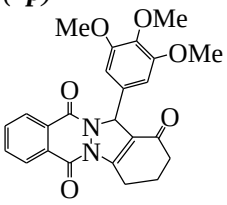
*13-(3,4-Dimethoxy-phenyl)-3,3-dimethyl-2,3,4,13-dihydro-indazolo[1,2-b]phthalazine-1,6,11(13H)-trione (**4o**)*



4o

Yellow powder; mp: 185-186 °C; IR (KBr, cm^{-1}): 2959, 1662, 1630, 1361, 1313, 1267, 699. ^{1}H NMR (400 MHz, $CDCl_3$) δ = 1.22 (s, 6H), 2.35 (s, 2H), 3.22-3.44 (AB System, *J* = 19.2 Hz, 2H), 3.82 (s, 3H), 3.87 (s, 3H), 6.41 (s, 1H), 6.79-7.00 (m, 3H), 7.83-7.88 (m, 2H), 8.26-8.36 (m, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ = 28.33, 28.84, 34.64, 38.09, 50.99, 55.82, 55.98, 64.77, 111.05, 111.17, 118.52, 119.31, 127.74, 127.96, 128.79, 128.97, 129.16, 133.52, 134.53,149.30, 150.76, 154.41, 156.12, 192.2; MS (ESI): *m/z* = 432 (M^+).

*3,4-Dihydro-3-(3,4,5-trimethoxyphenyl)-3,3-dimethyl-2H-indazolo[1,2-b]phthlazine-1,6,11(13H)-trione (**4p**)*



4p

Yellow powder: m. p: 234-236 °C; IR (KBr, cm^{-1}): 2958, 2838, 1655, 1627; ^{1}H NMR: (400 MHz, DMSO-d_6): δ = 1.23 (s, 6H), 2.37 (s, 2H), 3.20-3.45 (AB System, *J* = 19.1 Hz, 2H), 3.81 (s, 9H), 6.39 (s, 1H), 6.63 (s, 2H) 7.83-8.37 (m, 4H); ^{13}CNMR: (400 MHz, DMSO-d_6): δ = 28.1, 28.9, 34.6, 38.0, 50.9, 56.2, 60.7, 64.9, 104.6, 118.3, 127.7, 128.0 (2C), 129.7, 129.30, 131.7, 133.5, 134.7, 138.3, 150.8, 153.3, 154.5, 156.1, 192.1; MS: *m/z* = 462 (M^+).

Table S1: ^{1}H NMR data of compounds **4a-p**

Entry						
4a	1.21(s, 6H)	2.33 (s,2H)	3.22 -3.47 (AB System, *J* = 18.10 Hz, 2H)	6.44 (s,1H)	7.23 - 8.35 (m, 9H)	
4b	1.23 (s, 6H)	2.34 (s, 2H)	3.23-3.45 (AB System, *J* = 18.9 Hz, 2H)	6.53 (s,1H)	7.54-8.40 (m, 8H)	
4c	1.18 (s, 3H) 1.26 (s, 3H)	2.34 (s, 2H)	3.24-3.45 (AB system, *J* = 19.2 Hz, 2H)	6.53 (s,1H)	7.27 and 8.15 (dd, 4H, *J* = 11.1 Hz)	7.87-7.90 (m, 2H) 8.25-8.38 (m, 2H)
4d	1.22 (s, 6H)	2.33 (s, 2H)	3.22-3.44 (AB system, *J* =19.1 Hz, 2H)	6.41 (s,1H)	7.28 - 7.38 (m, 4H)	7.84-8.38 (m, 4H)
4e	1.21 (s, 6H)	2.20 (s, 3H) 2.33 (s, 2H)	3.24-3.42 (AB system, *J* = 18.9 Hz, 2H)	6.43(s, 1H)	7.12-7.32 (dd, 4H, *J* =7.8 Hz)	7.83-8.36 (m, 4H)
4f	1.24 (s, 6H)	2.36 (s, 2H)	3.26-3.43 (AB system, *J* = 19.1 Hz, 2H)	6.46 (s, 1H)	7.02-7.06 (m, 2H) 7.40-7.44 (m, 2H)	7.86-7.89 (m, 2H) 8.27-8.39 (m, 2H)
4g	1.23 (s, 6H)	2.36 (s, 2H)	3.26-3.42 (AB system, *J* = 19.0 Hz, 2H)	6.42 (s, 1H)	7.29-7.40 (m, 4H)	7.80-8.29 (m, 4H)
4h	1.23 (s, 3H) 1.24 (s,3H)	2.30 (s, 2 H)	3.26-3.42 (AB System, *J* = 18.9 Hz 2H)	6.42 (s, 1 H)	6.84-7.35 (m, 4H), 7.82-7.85 (m, 2H)	8.27-8.35 (m, 2H)
4i	0.97 (s, 3H) 1.03 (s, 3H)	2.32 (s, 2H)	3.26-3.37 (AB System, *J* = 18.0 Hz, 2H)	6.33 (s, 1H)	6.97-7.56 (m, 4H) 7.83-7.85 (m, 2H) 8.25-8.34 (m, 2H)	10.98 (br s, 1H, OH)

4j	1.10 (s,3H), 1.11 (s,3H)	2.24 (s, 2H)	3.22-3.36 (AB System, *J* = 19.0 Hz 2H)	6.22 (s, 2H)	6.84 (d, 2H, *J* = 8.4 Hz), 7.33 (d, 2H, *J* = 8.4 Hz) 7.93 (t, 2H, *J* = 7.6 Hz),	8.07 (d, 1H, *J* = 7.2 Hz) 8.23 (d, 1H , *J* = 7.2 Hz)
4k	1.21 (s, 6H)	2.32 (s, 2H)	3.21-3.44 (AB System, *J* = 18.9 Hz, 2H)	5.97 (s, 1H, OH) 6.41 (s, 1H)	6.71-7.19 (m, 4H)	7.84-7.90 (m, 2H) 8.27-8.38 (m, 2H)
4l	1.23 (s, 6H)	2.35 (s, 2H)	3.24-3.41 (AB System, *J* = 18.9 Hz, 2H)	6.47 (s, 1H)	7.29-7.66 (m, 4H)	7.89-8.40 (m, 4H)
4m	1.21 (s, 6H)	2.34 (s, 2H)	3.21-3.41 (AB System, *J* = 19.1 Hz, 2H)	6.40 (s, 1H)	7.24-7.38 (m, 4H) 7.86 (dd, 2H, *J* = 3.6 Hz)	8.27 (dd, 1H, *J* = 3.6 Hz) 8.36 (t, 1H, *J* = 4.5 Hz)
4n	1.23 (s, 6H)	2.34 (s, 2H)	3.26-3.42 (AB System, *J* = 19.0 Hz, 2H)	6.70 (s, 1H)	7.24-7.50 (m, 4H)	7.87-8.39 (m, 4H)
4o	1.22 (s, 6H)	2.35 (s, 2H)	3.22-3.44 (AB System, *J* = 19.2 Hz, 2H) 3.87 (s, 3H), 3.82 (s, 3H)	6.41 (s, 1H)	6.79-7.00 (m, 3H) 7.83-7.88 (m, 2H)	8.26-8.36 (m, 2H)
4p	1.29 (s, 6H)	2.41 (s, 2H)	3.20-3.45 (AB System, *J* = 19.1 Hz, 2H), 3.90 (s, 9H)	6.29 (s, 1H) 6.63 (s, 2H)	7.83-8.37 (m, 4H)	

Table S2: ^{13}C NMR data of compounds **4a-p**

Entry				
4a	28.3, 28.7, 34.8, 38.1	50.9, 64.8	118.7, 127.0, 127.9, 128.6, 129.1, 129.4, 129.5, 133.9, 134.5, 136.4, 150.8, 154.2, 156.0	192.1
4b	28.4, 28.9, 35.7, 38.4	51.8, 63.1	118.1, 122.5, 124.7, 128.2, 128.8, 129.1, 129.7, 132.9, 133.2, 134.4, 138.7, 148.5, 150.8, 154.3, 155.9	192.1
4c	27.4, 28.5, 33.5, 37.1	51.8, 63.1	114.3, 121.0, 125.7, 127.0, 128.7, 128.9, 129.5, 132.9, 133.8, 142.4, 145.9, 152.6, 153.5, 154.9	192.9
4d	27.4, 28.2, 33.7, 36.0	51.9, 63.3	114.6, 122.0, 126.1, 127.7, 128.1, 128.7, 128.9, 129.8, 129.9, 130.1, 131.5, 132.5, 134.4, 149.8,151.3, 154.0, 156.1	192.2
4e	21.3, 28.7, 28.9, 34.7, 38.1	51.9, 62.8	117.7, 126.02, 126.7, 126.9, 128.7, 129.4, 129.7, 132.40, 132.41, 133.5, 137.4, 147.5,153.7, 154.1, 156.1	192.1

4f	28.8, 29.1, 35.1, 38.4	51.3, 64.7	116.0, 116.2, 118.6, 128.1, 128.4, 129.3, 129.4, 132.6, 134.0, 135.0, 151.4, 154.8, 156.4, 162.1, 164.1	192.5
4g	28.5, 28.7, 34.7, 38.0	50.9, 64.4	118.0, 122.8, 127.8, 128.1, 128.8, 128.9, 129.0, 131.9, 133.7, 134.7, 135.5, 151.1, 154.4, 156.0	192.1
4h	28.4, 28.7, 34.6, 38.1	50.9, 55.1, 64.5	114.1, 118.5, 127.6, 127.9, 128.3, 128.5, 128.9, 129.1, 133.4, 134.9, 1507, 154.2, 156.0, 159.6	192.2
4i	27.3, 26.4	52.2, 43.3, 41.5	111.1, 115.8, 120.6, 124.5, 127.5, 128.1, 128.7, 131.7, 133.4, 137.1, 150.8, 161.5, 169.3	196.1, 201.1
4j	**No data**			
4k	28.5, 28.6, 34.6, 38.0	50.9, 64.7	114.6, 115.9, 118.5, 118.6, 127.7, 128.0 (2), 128.9, 129.9, 133.6, 134.6, 137.9, 151.0, 154.0, 156.1	192.3

4l	28.4, 28.7, 34.7, 38.0,	50.8, 64.4	112.5, 117.4, 118.45, 127.79, 127.9, 128.2, 128.7, 128.9, 132.6, 133.9, 134.8, 141.6, 151.6, 154.5, 155.9	192.1
4m	28.5, 28.6, 34.7, 38.0	50.9, 64.3	117.9, 125.8, 127.0, 127.7, 128.1, 128.9, 129.0, 130.0, 133.7, 134.6, 138.5, 151.2, 154.4, 156.0	192.1
4n	28.8, 29.2, 35.0, 38.4	51.3, 64.4	116.7, 127.6, 128.1, 128.4, 129.1, 129.4, 130.2, 130.9, 132.0, 133.0, 133.9, 134.9, 152.2, 154.6, 156.6	192.4
4o	34.64, 38.09	50.99, 55.82, 55.98, 64.77	111.05, 111.17, 118.52, 119.31, 127.74, 127.96, 128.79, 128.97, 129.16, 133.52, 134.53, 149.30, 150.76, 154.41, 156.12	192.2
4p	24.5, 28.6, 33.6, 37.0	51.9, 55.2, 61.7, 63.9	105.6, 119.3, 128.7 (2C), 129.0 (2C), 129.7, 129.30, 132.7, 133.5, 134.7, 137.3, 151.8, 154.3, 153.5, 155.1	193.1

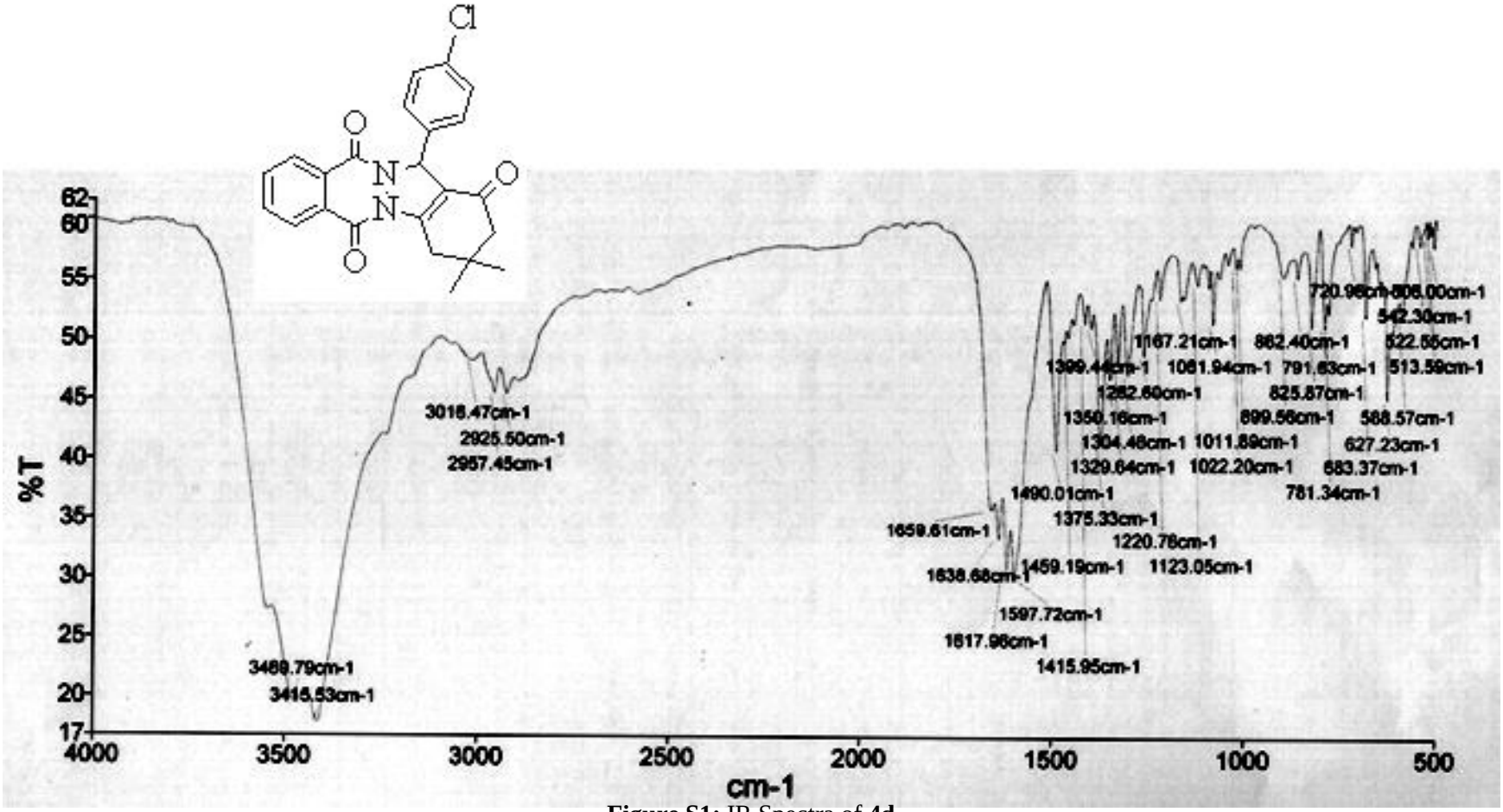


Figure S1: IR Spectra of **4d**

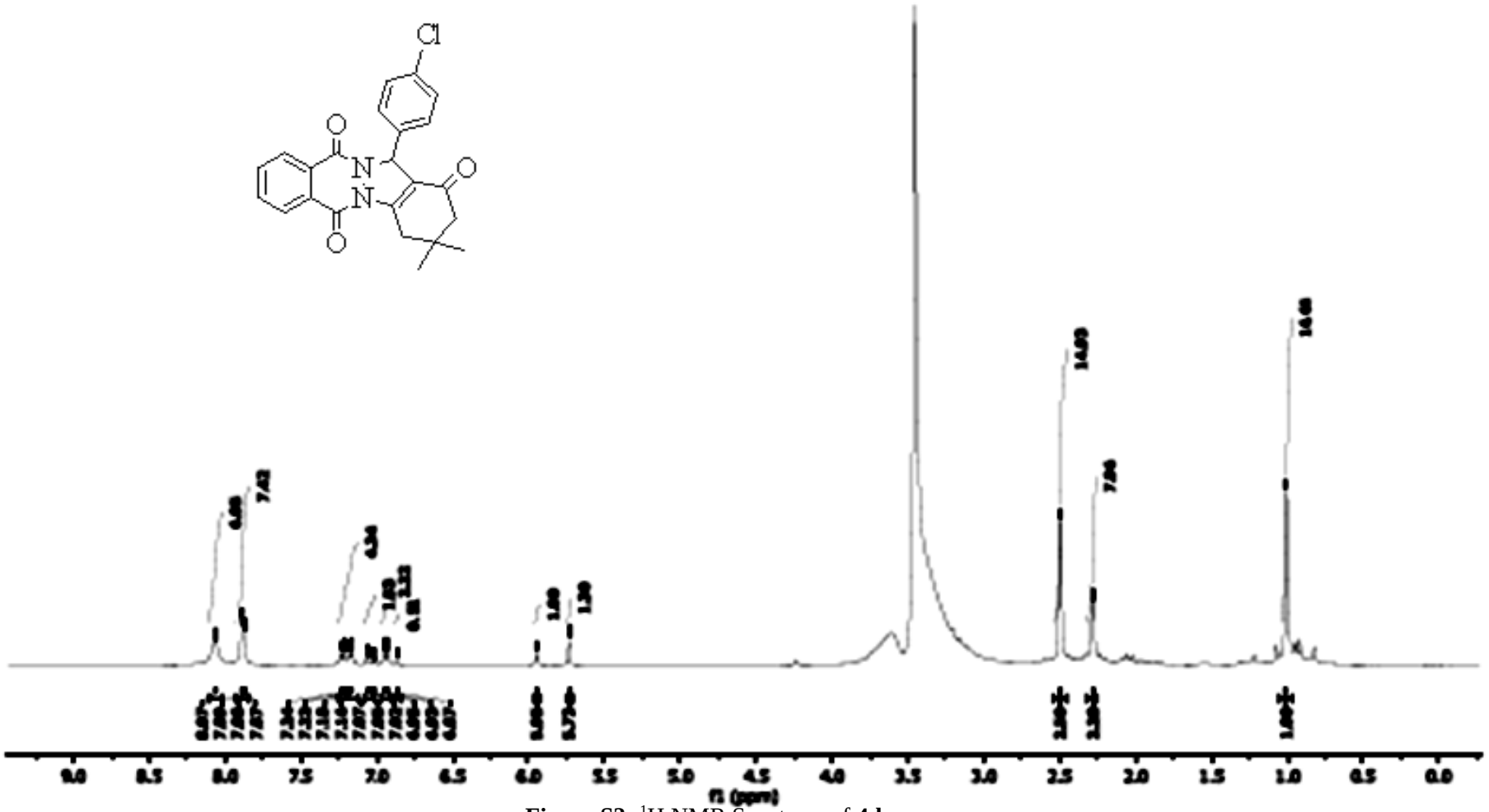


Figure S2: [1]H NMR Spectrum of **4d**

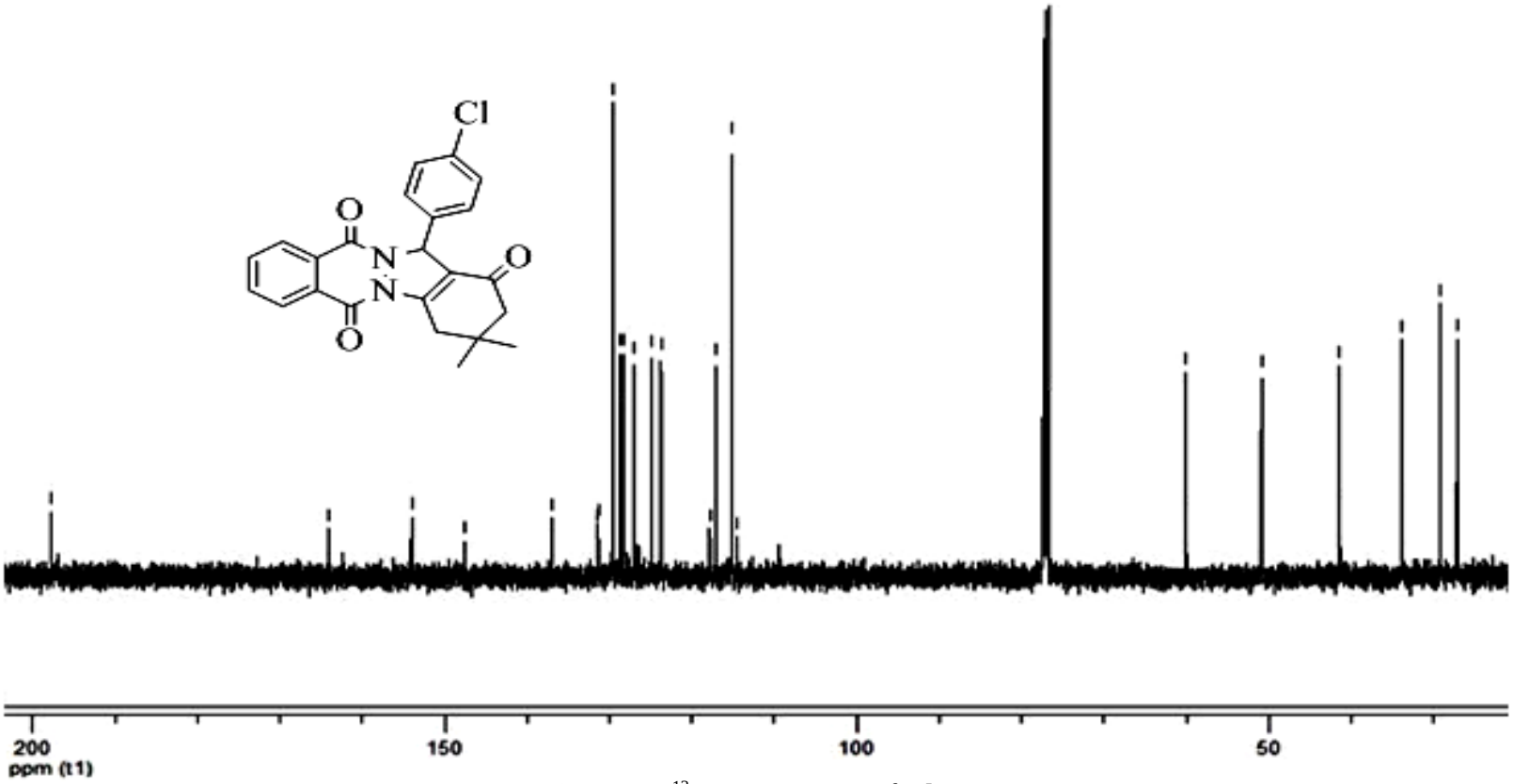


Figure S3: ^{13}C NMR Spectra of **5d**

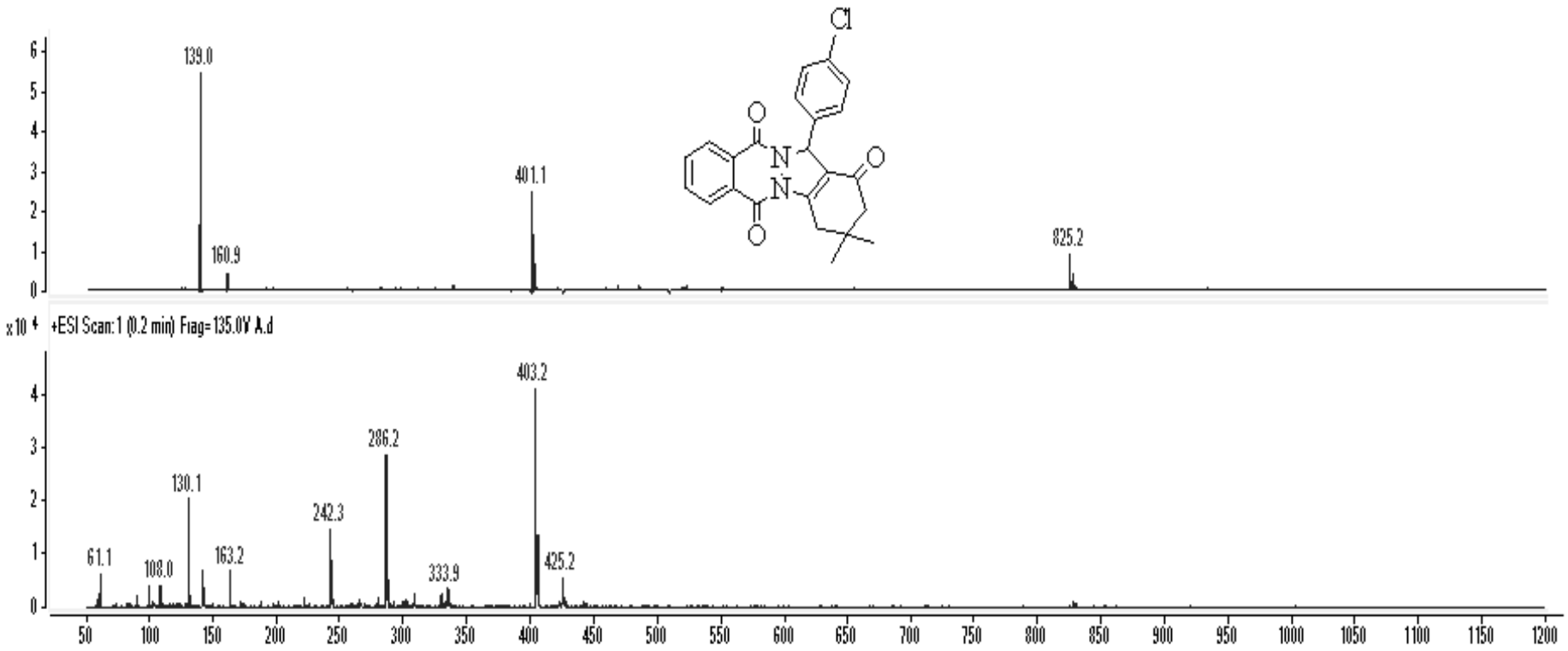


Figure S4: Mass Spectrum of **4d**