

Magnetite-supported Montmorillonite (K₁₀) (Nanocat-Fe-Si-K₁₀): an efficient green catalyst for multicomponent synthesis of amidoalkyl naphthols

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General Information:

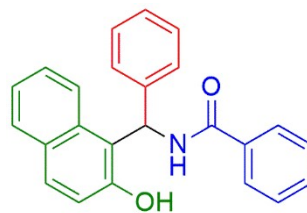
Those standard chemicals, solvents, and reagents (Merck, Sigma-Aldrich, and Spectrochem, among many others) have been used without purification. All melting points were tested within an open capillary system. TLC (thin layer chromatography) was used to efficiently monitor reactions carried out on Merck 0.2 mm silica gel 60 F-254 Al-plates utilizing n-hexane and ethyl acetate (8:2) as the eluent. The ¹H-NMR spectroscopy and ¹³C-NMR spectroscopy were performed on a Bruker Advanced 500 device using CDCl₃ as solvent and solvent signal or tetramethyl silane as internal standards. A Bruker Vertex-70 was used to capture the FT-IR spectrum inside the presence of a KBr emitter. The synthesized Fe₃O₄@SiO₂@K₁₀ nanocatalysts were analyzed using various techniques such as XRD advance Bruker D8 (powder X-ray diffraction), FT-IR Elmer Perkin, Version 10.6.1 (Fourier Transmission-Infrared Spectroscopy), FE-SEM JSM-7610F Plus, JEOL (Field Emission-Scanning Electron Microscope), EDS, EDS LN2, OXFORD (Energy-Dispersive X-ray spectra), and TGA Thermo-gravimetric analysis.

Synthesis of amidoalkyl naphthol derivatives using Nanocat-Fe-Si-K₁₀

A solvent-free reaction mass containing benzaldehyde (10 mmol), β-naphthol (10 mmol), benzamide (12 mmol), and Fe₃O₄@SiO₂@K₁₀ (0.08 mg) were heated at 70 °C. Then the reaction progress was monitored using TLC (thin-layer chromatography). After the reaction was completed, the mixture was cooled to room temperature. Then, 5 mL Ethyl acetate was added to the mixture, the catalyst was isolated using an external magnet, rinsed in alcohol, and dry at 60 °C for reusing. The ethyl acetate layer vaporized under lower pressure which got the pure products.

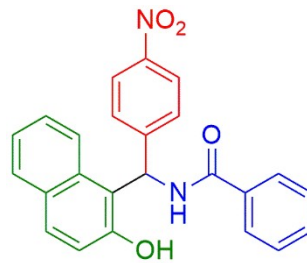
Spectral data:

***N*-((2-Hydroxynaphthalen-1-yl) (phenyl) methyl) Benzamide (1):**



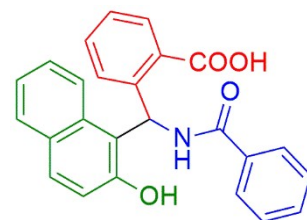
White solid, mp = 234 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.32 (s, 1H), 9.04 (d, *J* = 8.4 Hz, 1H), 8.08 (d, *J* = 8.5 Hz, 1H), 7.87-7.79 (m, 4H), 7.53 (t, *J* = 7.5 Hz, 1H), 7.48 (dd, *J* = 15.0, 7.5 Hz, 3H), 7.33-7.24 (m, 7H), 7.21-7.18 (m, 1H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 166.1, 153.8, 142.4, 134.9, 132.9, 131.8, 129.8, 129.2, 129.1, 128.8, 128.6, 127.7, 127.4, 127.2, 126.8, 123.1, 119.1, 118.9, 49.6. FT-IR (KBr; cm⁻¹): 3420, 3063, 3023, 1632, 1572, 1437, 823, 753, 615.

***N*-((2-Hydroxynaphthalen-1-yl) (4-nitrophenyl) methyl) Benzamide (2):**



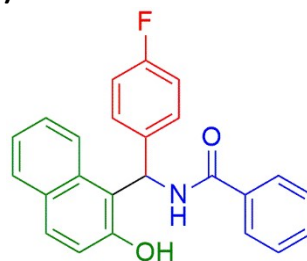
Yellow solid, mp = 230 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.42 (s, 1H), 9.06 (d, *J* = 8.0 Hz, 1H), 8.15 (d, *J* = 9.0 Hz, 2H), 8.07 (d, *J* = 8.5 Hz, 1H), 7.94 (d, *J* = 7.5 Hz, 2H), 7.83 (t, *J* = 9.0 Hz, 2H), 7.57-7.55 (m, 3H), 7.52 (t, *J* = 8.0 Hz, 3H), 7.44 (d, *J* = 8.0 Hz, 1H), 7.35 (t, *J* = 7.5 Hz, 1H), 7.29 (d, *J* = 9.0 Hz, 1H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 166.6, 153.7, 150.5, 146.5, 134.2, 132.5, 132.3, 130.3, 129.0, 128.7, 128.7, 128.2, 127.7, 127.6, 123.8, 123.5, 123.3, 119.2, 117.7, 49.4. FT-IR (KBr, cm⁻¹): 3436, 3069, 2852, 1636, 1514, 1346, 853, 802, 738.

2-(Benzamido (2-hydroxynaphthalen-1-yl) methyl) benzoic acid (3):



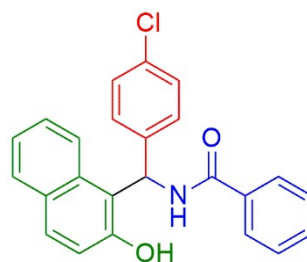
White solid, mp = 235-236 °C; $^1\text{H-NMR}$ (500 MHz, DMSO- d_6) δ 12.84 (s, 1H), 9.83 (s, 1H), 8.84 (d, J = 7.5 Hz, 1H), 8.12 (d, J = 8.5 Hz, 1H), 7.88 (d, J = 8.0 Hz, 1H), 7.86 (d, J = 7.5 Hz, 2H), 7.82 (d, J = 8.0 Hz, 1H), 7.76 (d, J = 9.0 Hz, 1H), 7.68 (dd, J = 7.5, 1.0 Hz, 1H), 7.52 (t, J = 7.5 Hz, 1H), 7.48-7.32 (m, 5H), 7.26 (t, J = 7.6 Hz, 2H), 7.16 (d, J = 8.5 Hz, 1H). $^{13}\text{C-NMR}$ (125 MHz, DMSO- d_6) δ 165.6, 154.3, 141.3, 134.8, 133.6, 131.4, 130.9, 129.8, 129.8, 130.2, 128.7, 128.6, 128.8, 127.8, 127.3, 126.6, 123.6, 122.7, 119.5, 118.4, 48.6, 31.3. FT-IR (KBr, cm^{-1}): 3225, 1714, 1626, 1518, 1307, 940, 816, 745, 713.

***N*-((4-Fluorophenyl) (2-hydroxynaphthalen-1-yl) methyl) Benzamide (4):**



White solid, mp = 234 °C; $^1\text{H-NMR}$ (500 MHz, DMSO- d_6) δ 10.39 (s, 1H), 9.07 (d, J = 8.5 Hz, 1H), 8.06 (d, J = 8.5 Hz, 1H), 7.92-7.81 (m, 3H), 7.82 (d, J = 9.0 Hz, 1H), 7.58 (t, J = 7.5 Hz, 1H), 7.54-7.44 (m, 3H), 7.32 (td, J = 14.0, 7.5 Hz, 4H), 7.27 (d, J = 9.0 Hz, 1H), 7.13 (t, J = 9.0 Hz, 2H). $^{13}\text{C-NMR}$ (125 MHz, DMSO- d_6) δ 166.6, 162.2 (d, J = 245.7 Hz), 153.6, 138.7, 138.8, 134.9, 132.8, 131.7, 130.3, 130.2, 129.3, 129.2, 128.7 (d, J = 8.2 Hz), 127.6, 127.4, 123.3, 119.4, 118.8, 115.6 (d, J = 21.1 Hz), 49.5. FT-IR (KBr, cm^{-1}): 3420, 3065, 2290, 1635, 1513, 1347, 1263, 1172, 827, 749, 714, 592.

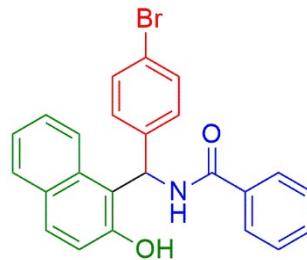
***N*-((4-Chlorophenyl) (2-hydroxynaphthalen-1-yl) methyl) Benzamide (5):**



White solid, mp = 186 °C; $^1\text{H NMR}$ (500 MHz, DMSO- d_6) δ 10.34 (s, 1H), 9.04 (d, J = 8.0 Hz, 1H), 8.09 (d, J = 8.5 Hz, 1H), 7.92-7.82 (m, 4H), 7.58 (t, J = 7.5 Hz, 1H), 7.49 (dd, J = 13.5, 7.5 Hz, 3H), 7.35 (t, J = 7.5 Hz, 3H), 7.33-7.29 (m, 3H), 7.27 (d, J = 8.5 Hz, 1H). $^{13}\text{C NMR}$ (125 MHz, DMSO- d_6) δ 166.6, 153.9, 141.8, 134.8, 132.6, 132.2, 131.8, 130.3, 129.3, 129.2, 128.8, 128.9, 128.8, 127.6,

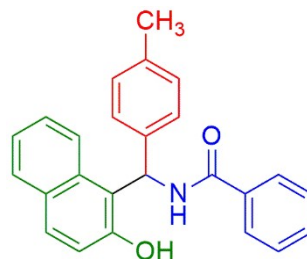
127.5, 123.3, 119.2, 118.6, 49.4. **FT-IR (KBr, cm⁻¹):** 3372, 3175, 2780, 1660, 1580, 1415, 773, 689, 635.

***N*-((4-Bromophenyl) (2-hydroxynaphthalen-1-yl) methyl) Benzamide (6):**



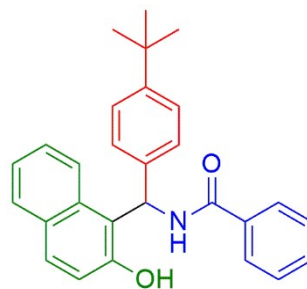
White solid, mp = 196-198 °C; **¹H-NMR** (500 MHz, DMSO-*d*₆) δ 10.38 (s, 1H), 9.04 (d, *J* = 8.5 Hz, 1H), 8.08 (d, *J* = 8.5 Hz, 1H), 7.90-7.86 (m, 3H), 7.84 (d, *J* = 9.0 Hz, 1H), 7.58 (t, *J* = 7.5 Hz, 1H), 7.55-7.45 (m, 5H), 7.35 (t, *J* = 7.5 Hz, 1H), 7.32-7.23 (m, 4H). **¹³C-NMR** (125 MHz, DMSO-*d*₆) δ 166.6, 153.8, 142.2, 134.8, 132.9, 132.2, 131.7, 130.3, 129.4, 129.2, 129.1, 128.7, 127.6, 127.4, 123.4, 120.3, 119.2, 118.4, 49.4. **FT-IR (KBr, cm⁻¹):** 3420, 3185, 1630, 1582, 1345, 814, 728, 589.

***N*-((2-hydroxynaphthalen-1-yl) (p-tolyl) methyl) Benzamide (7):**



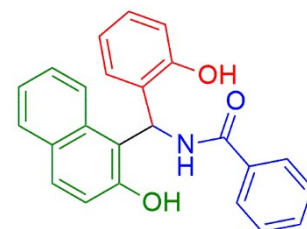
White solid, mp = 207-209 °C; **¹H-NMR** (500 MHz, DMSO-*d*₆) δ 10.35 (s, 1H), 9.05 (d, *J* = 8.5 Hz, 1H), 8.09 (d, *J* = 8.5 Hz, 1H), 7.86 (t, *J* = 7.5 Hz, 3H), 7.76 (d, *J* = 9.0 Hz, 1H), 7.56 (t, *J* = 7.5 Hz, 1H), 7.53-7.42 (m, 3H), 7.33 (t, *J* = 7.5 Hz, 1H), 7.25 (dd, *J* = 19.0, 8.5 Hz, 4H), 6.85 (d, *J* = 9.0 Hz, 2H), 3.69 (s, 3H). **¹³C-NMR** (125 MHz, DMSO-*d*₆) δ 166.2, 158.7, 153.6, 134.8, 134.5, 132.5, 131.7, 129.9, 129.3, 129.2, 128.7, 128.4, 127.6, 127.3, 123.3, 119.1, 118.8, 114.2, 55.6, 49.5. **FT-IR (KBr, cm⁻¹):** 3420, 3026, 2955, 1630, 1535, 1383, 1348, 872, 752, 690.

***N*-((4-(*tert*-Butyl) phenyl) (2-hydroxynaphthalen-1-yl) methyl) benzamide (8):**



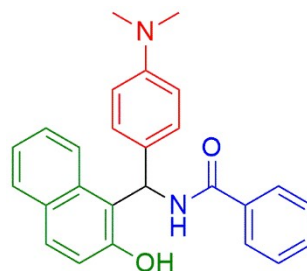
White solid, mp = 206-208 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.35 (s, 1H), 9.06 (d, *J* = 8.5 Hz, 1H), 8.13 (d, *J* = 8.5 Hz, 1H), 7.92-7.84 (m, 3H), 7.80 (d, *J* = 9.0 Hz, 1H), 7.55 (t, *J* = 7.5 Hz, 1H), 7.52-7.44 (m, 3H), 7.33-7.20 (m, 7H), 1.20 (s, 9H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 166.2, 153.8, 149.5, 139.5, 134.7, 132.6, 131.7, 129.8, 129.3, 129.2, 128.6, 128.5, 127.7, 127.7, 127.4, 126.6, 125.4, 123.3, 119.4, 118.7, 49.5, 34.4, 31.7. FT-IR (KBr, cm⁻¹): 3425, 3066, 2965, 1634, 1540, 1442, 880, 759, 694.

***N*-((2-Hydroxynaphthalen-1-yl) (2-hydroxyphenyl) methyl) Benzamide (9):**



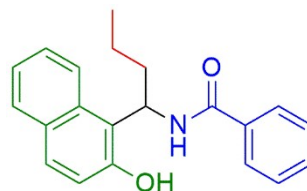
White solid, mp = 235 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.19 (s, 1H), 9.65 (s, 1H), 8.91 (s, 1H), 8.23 (d, *J* = 9.0 Hz, 1H), 7.85 (d, *J* = 7.0 Hz, 2H), 7.77 (d, *J* = 8.0 Hz, 1H), 7.75 (d, *J* = 9.0 Hz, 1H), 7.54 (t, *J* = 7.0 Hz, 1H), 7.51-7.39 (m, 4H), 7.35 (d, *J* = 8.0 Hz, 1H), 7.29 (t, *J* = 7.0 Hz, 1H), 7.21 (d, *J* = 9.0 Hz, 1H), 7.04 (t, *J* = 7.0 Hz, 1H), 6.82 (d, *J* = 7.5 Hz, 1H), 6.69 (t, *J* = 7.0 Hz, 1H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 165.8, 155.5, 153.7, 135.2, 133.1, 131.8, 129.6, 129.3, 128.8, 128.9, 128.4, 128.3, 127.7, 126.8, 123.9, 123.2, 122.7, 119.5, 119.4, 119.2, 115.9, 46.1. FT-IR (KBr, cm⁻¹): 3594, 3207, 2365, 1609, 1566, 1350, 817, 754, 689, 587.

***N*-((4-(Di-methyl-amino) phenyl) (2-hydroxynaphthalen-1-yl) methyl) Benzamide (10):**



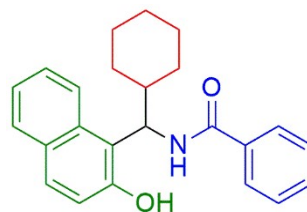
White solid, mp = 218-220 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.34 (s, 1H), 9.05 (d, *J* = 8.5 Hz, 1H), 8.07 (d, *J* = 9.0 Hz, 1H), 7.91-7.78 (m, 3H), 7.78 (d, *J* = 9.0 Hz, 1H), 7.55 (t, *J* = 7.5 Hz, 1H), 7.53-7.43 (m, 3H), 7.33 (t, *J* = 7.5 Hz, 1H), 7.27 (d, *J* = 9.0 Hz, 1H), 7.22 (d, *J* = 8.5 Hz, 1H), 7.14 (d, *J* = 8.5 Hz, 2H), 6.66 (d, *J* = 8.5 Hz, 2H), 2.83 (s, 6H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 165.9, 153.6, 149.8, 135.1, 132.8, 131.9, 129.8, 129.4, 129.2, 128.7, 127.8, 127.3, 127.2, 123.2, 119.4, 119.3, 112.8, 112.9, 49.7, 40.8. FT-IR (KBr, cm⁻¹): 3418, 3076, 2808, 1635, 1538, 1351, 1333, 1171, 818, 759, 691, 572.

***N*-(1-(2-Hydroxynaphthalen-1-yl) butyl) Benzamide (11):**



White solid, mp = 219-220 °C; ¹H-NMR (500 MHz, DMSO-*d*₆) δ 10.11 (s, 1H), 8.62 (d, *J* = 6.5 Hz, 1H), 8.23 (d, *J* = 6.5 Hz, 1H), 7.86-7.76 (m, 3H), 7.71 (d, *J* = 8.5 Hz, 1H), 7.56-7.45 (m, 4H), 7.31 (t, *J* = 7.5 Hz, 1H), 7.18 (d, *J* = 8.5 Hz, 1H), 6.02 (q, *J* = 8.5 Hz, 1H), 2.22-2.12 (m, 1H), 1.94-1.84 (m, 1H), 1.55-1.43 (m, 1H), 1.36-1.23 (m, 1H), 0.94 (t, *J* = 7.5 Hz, 3H). ¹³C-NMR (125 MHz, DMSO-*d*₆) δ 165.9, 153.5, 135.1, 132.5, 131.4, 129.1, 128.8, 128.7, 127.5, 126.7, 122.7, 120.3, 119.2, 47.0, 36.5, 20.0, 14.2. FT-IR (KBr, cm⁻¹): 3419, 3217, 3071, 2960, 2938, 2879, 1638, 1533, 1346, 820, 782, 693.

N-(Cyclohexyl (2-hydroxynaphthalen-1-yl) methyl) Benzamide (12):



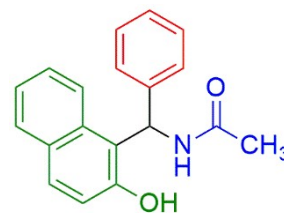
White solid, mp = 244-246 °C; $^1\text{H-NMR}$ (500 MHz, $\text{DMSO-}d_6$) δ 10.24 (s, 1H), 8.47 (s, 1H), 8.20 (s, 1H), 7.78 (d, $J = 7.0$ Hz, 3H), 7.72 (d, $J = 8.0$ Hz, 1H), 7.56-7.40 (m, 4H), 7.31-7.25 (m, 1H), 7.18 (d, $J = 8.5$ Hz, 1H), 5.77 (s, 1H), 2.26 (s, 1H), 2.08 (s, 1H), 1.76 (d, $J = 11.0$ Hz, 1H), 1.57 (dd, $J = 24.0$, 11.0 Hz, 2H), 1.32-1.07 (m, 4H), 1.06-0.91 (m, 2H). $^{13}\text{C-NMR}$ (125 MHz, $\text{DMSO-}d_6$) δ 165.7, 153.5, 135.4, 131.5, 128.7, 127.4, 126.9, 123.3, 122.8, 119.5, 119.2, 55.7, 53.5, 52.4, 41.2, 30.6, 26.5, 26.3, 26.2. **FT-IR (KBr, cm^{-1}):** 3413, 3076, 2939, 1636, 1578, 1334, 855, 817, 694.

N-(Furan-2-yl (2-hydroxynaphthalen-1-yl) methyl) Benzamide (13):



Brown solid, mp = 221-222 °C; $^1\text{H-NMR}$ (500 MHz, $\text{DMSO-}d_6$) δ 10.20 (s, 1H), 9.07 (d, $J = 8.0$ Hz, 1H), 8.19 (d, $J = 8.5$ Hz, 1H), 7.90-7.76 (m, 4H), 7.60-7.54 (m, 2H), 7.48 (t, $J = 7.5$ Hz, 3H), 7.37-7.28 (m, 2H), 7.24 (d, $J = 9.0$ Hz, 1H), 6.37 (dd, $J = 3.0$, 2.0 Hz, 1H), 6.14 (d, $J = 3.0$ Hz, 1H). $^{13}\text{C-NMR}$ (125 MHz, $\text{DMSO-}d_6$) δ 166.2, 154.6, 153.8, 142.6, 142.4, 134.8, 132.6, 131.8, 130.2, 129.1, 128.8, 128.9, 128.6, 127.8, 127.1, 123.5, 123.1, 119.1, 116.9, 110.8, 110.8, 107.1, 107.3, 45.1. **FT-IR (KBr, cm^{-1}):** 3411, 2199, 1634, 1574, 1439, 819, 747, 599.

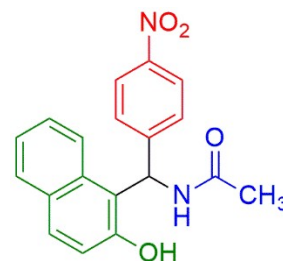
N-((2-hydroxynaphthalen-1-yl)(phenyl)methyl)acetamide (14):



Brown solid, mp. 239-241 °C, $^1\text{H-NMR}$ (300 MHz, $\text{DMSO-}d_6$): δ 8.49 (d, $J = 8.3$ Hz, 1H), 7.97 (d, $J = 7.2$ Hz, 1H), 7.83-7.75 (m, 2H), 7.60 (d, $J = 7.2$ Hz, 1H), 7.50 (t, $J = 7.5$ Hz, 1H), 7.36 (d, $J = 4.8$ Hz,

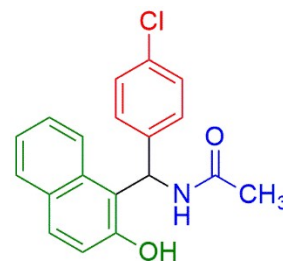
2H), 7.25 (d, $J = 3.3$ Hz, 2H), 7.23 (d, $J = 1.9$ Hz, 1H), 7.20-7.14 (m, 4H), 2.00 (s, 3H). **$^{13}\text{C-NMR}$ (75 MHz, DMSO- d_6):** δ 170.2, 154.1, 143.4, 133.6, 133.2, 131.8, 130.1, 129.4, 129.3, 129.1, 128.8, 127.2, 126.9, 123.2, 119.7, 119.4, 48.7, 23.4 ppm.

N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)acetamide (15):



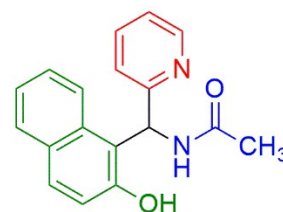
Pale Yellow solid, mp. 230-232 °C, **$^1\text{H-NMR}$ (300 MHz, DMSO- d_6):** δ 10.17 (s, 1H), 8.58 (d, $J = 7.8$ Hz, 1H), 8.38 (d, $J = 8.6$ Hz, 1H), 8.12 (d, $J = 8.6$ Hz, 2H), 7.80 (dd, $J = 8.0, 4.5$ Hz, 3H), 7.44–7.35 (m, 4H), 7.20 (d, $J = 9.2$ Hz, 1H), 2.02 (s, 3H). **$^{13}\text{C-NMR}$ (75 MHz, DMSO- d_6):** δ 170.7, 154.2, 152.0, 146.8, 133.0, 130.7, 129.5, 129.3, 127.9, 124.1, 123.5, 119.2, 48.8, 23.4 ppm.

N-((4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (16):



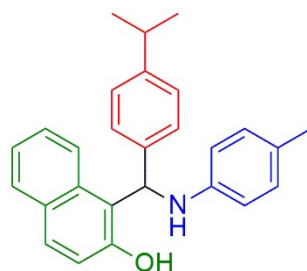
White Solid, mp. 230-232 °C, **$^1\text{H-NMR}$ (300 MHz, DMSO- d_6):** δ 10.09 (s, 1H), 8.52 (s, 1H), 7.80 (s, 2H), 7.75 (s, 1H), 7.36 (s, 2H), 7.28 (s, 2H), 7.22 (s, 1H), 7.17 (s, 1H), 7.14 (s, 2H), 7.09 (s, 1H), 1.98 (s, 3H) ppm. **$^{13}\text{C-NMR}$ (75 MHz, DMSO- d_6):** δ 170.4, 154.0, 142.6, 133.0, 131.5, 130.3, 129.5, 129.3, 128.8, 128.7, 123.3, 119.3, 119.2, 48.3, 23.5 ppm.

N-((2-hydroxynaphthalen-1-yl)(pyridin-2-yl)methyl)acetamide (17):



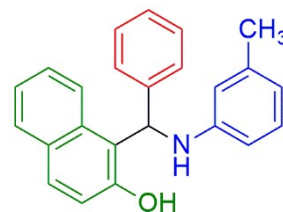
Grey solid, mp. 248-250 °C, **¹H-NMR (300 MHz, CDCl₃ + DMSO-d₆):** δ 10.21 (s, 1H), 8.47 (d, *J* = 8.9 Hz, 2H), 8.11-8.03(m, 1H), 7.74 (d, *J* = 8.0 Hz, 1H), 7.66 (t, *J* = 8.2 Hz, 2H), 7.37 (t, *J* = 7.9 Hz, 2H), 7.28-7.22 (m, 1H), 7.17 (d, *J* = 8.5 Hz, 2H), 7.10 (d, *J* = 7.7 Hz, 1H), 2.02 (d, *J* = 3.1 Hz, 3H) ppm. **¹³C-NMR (75 MHz, CDCl₃ + DMSO-d₆):** δ 170.1, 161.7, 154.1, 148.6, 137.2, 133.3, 129.9, 129.3, 129.1, 126.9, 123.7, 123.1, 122.3, 121.9, 119.7, 51.3, 23.5 ppm.

1-((4-isopropylphenyl)(p-tolylamino)methyl)naphthalen-2-ol (18):



White solid; mp: 140-142 °C. **¹H-NMR (300 MHz, Chloroform-d)** δ 7.94 (d, *J* = 6 Hz, 2H), 7.57 (t, *J* = 6 Hz, 1H), 7.48 (dd, *J*₁ = 9Hz, *J*₂ = 6 Hz, 2H), 7.39 (dd, *J*₁ = 6Hz, *J*₂ = 3 Hz, 2H), 7.30 (s, 1H), 7.21 (d, *J* = 9Hz, 2H), 6.95 (d, *J* = 9 Hz, 2H), 6.53 (d, *J* = 9 Hz, 2H), 5 (dd, *J*₁ = 9Hz, *J*₂ = 6 Hz, 1H), 4.41 (s, 1H), 3.54 (dd, *J*₁ = 15Hz, *J*₂ = 6 Hz, 1H), 3.44 (dd, *J*₁ = 15Hz, *J*₂ = 6 Hz, 1H), 2.90 (m, 1H), 2.22 (s, 3H), 1.26 (d, *J* = 9 Hz, 6H). **¹³C-NMR (100 MHz, CDCl₃)** δ 147.82, 144.80, 140.42, 136.80, 133.30, 129.61, 128.65, 128.22, 126.86, 126.83, 126.27, 113.92, 54.75, 46.36, 33.73, 24.00, 23.97, 20.38.

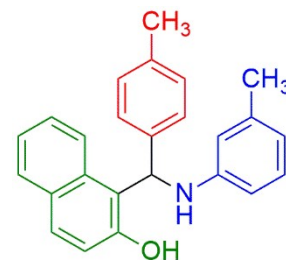
1-(phenyl (m-tolylamino) methyl) naphthalen-2-ol (19):



White powder; mp: 182-184 °C. **¹H-NMR (300 MHz, Chloroform-d)** δ 7.85 (m, 2H), 7.57 (dd, *J*₁ = 21 Hz, *J*₂ = 6 Hz, 4H), 7.46-7.41 (m, 2H), 7.37 (dd, *J*₁ = 6 Hz, *J*₂ = 3 Hz, 2H), 7.35 (dd, *J*₁ = 6Hz, *J*₂ = 3 Hz, 2H), 7.25 (t, *J* = 6 Hz, 2H), 7.08 (s, 1H), 7.04 (d, *J* = 6 Hz, 1H), 6.94 (t, *J* = 6 Hz, 1H), 6.72 (d, *J* = 6 Hz, 1H), 6.27 (s, 1H), 6.13 (s, 1H), 2.19 (s, 3H). **¹³C-NMR (100 MHz, CDCl₃)** δ 147.02, 143.10, 138.88, 136.72, 133.42, 129.02, 128.83, 128.71, 128.23, 127.33, 126.38, 118.77, 114.70, 110.78,

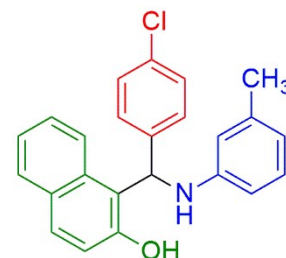
54.76, 46.31, 21.61.

1-(p-tolyl (m-tolylamino) methyl) naphthalen-2-ol (20)



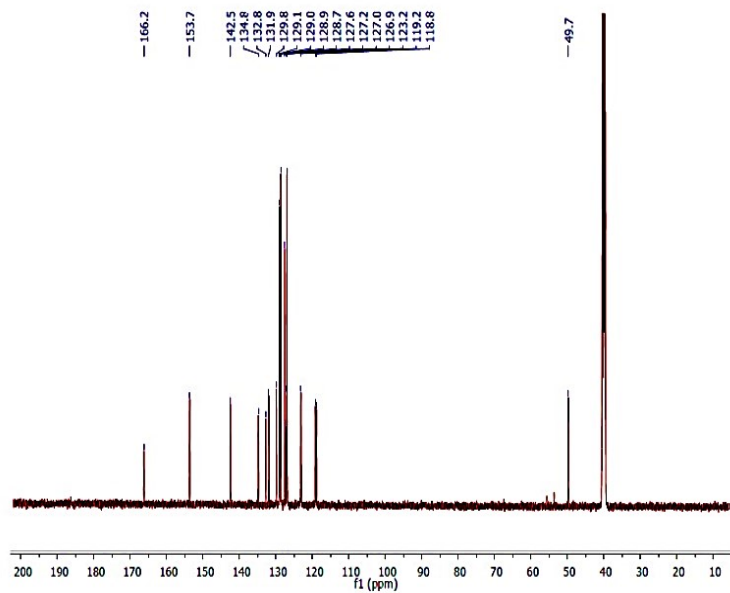
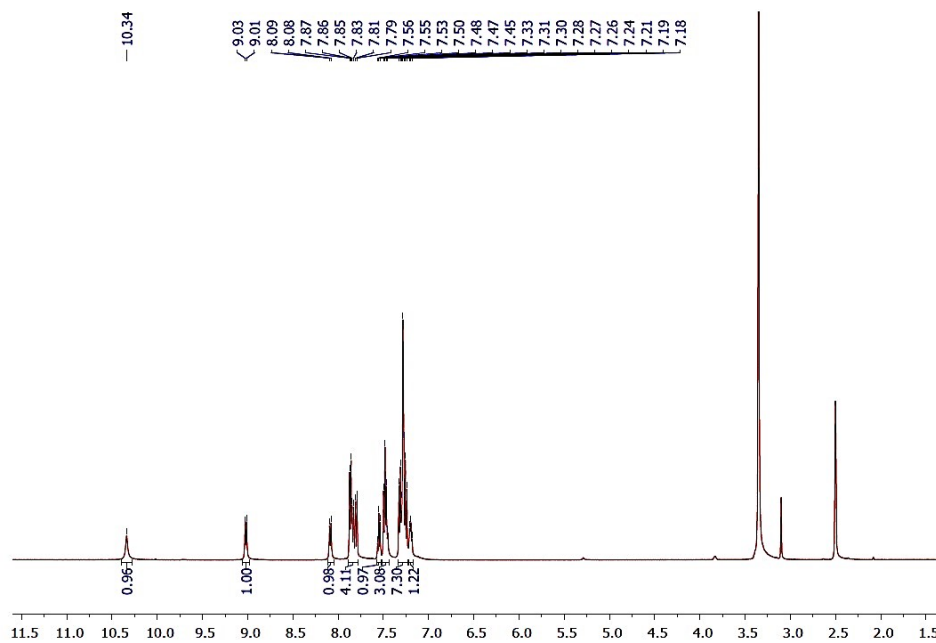
White solid; mp: 191-192 °C. **¹H-NMR (300 MHz, Chloroform-d):** δ 7.81 (m, 2H), 7.45 (d, $J = 9$ Hz, 2H), 7.40 (d, $J = 6$ Hz, 2H), 7.33 (m, 2H), 7.19 (d, $J = 9$ Hz, 2H), 7.08 (d, $J = 9$ Hz, 2H), 6.92 (t, $J = 6$ Hz, 1H), 6.83-6.54 (m, 1H), 6.23 (d, $J = 18$ Hz, 1H), 6.08 (s, 1H), 2.34 (d, $J = 15$ Hz, 5H), 2.22 (d, $J = 15$ Hz, 3H). **¹³C-NMR (100 MHz, CDCl₃)** δ 152.66, 148.52, 139.40, 137.42, 133.88, 133.85, 132.22, 130.13, 129.56, 129.39, 129.20, 129.14, 128.80, 128.57, 126.70, 126.31, 125.37, 123.54, 123.18, 123.09, 119.15, 113.28, 83.87, 65.52, 21.19, 21.16.

1-((4-chlorophenyl) (m-tolylamino) methyl) naphthalen-2-ol (21):

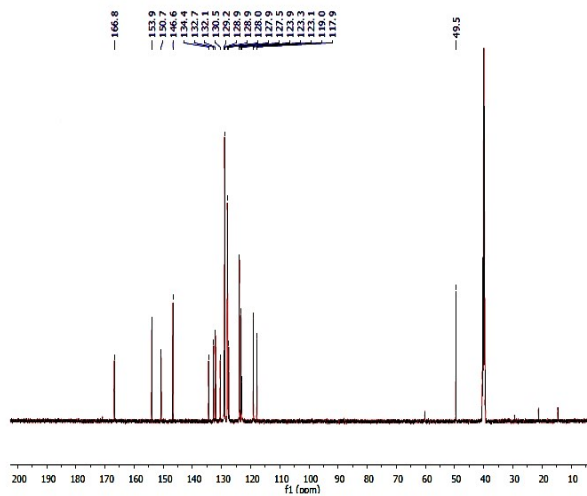
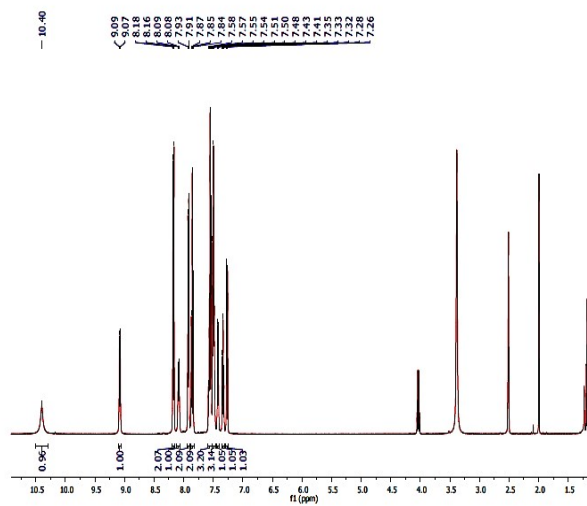


Light brown solid; mp: 129-131 °C. **¹H-NMR (300 MHz, Chloroform-d)** δ 11.52 (s, 1H), 7.83 (dd, $J_1 = 9$ Hz, $J_2 = 3$ Hz, 2H), 7.76 (d, $J = 9$ Hz, 1H), 7.44 (dd, $J_1 = 9$ Hz, $J_2 = 3$ Hz, 2H), 7.41 (d, $J = 3$ Hz, 1H), 7.36 (d, $J = 3$ Hz, 2H), 7.33 (d, $J = 3$ Hz, 1H), 7.18 (d, $J = 9$ Hz, 1H), 7.07 (t, $J = 9$ Hz, 1H), 6.66 (t, $J = 3$ Hz, 1H), 6.80 (dd, $J_1 = 6$ Hz, $J_2 = 3$ Hz, 1H), 6.66 (t, $J = 3$ Hz, 2H), 6.59 (dd, $J_1 = 9$ Hz, $J_2 = 3$ Hz, 1H), 6.18 (s, 1H), 4.08 (s, 1H), 2.25 (s, 3H). **¹³C-NMR (100 MHz, CDCl₃)** δ 156.19, 146.54, 139.64, 139.39, 134.45, 131.38, 130.23, 129.60, 129.51, 129.45, 129.16, 129.14, 126.93, 123.03, 122.99, 121.26, 120.12, 117.42, 113.50, 113.16, 62.07, 21.54.

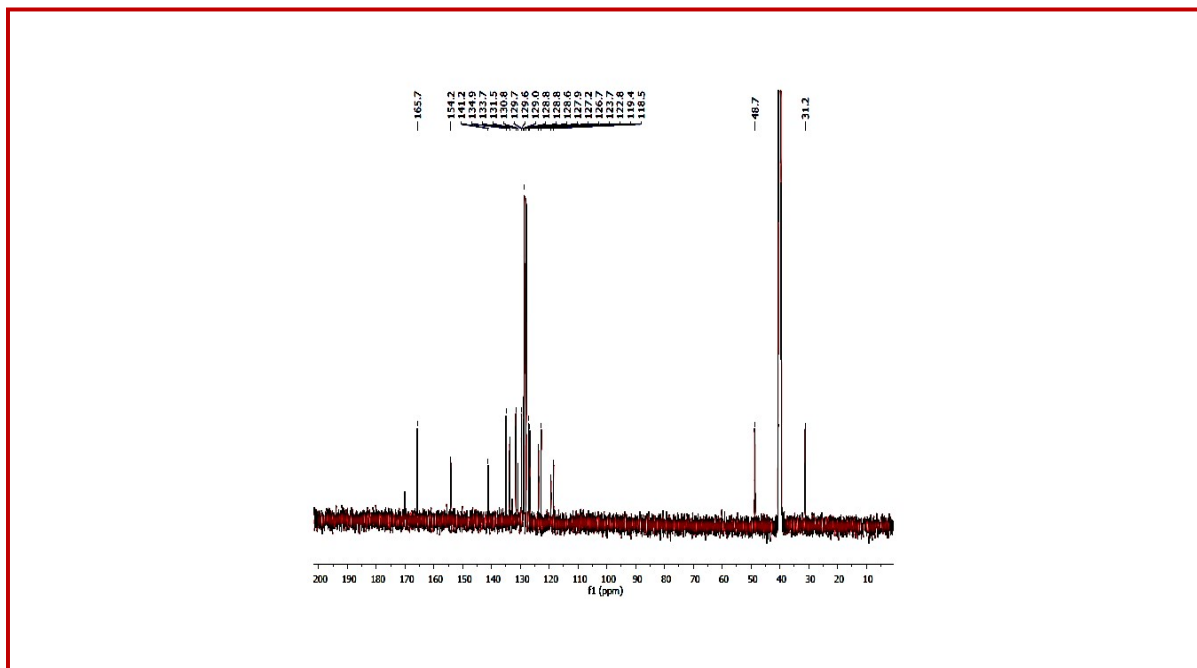
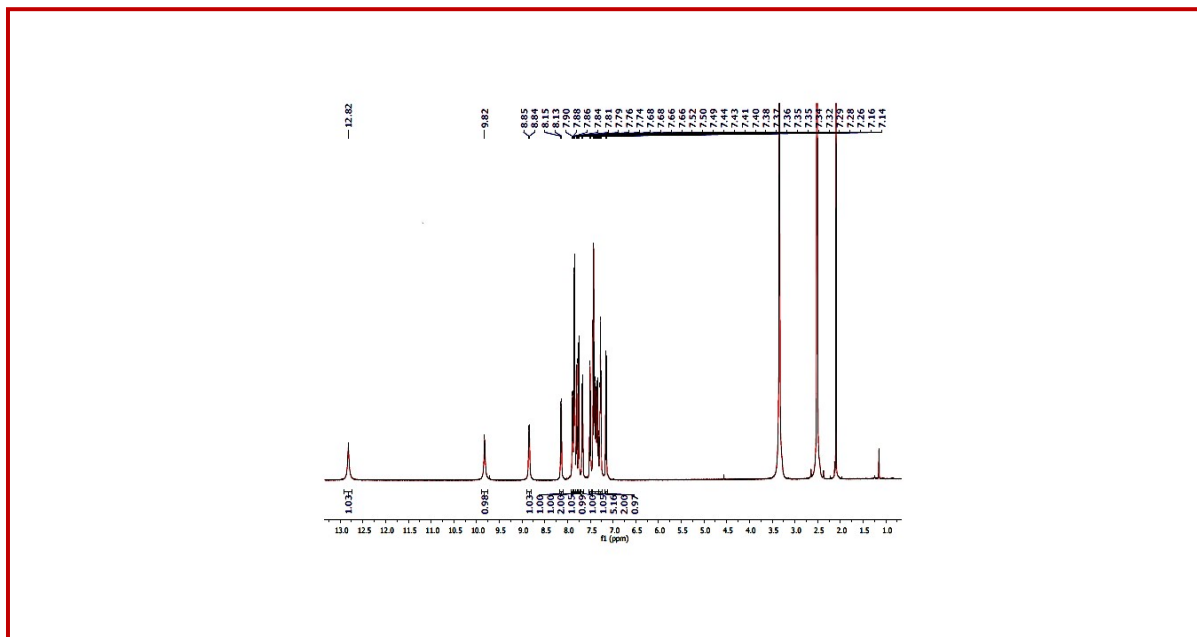
¹H-NMR and ¹³C-NMR spectra of *N*-((2-Hydroxynaphthalen-1-yl) (phenyl) methyl) Benzamide (1):



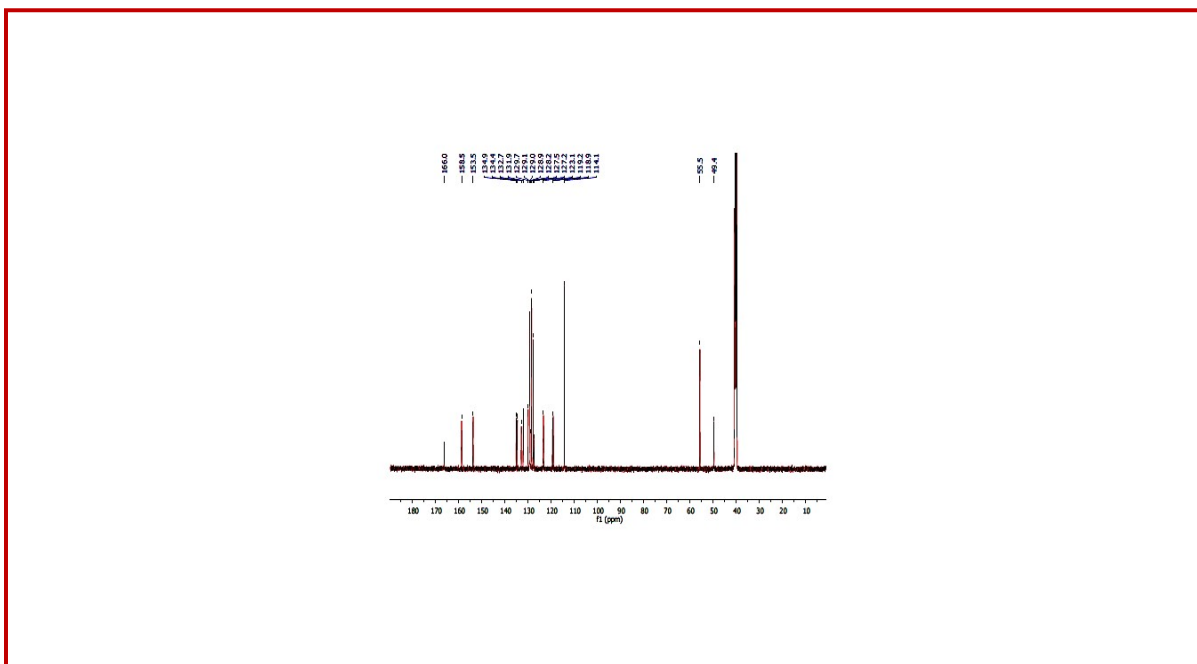
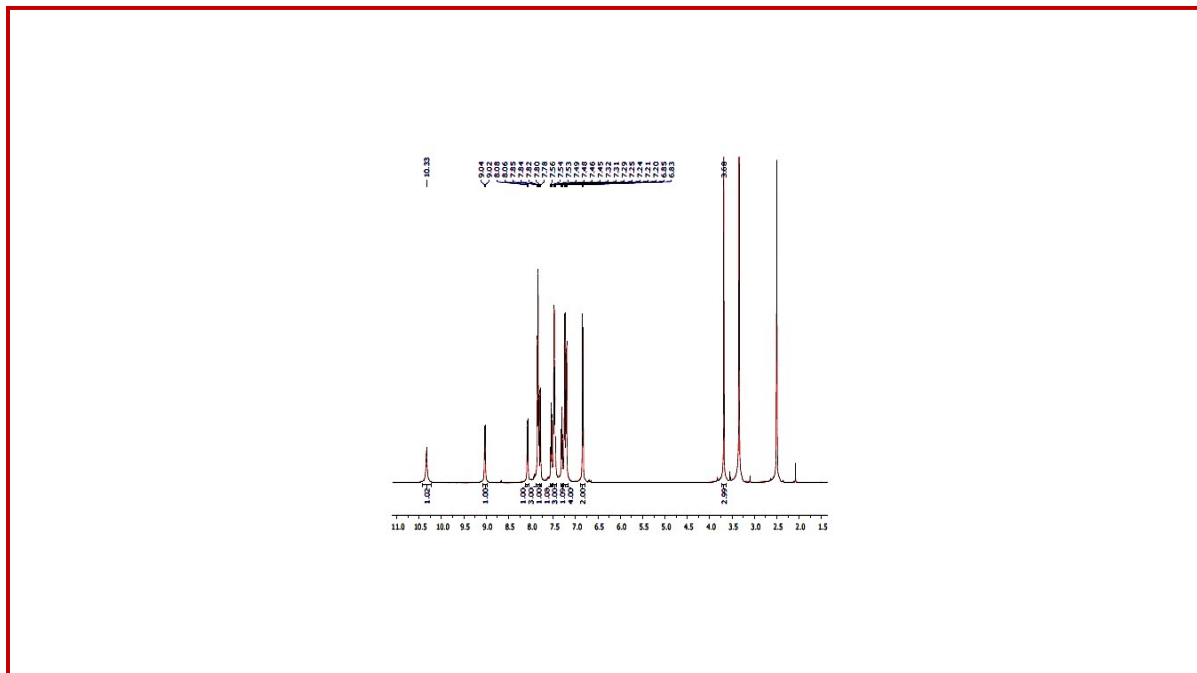
¹H-NMR and ¹³C-NMR spectra of *N*-((2-Hydroxynaphthalen-1-yl) (4-nitrophenyl) methyl) Benzamide (2):



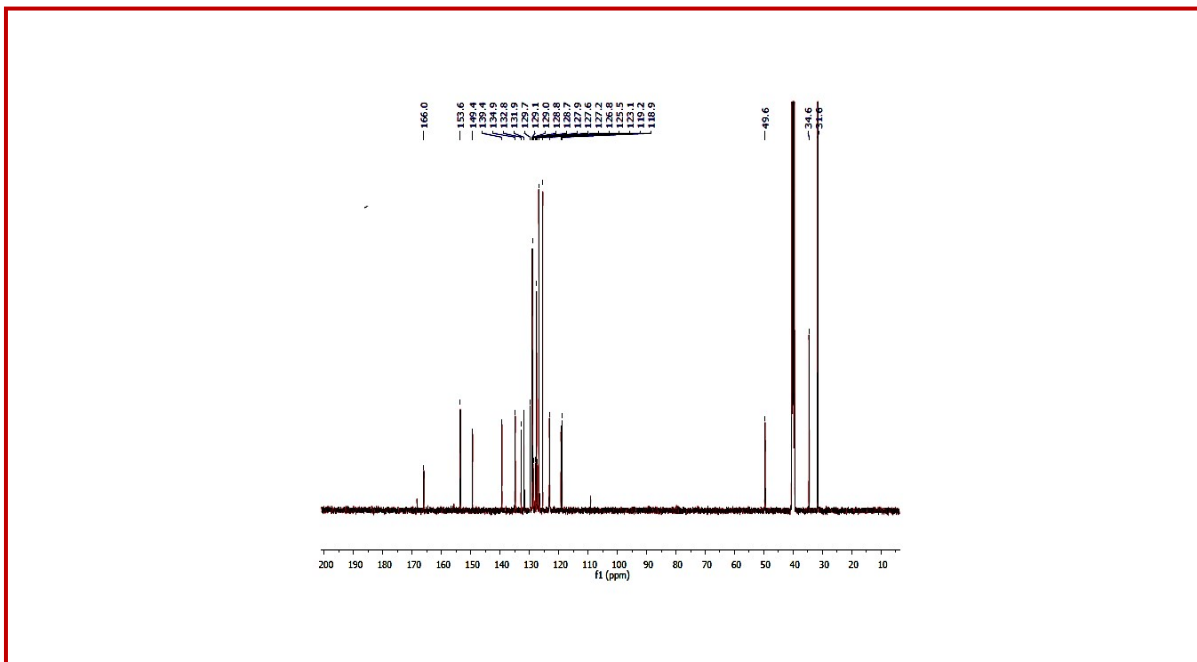
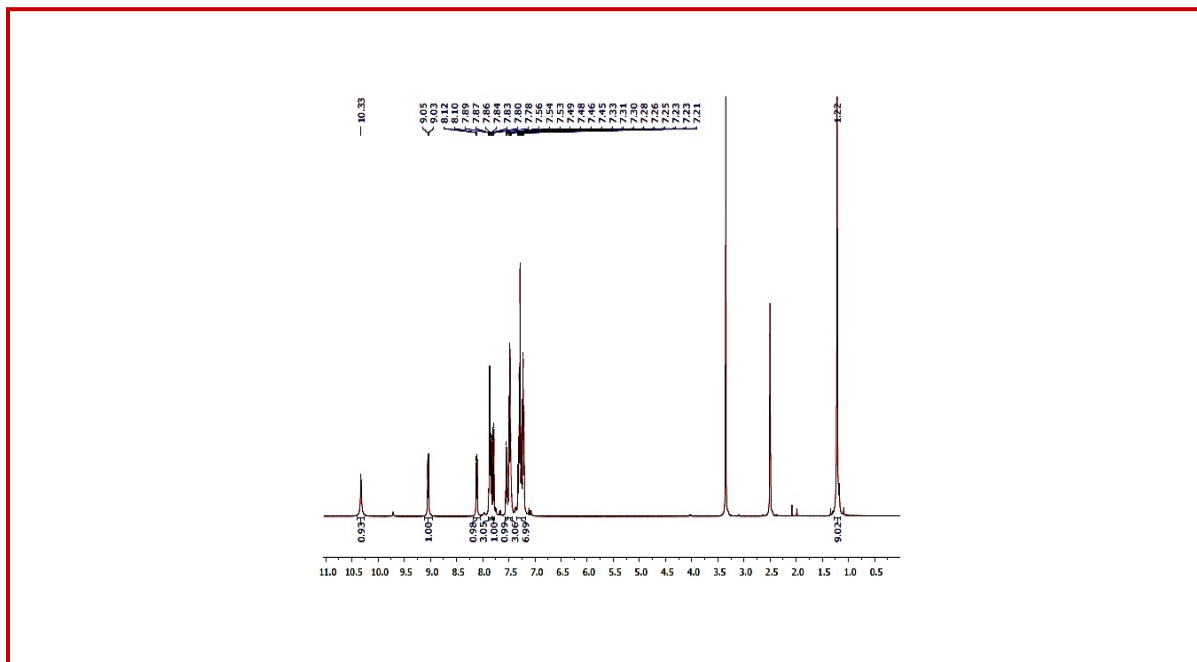
¹H-NMR and ¹³C-NMR spectra of 2-(Benzamido (2-hydroxynaphthalen-1-yl) methyl) benzoic acid (3):



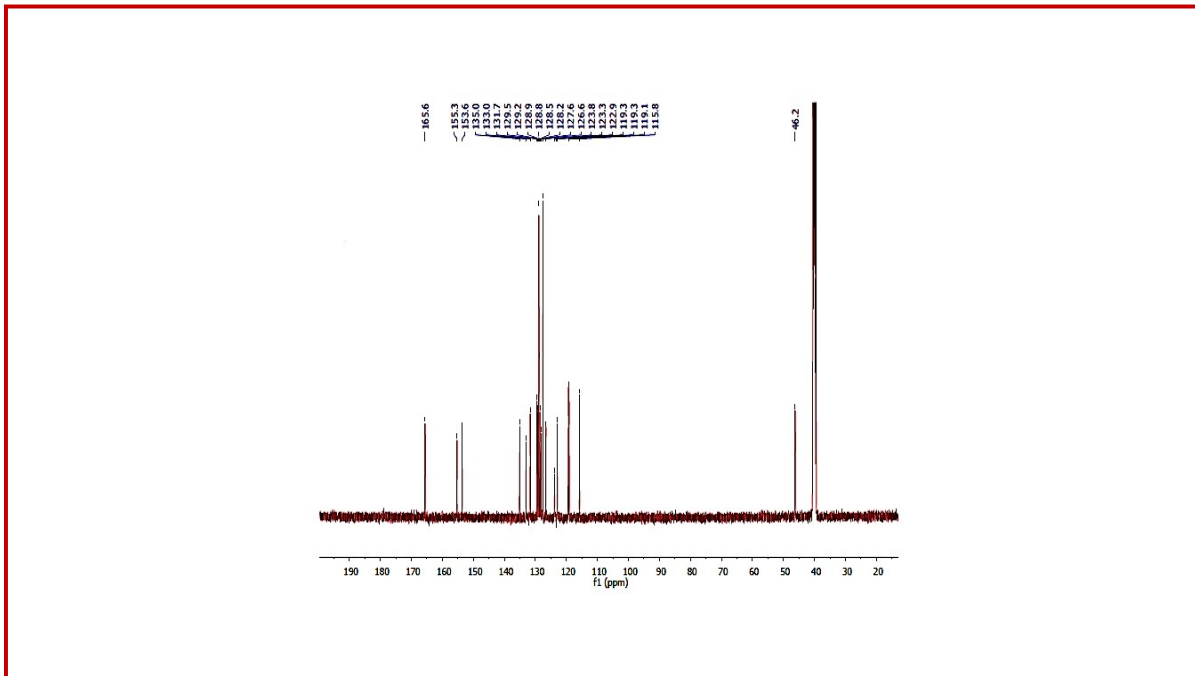
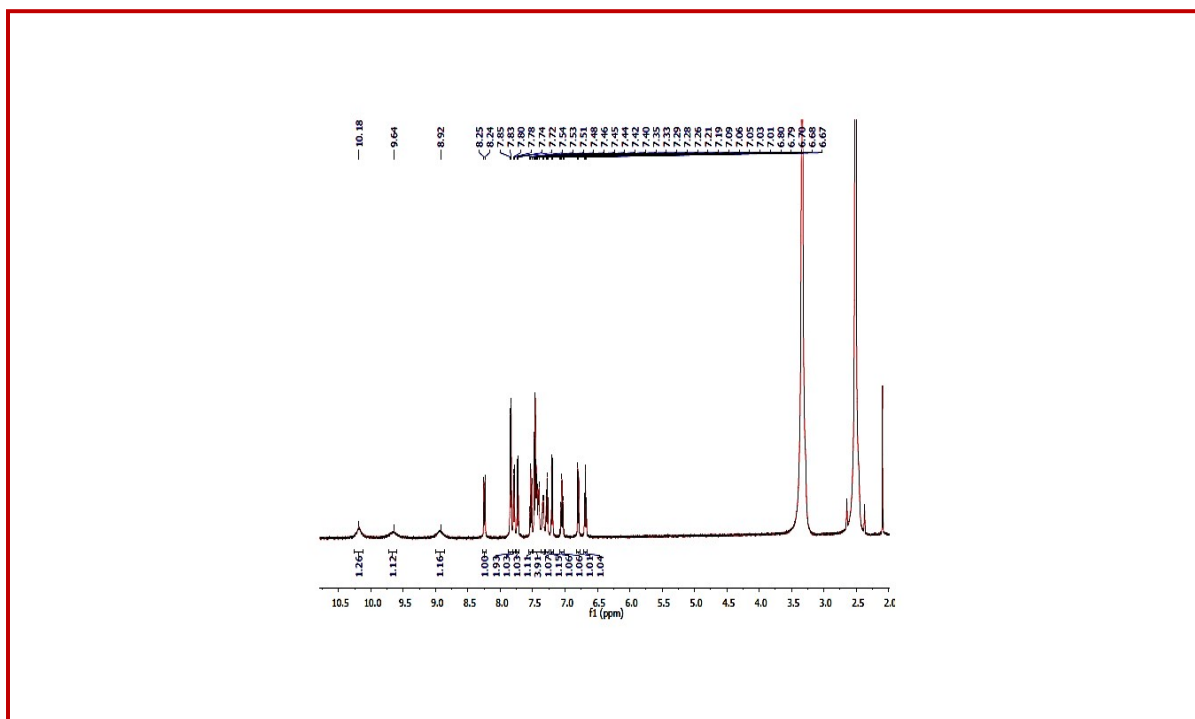
¹H-NMR and ¹³C-NMR spectra of *N*-((2-hydroxynaphthalen-1-yl) (p-tolyl) methyl) Benzamide (7):



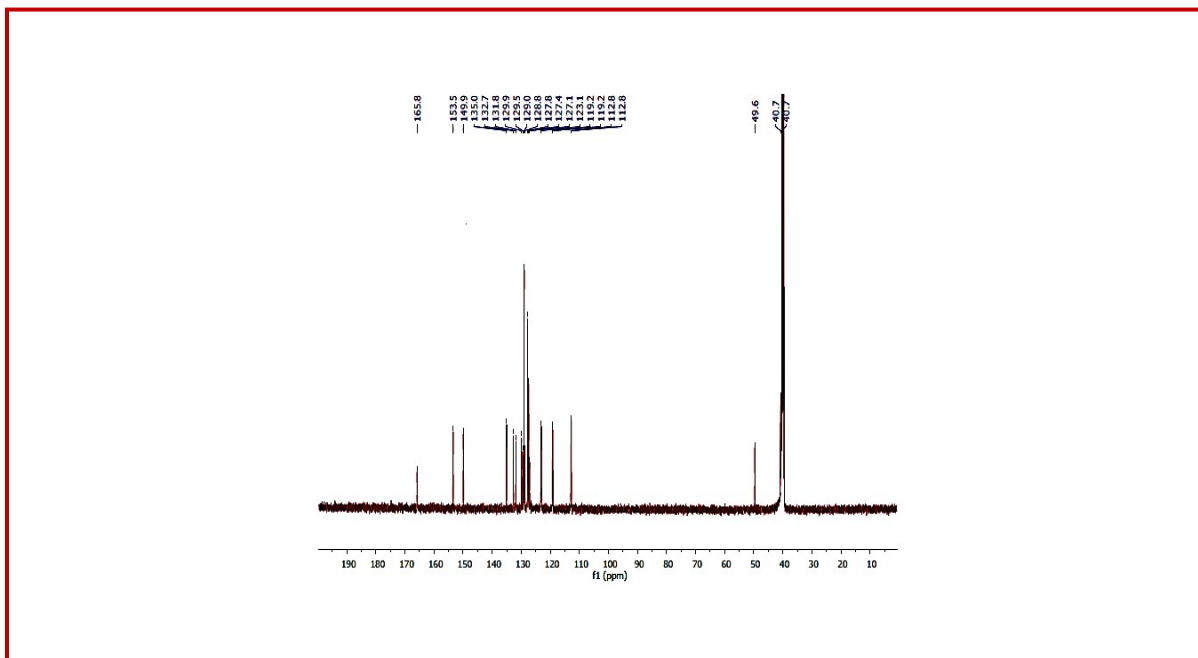
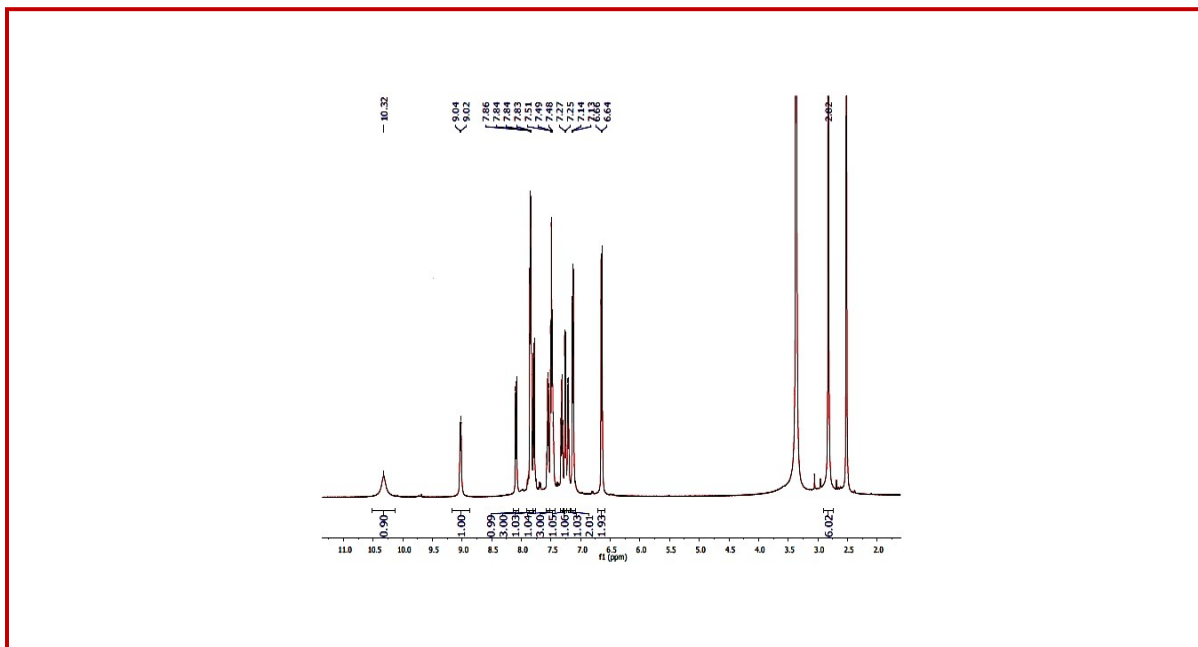
¹H-NMR and ¹³C-NMR spectra of *N*-((4-*tert*-Butyl) phenyl) (2-hydroxynaphthalen-1-yl) methyl benzamide (8):



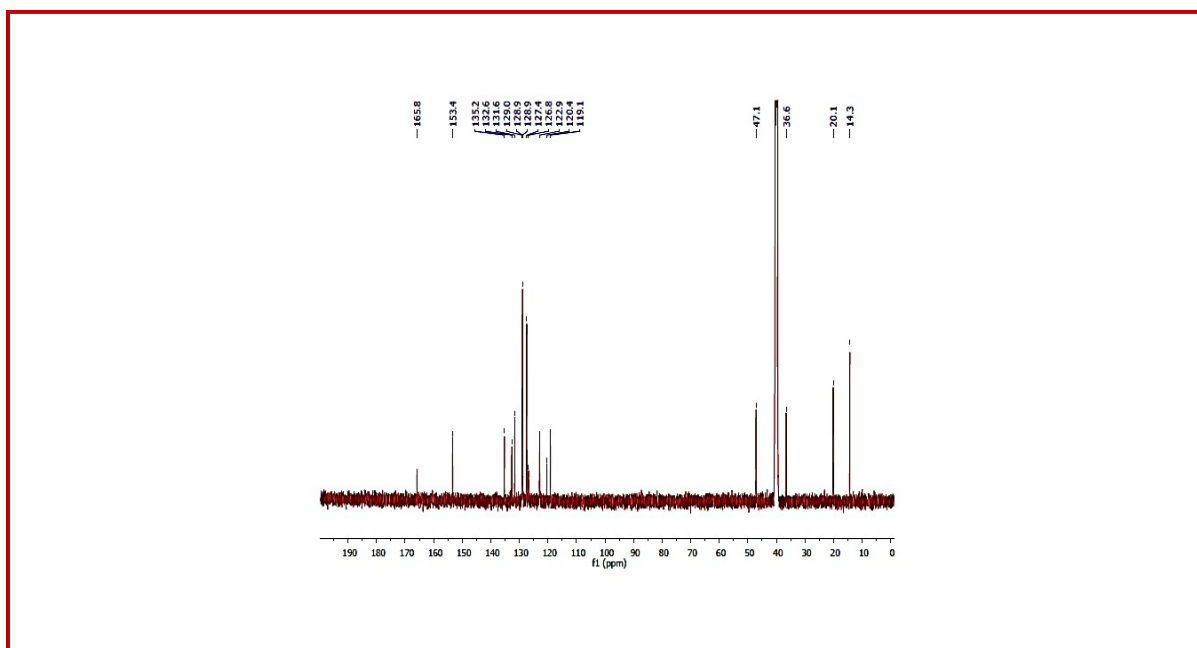
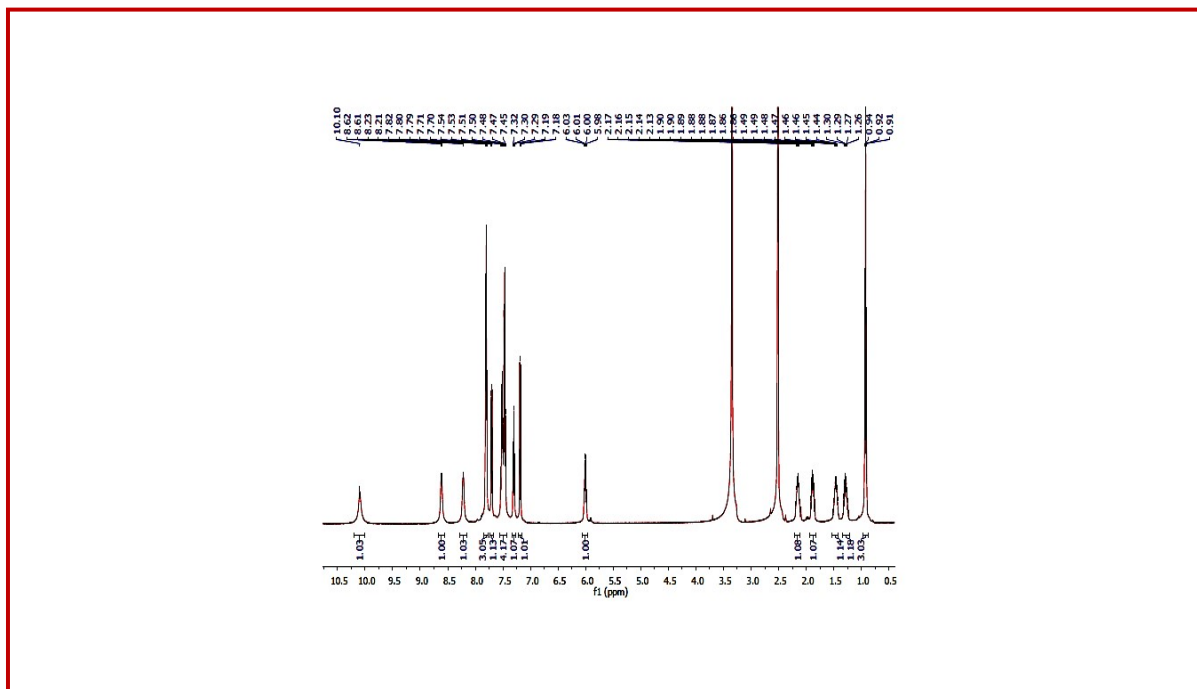
¹H-NMR and ¹³C-NMR spectra of *N*-((2-Hydroxynaphthalen-1-yl) (2-hydroxyphenyl) methyl) Benzamide (9):



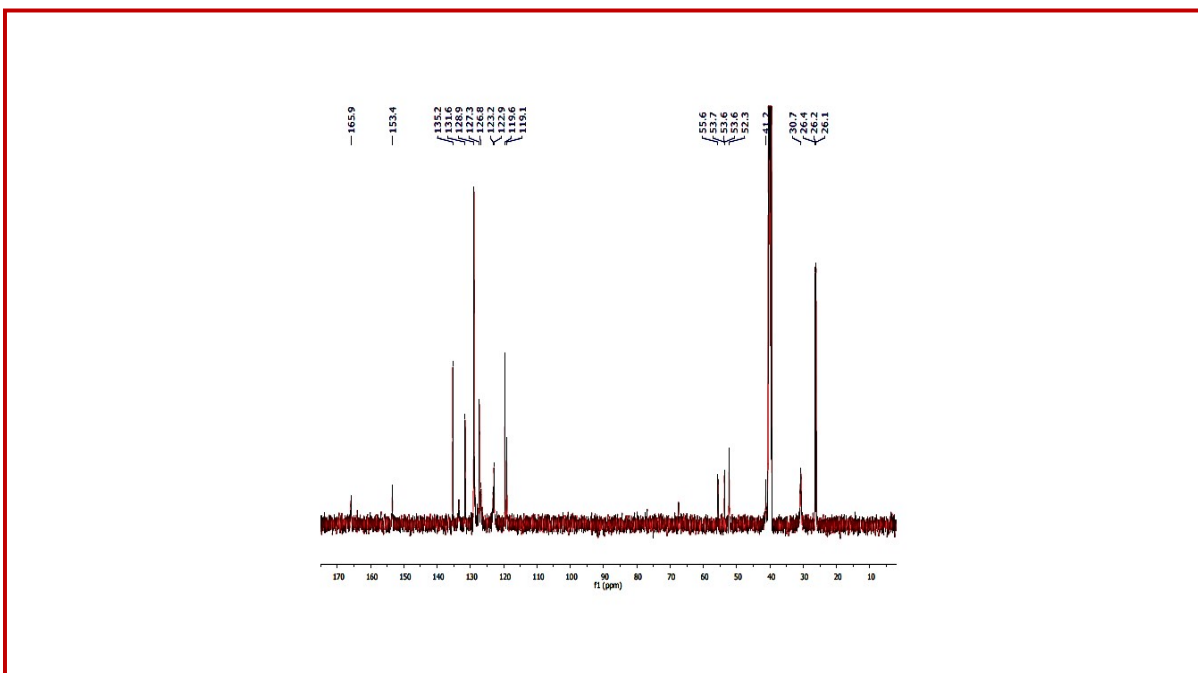
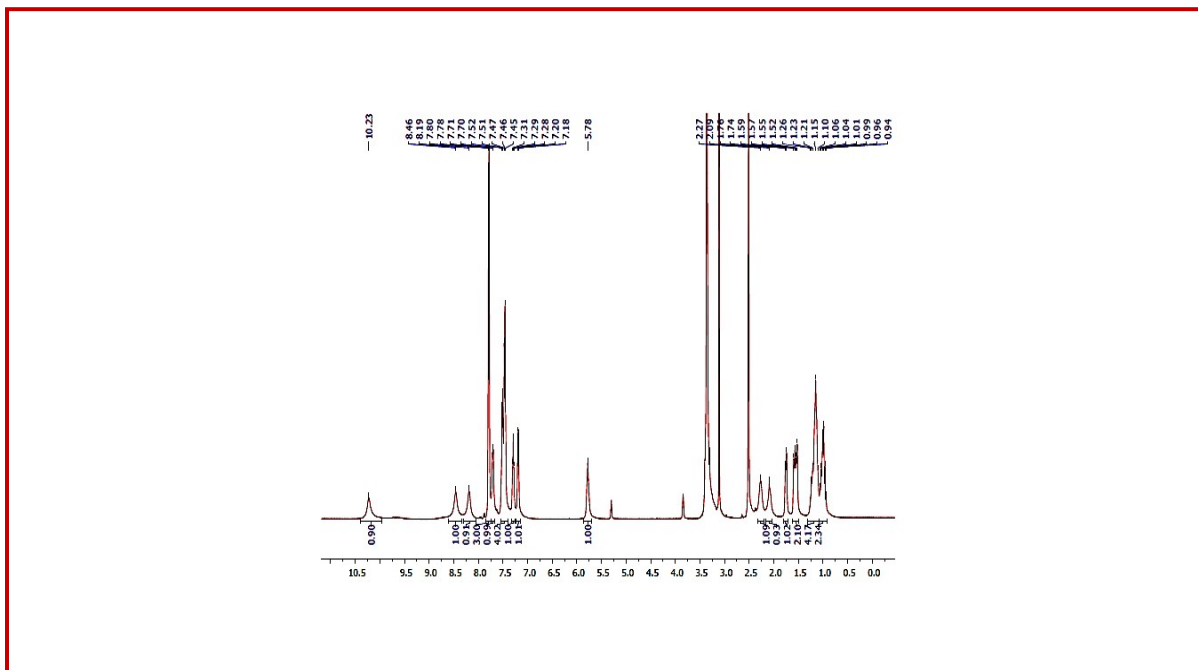
¹H-NMR and ¹³C-NMR spectra of *N*-((4-(Di-methyl-amino) phenyl) (2-hydroxynaphthalen-1-yl) methyl) Benzamide (10):



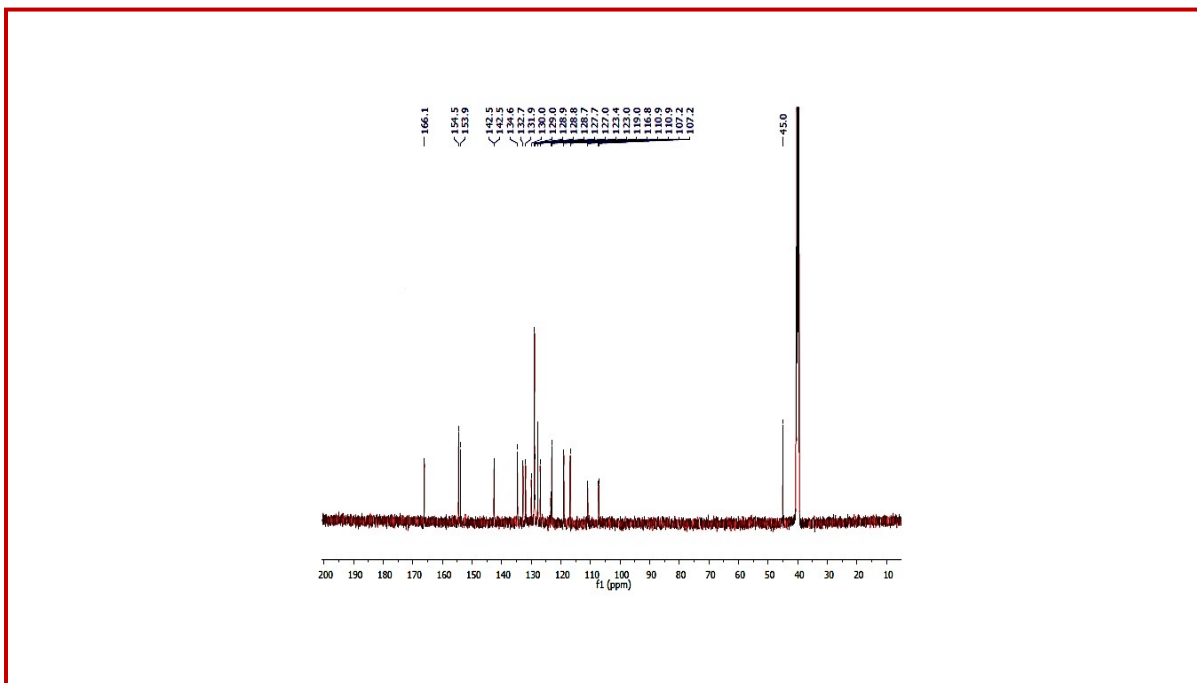
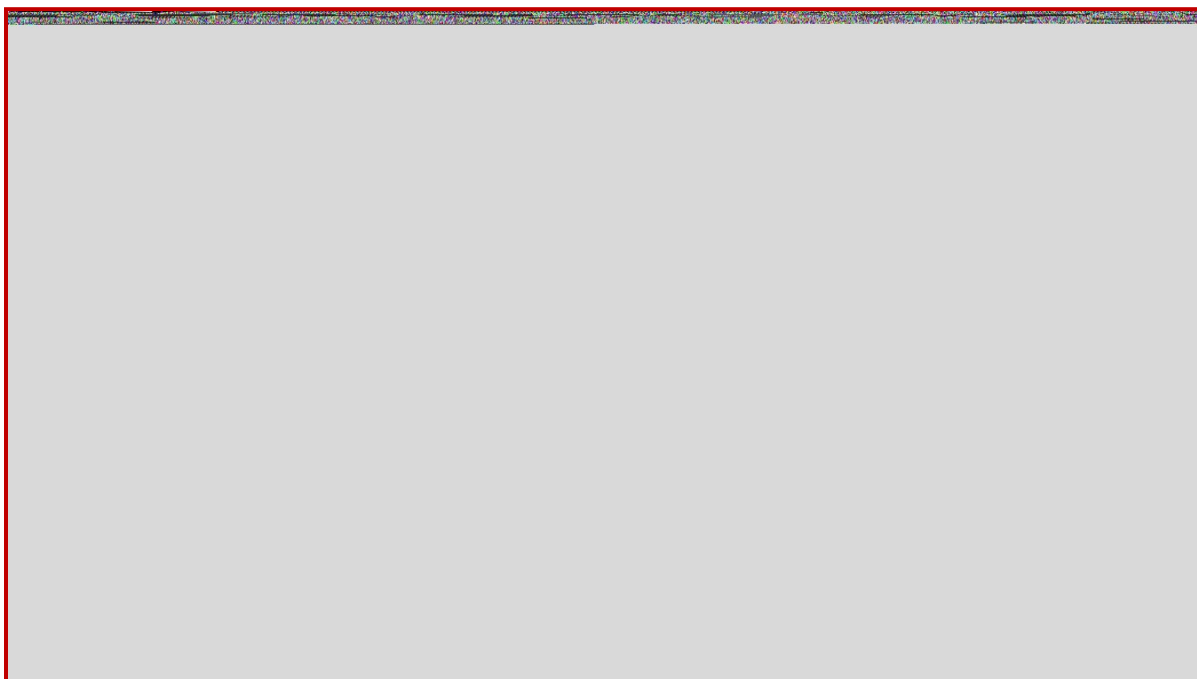
¹H-NMR and ¹³C-NMR spectra of *N*-(1-(2-Hydroxynaphthalen-1-yl) butyl) Benzamide (11):



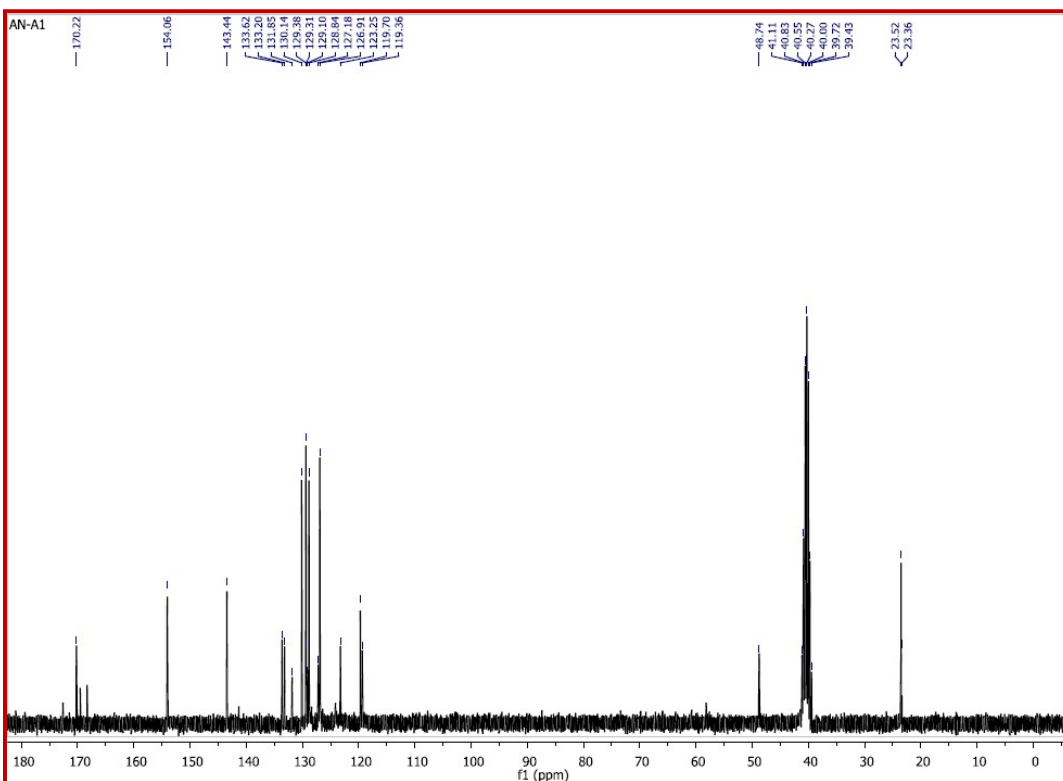
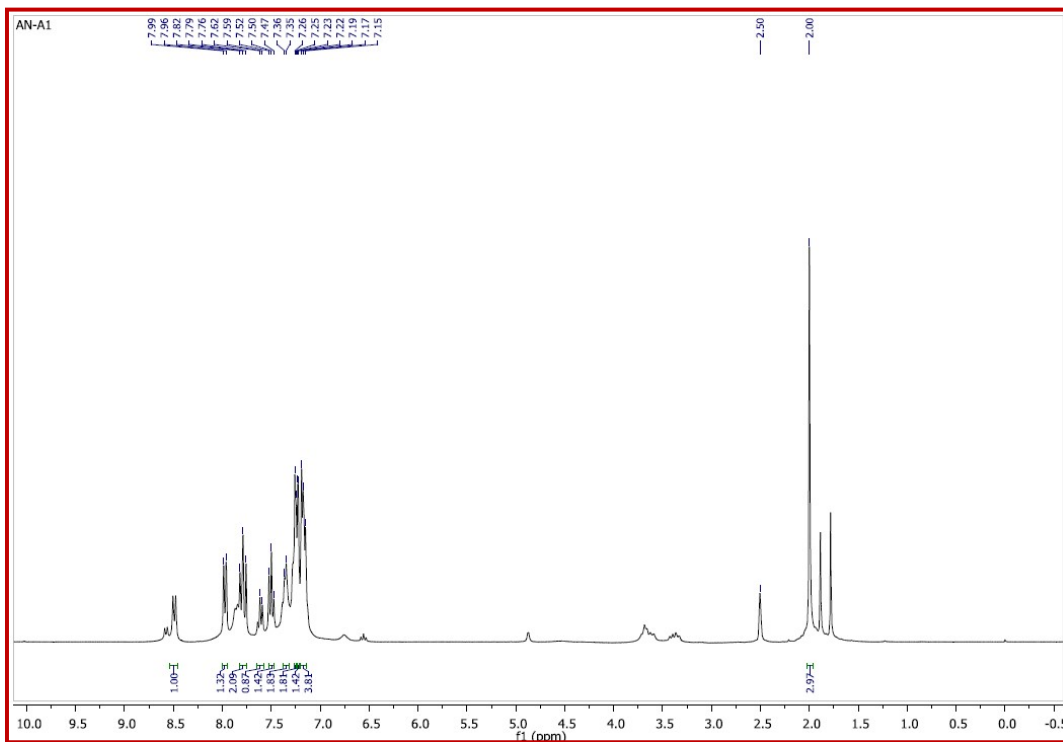
¹H-NMR and ¹³C-NMR spectra of *N*-(Cyclohexyl (2-hydroxynaphthalen-1-yl) methyl) Benzamide (12):



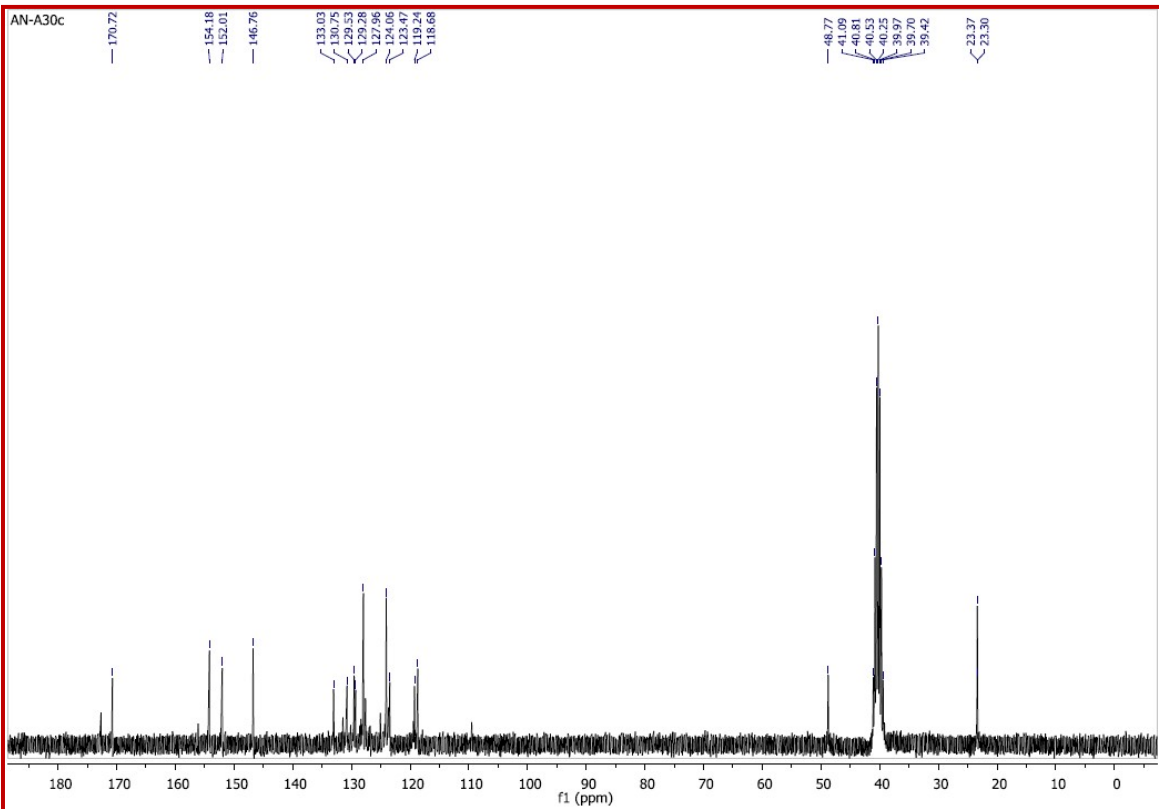
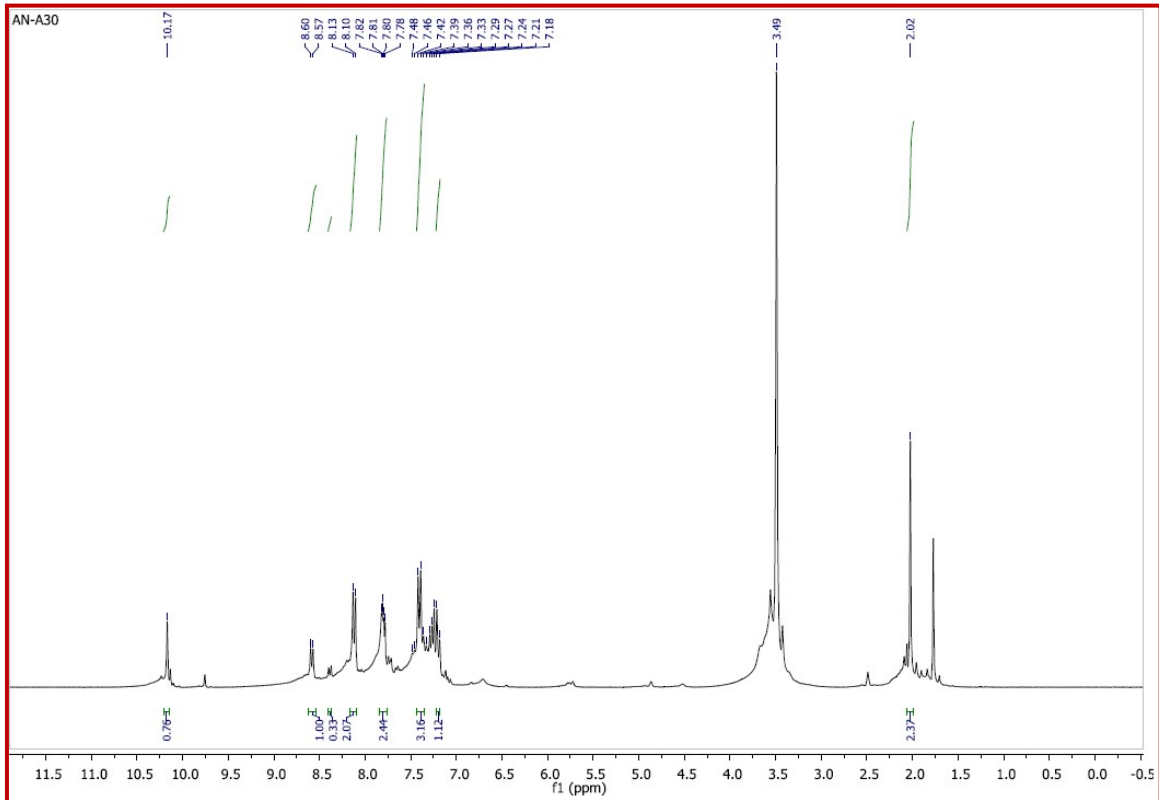
¹H-NMR and ¹³C-NMR spectra of *N*-(Furan-2-yl (2-hydroxynaphthalen-1-yl) methyl) Benzamide (13):



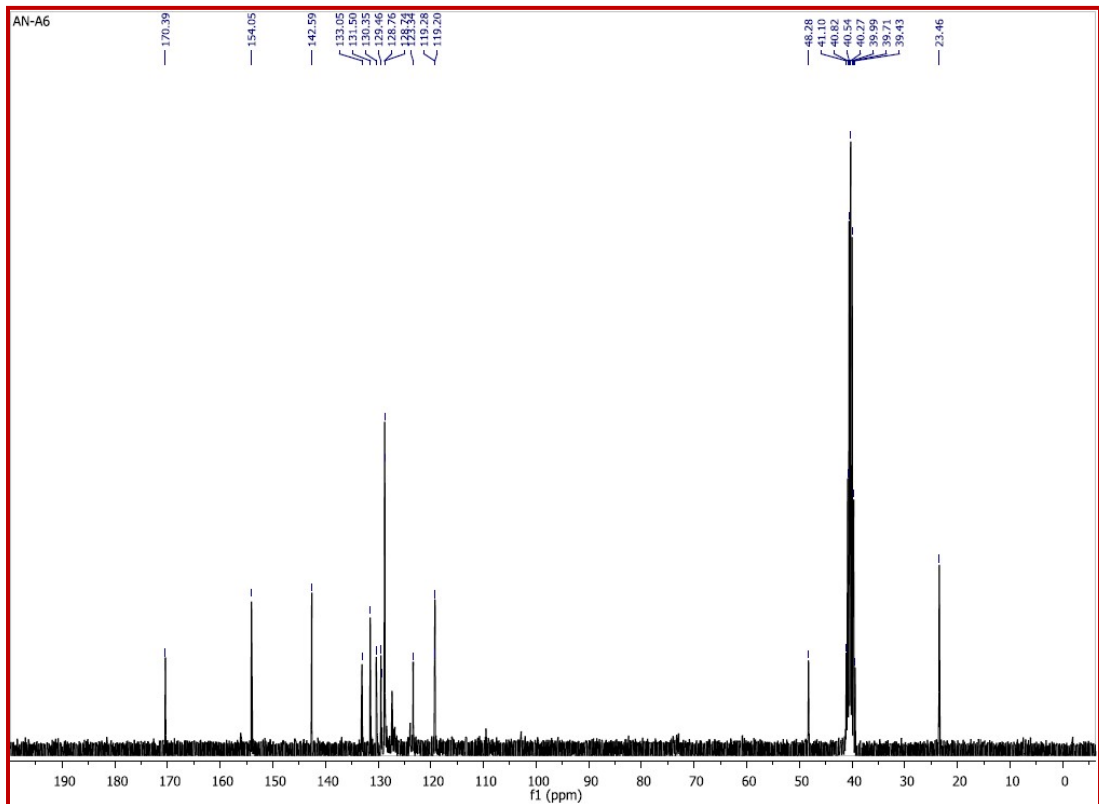
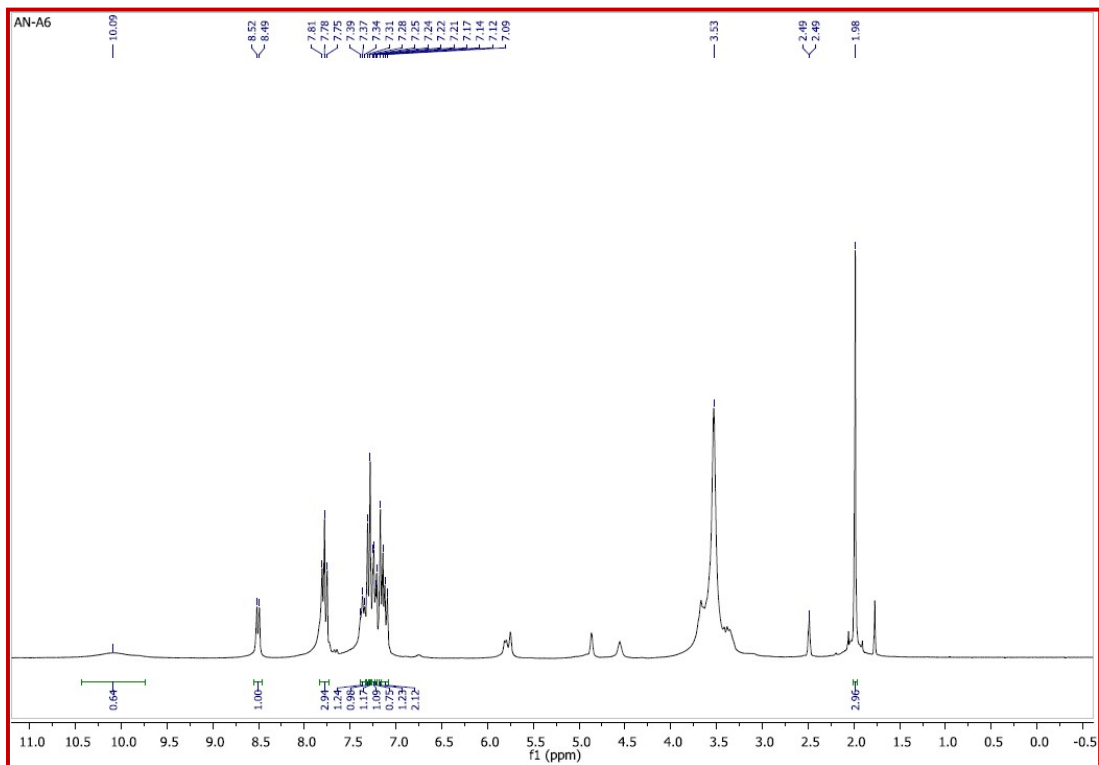
N-((2-hydroxynaphthalen-1-yl)(phenyl)methyl)acetamide (14):



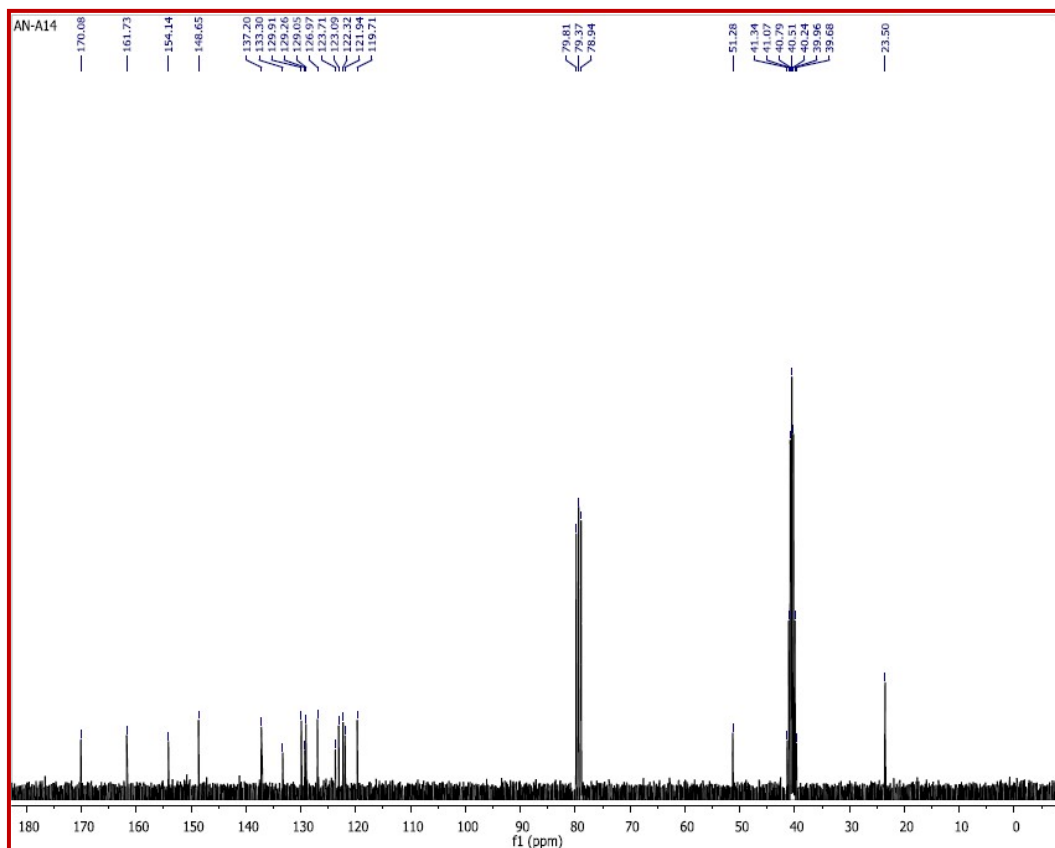
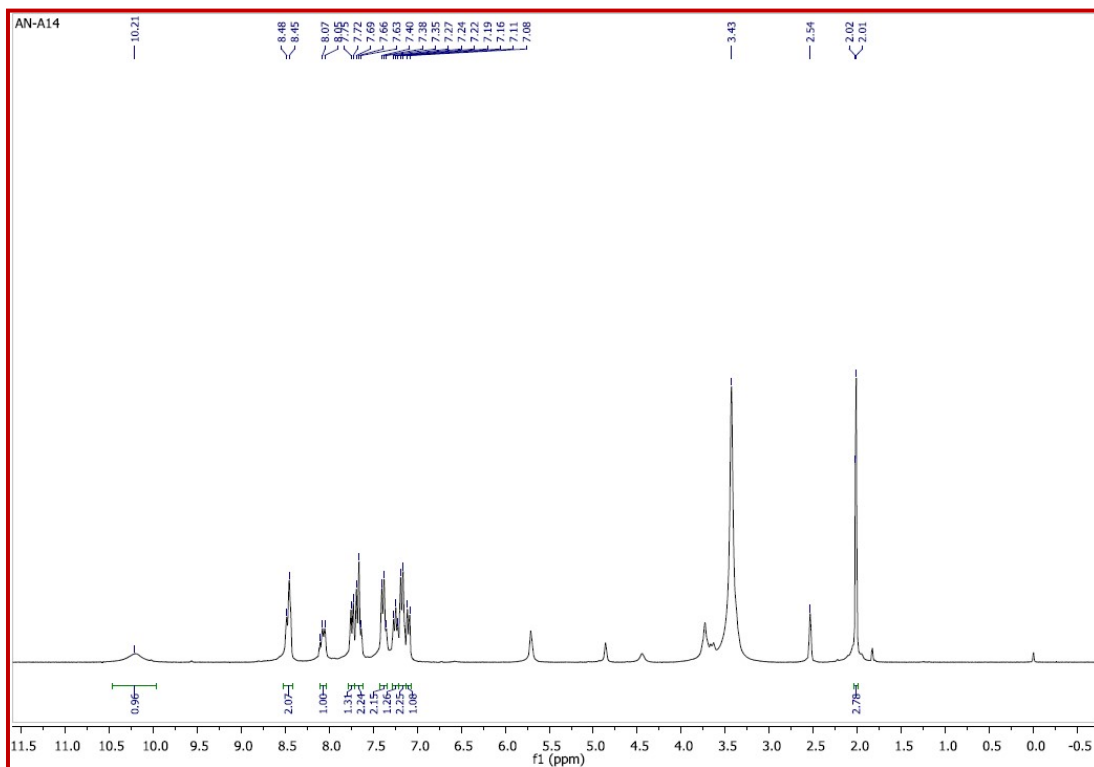
N-((2-hydroxynaphthalen-1-yl)(4-nitrophenyl)methyl)acetamide (15):



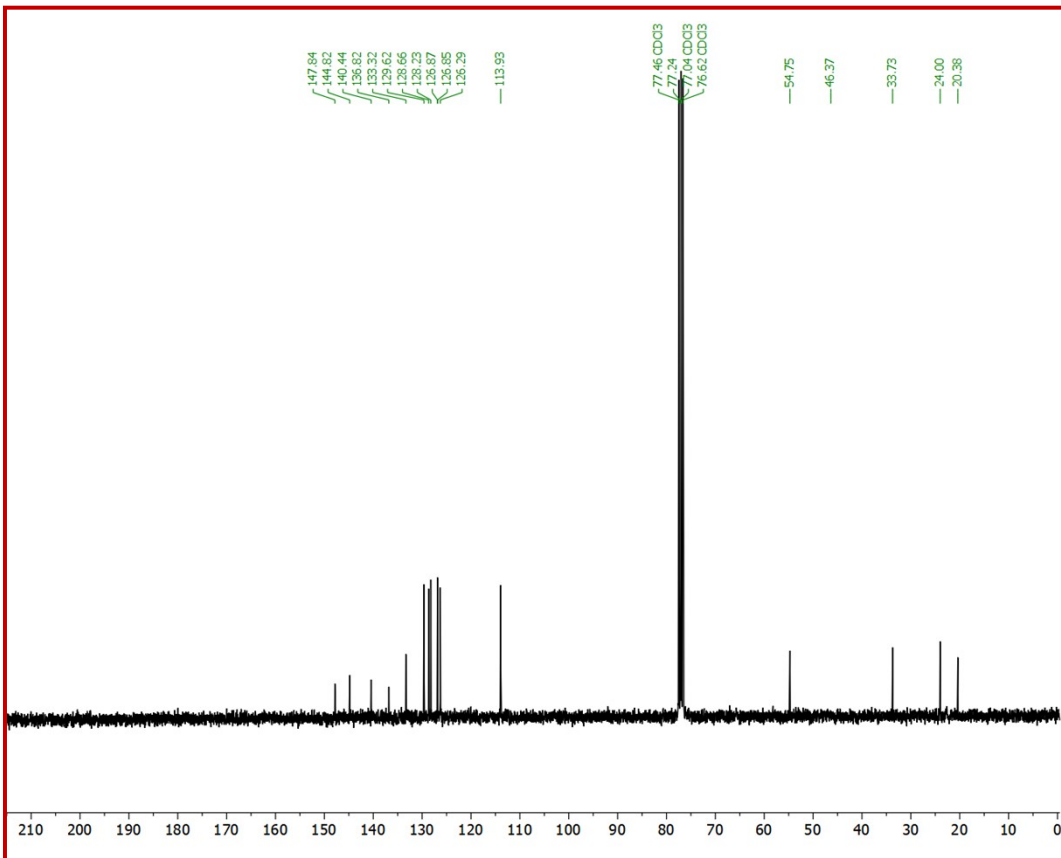
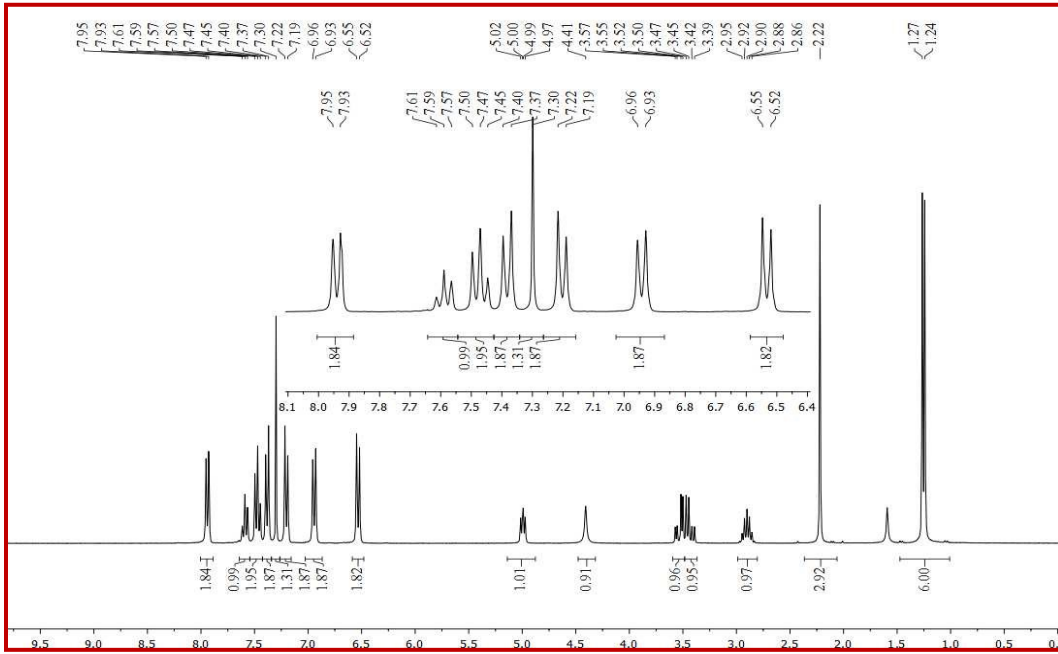
N-((4-chlorophenyl)(2-hydroxynaphthalen-1-yl)methyl)acetamide (16):



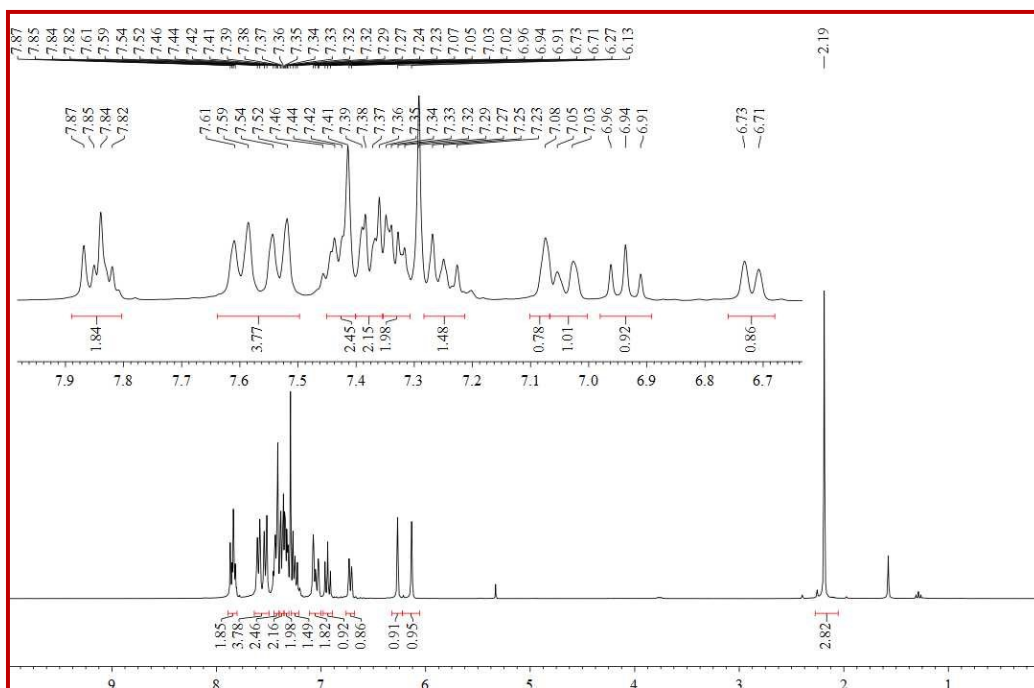
N-((2-hydroxynaphthalen-1-yl)(pyridin-2-yl)methyl)acetamide (17):

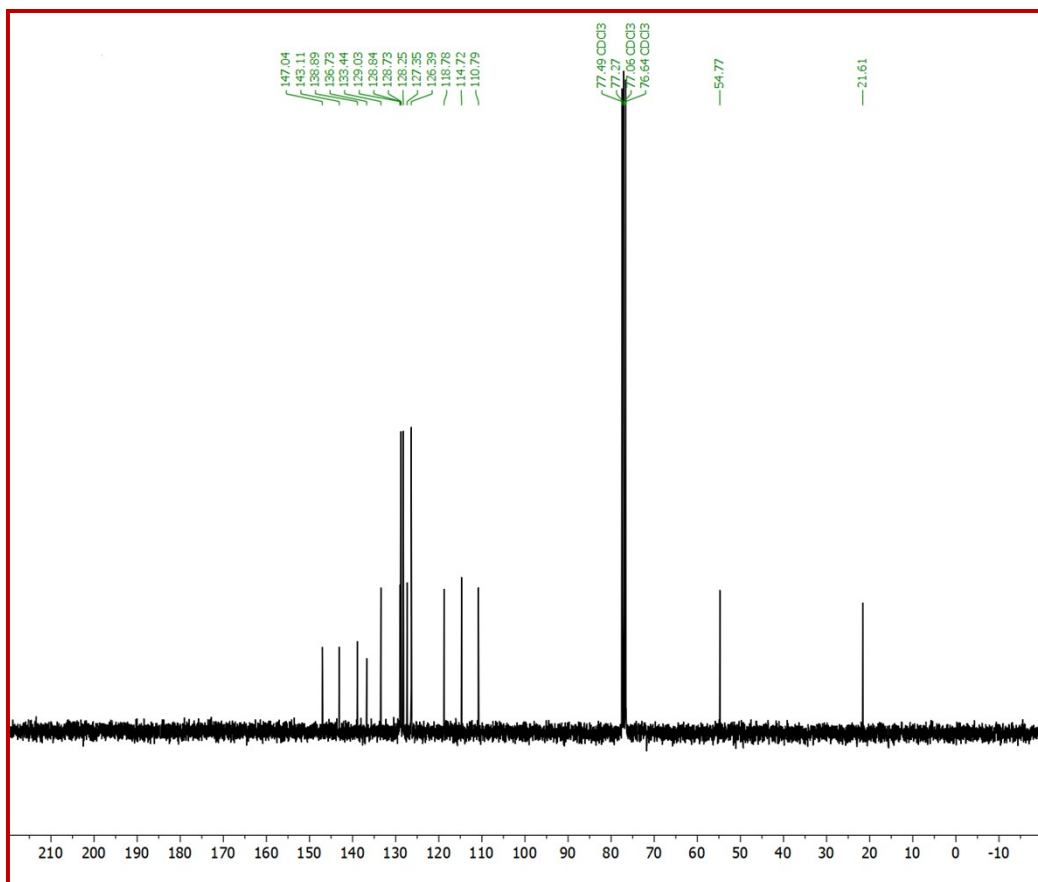


((4-isopropylphenyl)(p-tolylamino)methyl)naphthalen-2-ol (18)

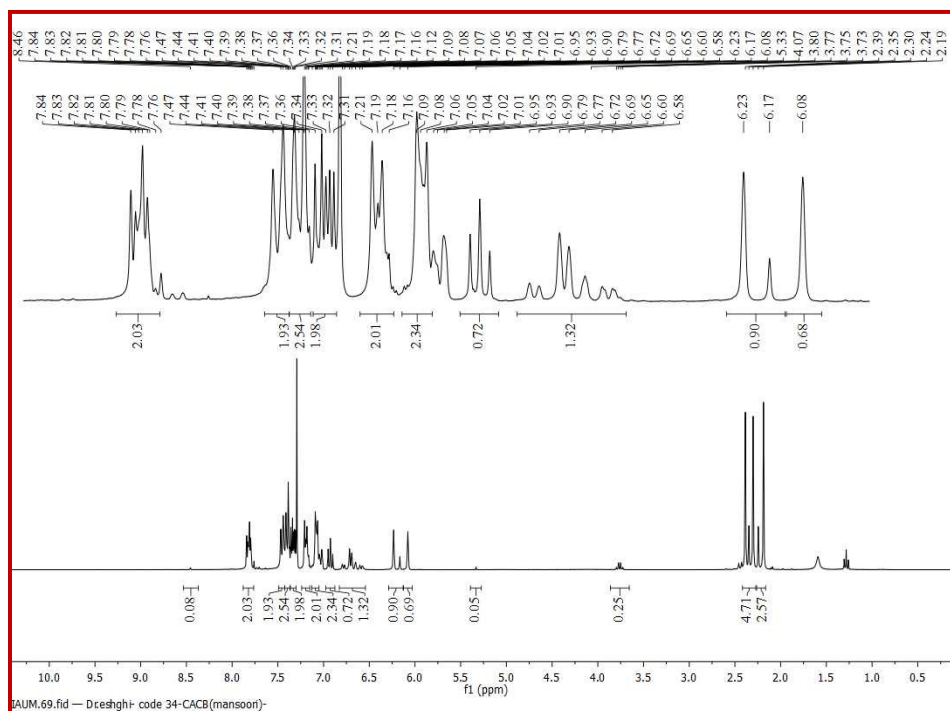


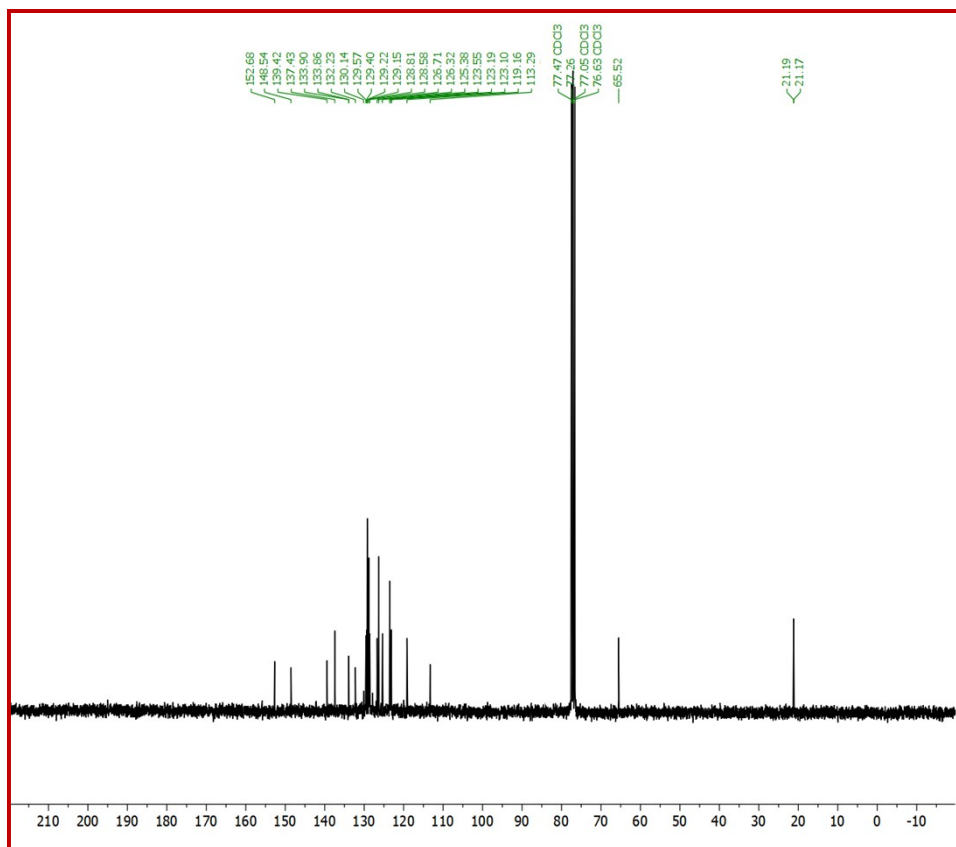
1-(phenyl (m-tolylamino) methyl) naphthalen-2-ol (19)





1-(p-tolyl (m-tolylamino) methyl) naphthalen-2-ol (20)





1-((4-chlorophenyl) (m-tolylamino) methyl) naphthalen-2-ol (21)

