

Supplementary Material

Ceric ammonium nitrate (CAN) catalyzed one-pot synthesis of fully substituted new indeno[1,2-*b*]pyridines at room temperature by a multi-component reaction

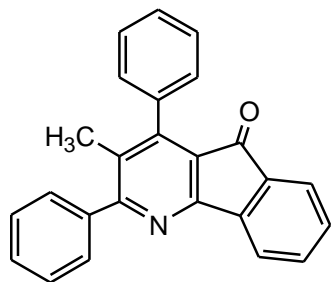
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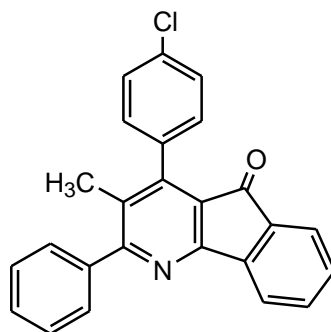
E-mail: cmukhop@yahoo.co.in

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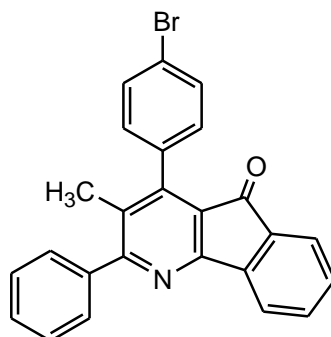
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**3-Methyl-2,4-diphenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 1)

Yellow solid, mp 178-180 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 372.6 nm (ϵ = 1547); IR (KBr): 3077, 1710, 1566, 1525, 1483, 1079, 834 and 714 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 7.85 (d, J =7.4 Hz, 1H), 7.60-7.35 (m, 10H), 7.33 (t, J =7.4 Hz, 1H), 7.22 (br. d, J =7.2 Hz, 2H), 2.01 (s, 3H); Anal. Calcd. for C₂₅H₁₇NO; C: 86.43, H: 4.93, N: 4.03%. Found: C: 86.29, H: 5.03, N: 4.07%.

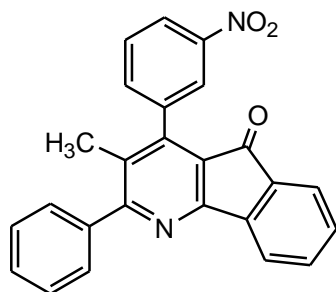
**4-(4-Chlorophenyl)-3-methyl-2-phenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 2)

Yellow solid, mp 222-224 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 382.1 nm (ϵ = 1420); IR (KBr): 3054, 1713, 1560, 1484, 1363, 1274, 1162, 1084, 989 and 756 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 7.89 (d, J =7.2 Hz, 1H), 7.65-7.43 (m, 9H), 7.36 (t, J =7.8 Hz, 1H), 7.23 (d, J =8.4 Hz, 2H), 2.06 (s, 3H); Anal. Calcd. for C₂₅H₁₆ClNO; C: 78.63, H: 4.22, N: 3.67%. Found: C: 78.50, H: 4.31, N: 3.71%.

**4-(4-Bromophenyl)-3-methyl-2-phenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 3)

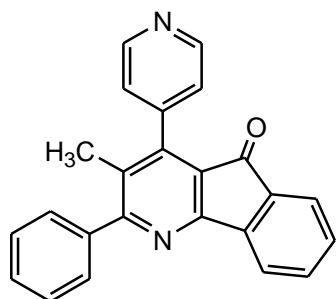
Yellow solid, mp 224-225 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 380.2 nm (ϵ = 1424); IR (KBr):

3044, 1712, 1547, 1483, 1278, 1157, 1075, 978 and 767 cm^{-1} ; ^1H NMR (300 MHz, CDCl_3) δ : 7.83 (d, $J=7.4$ Hz, 1H), 7.65-7.35 (m, 9H), 7.31 (t, $J=7.5$ Hz, 1H), 7.10 (d, $J=8.1$ Hz, 2H), 2.00 (s, 3H); Anal. Calcd. for $\text{C}_{25}\text{H}_{16}\text{BrNO}$; C: 70.43, H: 3.78, N: 3.29%. Found: C: 70.32, H: 3.85, N: 3.33%.



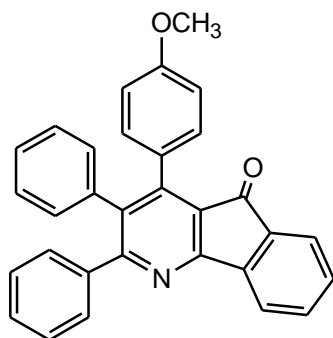
3-Methyl-4-(3-nitrophenyl)-2-phenyl-indeno[1,2-*b*]pyridin-5-one (Table 2, entry 5)

Yellow solid, mp 204-206 $^{\circ}\text{C}$ (EtOH); UV [λ_{max} (CH_2Cl_2)] = 380.4 nm ($\epsilon = 1687$); IR (KBr): 3034, 1714, 1566, 1534, 1345 and 768 cm^{-1} ; ^1H NMR (300 MHz, CDCl_3) δ : 8.36 (d, $J=7.8$ Hz, 1H), 8.21 (s, 1H), 7.94 (d, $J=7.3$ Hz, 1H), 7.75-7.45 (m, 8H), 7.35 (t, $J=6.8$ Hz, 2H), 2.01 (s, 3H); ^{13}C NMR (75 MHz, CDCl_3) δ : 191.1, 164.0, 162.8, 148.2, 146.3, 142.9, 140.2, 136.6, 135.2, 135.0, 134.7, 130.9, 129.5, 129.2, 129.1, 128.9, 128.4, 123.8, 123.7, 123.4, 121.0, 17.7; Anal. Calcd. for $\text{C}_{25}\text{H}_{16}\text{N}_2\text{O}_3$; C: 76.52, H: 4.11, N: 7.14%. Found: C: 76.38, H: 4.22, N: 7.17%.

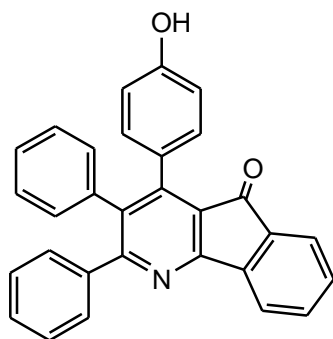


3-Methyl-2-phenyl-4-pyridin-4-yl-indeno[1,2-*b*]pyridin-5-one (Table 2, entry 6)

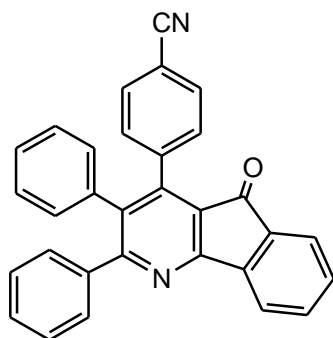
Yellow solid, mp 178-180 $^{\circ}\text{C}$ (EtOH); UV [λ_{max} (CH_2Cl_2)] = 379.4 nm ($\epsilon = 1696$); IR (KBr): 2989, 1714, 1586, 1467, 1145 and 767 cm^{-1} ; ^1H NMR (300 MHz, CDCl_3) δ : 7.89 (d, $J=7.4$ Hz, 1H), 7.66-7.29 (m, 10H), 7.25 (br. d, $J=6.2$ Hz, 2H), 2.04 (s, 3H); Anal. Calcd. for $\text{C}_{24}\text{H}_{16}\text{N}_2\text{O}$; C: 82.74, H: 4.63, N: 8.04%. Found: C: 82.62, H: 4.72, N: 8.07%.

**4-(4-Methoxyphenyl)-2,3-diphenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 7)

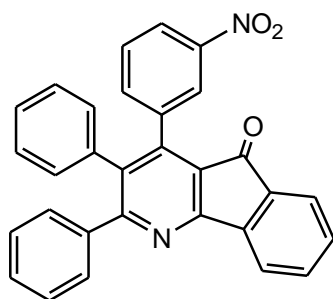
Yellow crystalline solid, mp 224-226 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 356.9 nm (ϵ = 1512); IR (KBr): 3045, 1714, 1556, 1484, 1133 and 806 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 7.99 (d, J =7.5 Hz, 1H), 7.65 (t, J =7.3 Hz, 1H), 7.60 (t, J =7.3 Hz, 1H), 7.42 (t, J =7.4 Hz, 1H), 7.38-7.33 (m, 2H), 7.27-7.17 (m, 3H), 7.11-7.7.03 (m, 3H), 7.00 (d, J =8.6 Hz, 2H), 6.88-6.80 (m, 2H), 6.77 (d, J =8.6 Hz, 2H), 3.78 (s, 3H); Anal. Calcd. for C₃₁H₂₁NO₂; C: 84.72, H: 4.82, N: 3.19%. Found: C: 84.59, H: 4.92, N: 3.22%.

**4-(4-Hydroxyphenyl)-2,3-diphenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 8)

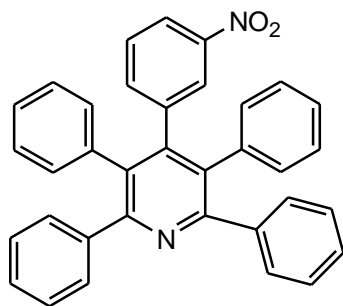
Yellow solid, mp 230-232 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 353.8 nm (ϵ = 1021); IR (KBr): 3034, 1712, 1567, 1476, 1178 and 768 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 7.99 (d, J =7.3 Hz, 1H), 7.66 (d, J =7.3 Hz, 1H), 7.58 (t, J =7.3 Hz, 1H), 7.43 (t, J =7.3 Hz, 1H), 7.38-7.30 (m, 2H), 7.24-7.15 (m, 3H), 7.04 (br. d, J =6.0 Hz, 3H), 6.92 (d, J =7.9 Hz, 2H), 6.86-6.78 (m, 2H), 6.64 (d, J =7.9 Hz, 2H); Anal. Calcd. for C₃₀H₁₉NO₂; C: 84.69, H: 4.50, N: 3.29%. Found: C: 84.57, H: 4.60, N: 3.31%.

**4-(4-Cyanophenyl)-2,3-diphenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 9)

Yellow solid, mp 220-222 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 386.8 nm (ϵ = 1710); IR (KBr): 2998, 2232, 1714, 1575, 1476, 1165 and 776 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 8.00 (d, J =7.3 Hz, 1H), 7.74-7.62 (m, 2H), 7.52 (d, J =7.4 Hz, 2H), 7.45 (t, J =7.5 Hz, 1H), 7.41-7.33 (m, 2H), 7.31-7.15 (m, 5H), 7.14-6.98 (m, 3H), 6.80 (br. d, J =6.9 Hz, 2H); Anal. Calcd. for C₃₁H₁₈N₂O; C: 85.69, H: 4.18, N: 6.45%. Found: C: 85.58, H: 4.25, N: 6.49%.

**4-(3-Nitrophenyl)-2,3-diphenyl-indeno[1,2-*b*]pyridin-5-one** (Table 2, entry 11)

Yellow solid, mp 196-198 °C (EtOH); UV [λ_{max} (CH₂Cl₂)] = 381.5 nm (ϵ = 1643); IR (KBr): 2989, 1714, 1567, 1486, 1156 and 767 cm⁻¹; ¹H NMR (300 MHz, CDCl₃) δ : 8.14-8.08 (m, 1H), 8.00 (br. t, J =7.4 Hz, 2H), 7.67-7.58 (m, 2H), 7.45 (t, J =7.4 Hz, 1H), 7.41-7.34 (m, 4H), 7.32-7.18 (m, 3H), 7.14-6.98 (m, 3H), 6.84 (br. s, 2H); Anal. Calcd. for C₃₀H₁₈N₂O₃; C: 79.28, H: 3.99, N: 6.16%. Found: C: 79.18, H: 4.06, N: 6.19%.



4-(3-Nitrophenyl)-2,3,5,6-tetraphenylpyridine (Table 3, entry 5)

Pale yellow solid, mp 200-202 °C (EtOH); IR (KBr): 3026, 1595, 1517, 1447, 1386, 1077, 1023, 856 and 758 cm^{-1} ; ^1H NMR (300 MHz, CDCl_3) δ : 7.84-7.76 (m, 1H), 7.70 (br. s, 1H), 7.55-7.36 (m, 4H), 7.34-7.14 (m, 7H), 7.13-6.83 (m, 11H); Anal. Calcd. for $\text{C}_{35}\text{H}_{24}\text{N}_2\text{O}_2$; C: 83.31, H: 4.79, N: 5.55%. Found: C: 83.19, H: 4.88, N: 5.58%.

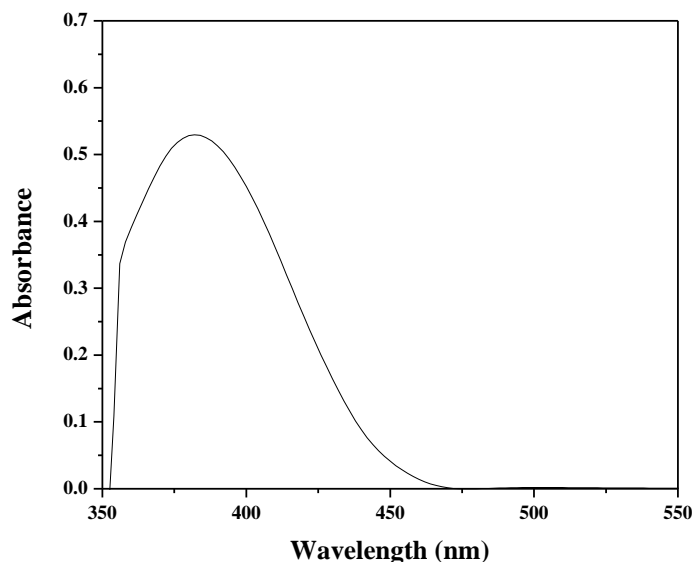


Figure 1. UV/Vis absorption spectra of 4-(4-Chlorophenyl)-3-methyl-2-phenyl-indeno[1,2-*b*]pyridin-5-one (Table 2, entry 2).

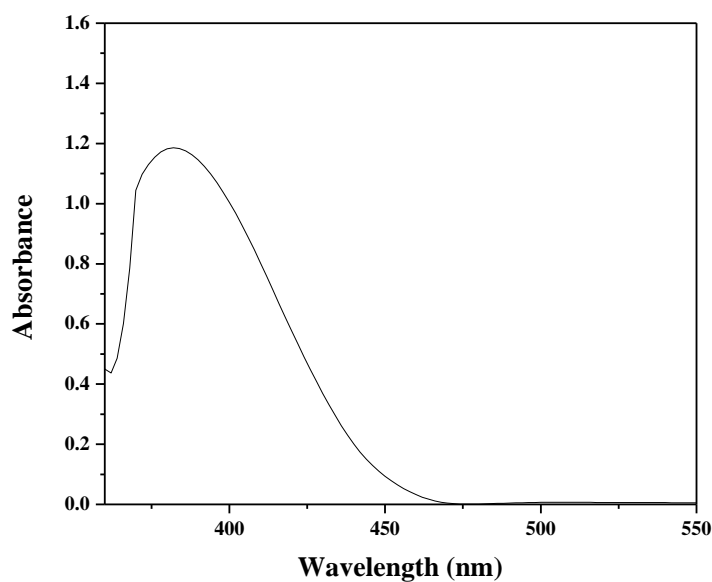


Figure 2. UV/Vis absorption spectra of 3-Methyl-4-(4-nitrophenyl)-2-phenyl-indeno[1,2-*b*]pyridin-5-one (Table 2, entry 4).