

Supporting Information

Mannich-Type Reactions of Aldehydes, Amines, and Ketones in a Colloidal Dispersion System Created by a Brønsted Acid–Surfactant-Combined Catalyst in Water

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Spectral data for the Mannich adducts in Table 2.

2-[1'-(*N*-*p*-Methoxyphenylamino)-1'-phenyl]methylcyclohexanone (entry 4): ^1H NMR (300 MHz, CDCl_3 , major/minor = 68/32) δ 1.61–1.88 (6H, m), 2.31–2.43 (2H, m), 2.71–2.72 (1H, m), 3.65 (major, 2.04H, s), 3.66 (minor, 0.96H, s), 4.5 (1H, br), 4.54 (major, 0.68H, d, $J = 7.3$ Hz), 4.73 (minor, 0.32H, d, $J = 4.2$ Hz), 6.47–6.52 (2H, m), 6.62–6.67 (2H, m), 7.19–7.36 (5H, m); ^{13}C NMR (75 MHz, CDCl_3 , major/minor = 68/32) δ 23.65, 24.86, 27.05, 27.89, 28.45, 31.19, 41.73, 42.40, 55.63, 55.65, 56.73, 57.52, 58.16, 58.96, 114.61, 114.66, 114.80, 115.17, 115.57, 116.38, 126.91, 127.12, 127.36, 127.51, 128.32, 128.42, 141.43, 141.69, 141.76, 141.87, 152.14, 152.25, 211.46, 212.87; IR (neat) 3364, 2935, 1706, 1604, 1512 cm^{-1} ; MS (EI) m/z 309 (M^+).

2-[1'-(*N*-*p*-Methoxyphenylamino)-1'-phenyl]methylcycloheptanone (entry 6): ^1H NMR (300 MHz, CDCl_3 , major/minor = 81/19) δ 2.0–2.48 (10H, m), 2.82–2.88 (1H, m), 3.65 (3H, s), 4.43 (major, 0.81H, d, $J = 7.9$ Hz), 4.57 (minor, 0.19H, d, $J = 4.6$ Hz), 4.6 (1H, br), 6.46–6.49 (2H, m), 6.62–6.67 (2H, m), 7.17–7.32 (5H, m); ^{13}C NMR (75 MHz, CDCl_3 , major/minor = 81/19) δ 24.95, 25.05, 27.31, 27.82, 28.54, 28.86, 29.27, 29.77, 42.57, 44.14, 55.67, 58.41, 58.71, 61.04, 61.15, 114.68, 114.87, 114.93, 127.23, 128.37, 128.48, 140.75, 141.05, 141.20, 141.58, 152.01, 215.64, 216.21; IR (neat) 3387, 2929, 1696, 1512 cm^{-1} ; MS (EI) m/z 323 (M^+).

3-(*N*-*p*-Chlorophenylamino)-2-methyl-1,3-diphenyl-1-propanone (entry 7): ^1H NMR (300 MHz, CDCl_3 , major/minor = 58/42) δ 1.20 (1.26H, d, $J = 6.8$ Hz), 1.29 (1.74H, d, $J = 7.0$ Hz), 3.94–3.98 (1H, m), 4.5 (0.42H, br), 4.65 (0.58H, d, $J = 5.9$ Hz), 4.69 (0.42H, d, $J = 4.9$ Hz), 5.3 (0.58H, br), 6.37 (1.16H, d, $J = 8.8$ Hz), 6.44 (0.84H, d, $J = 8.8$ Hz), 6.94–7.56 (10H, m), 7.72 (1.16H, d, $J = 7.5$ Hz), 7.92 (0.84H, d, $J = 7.3$ Hz); ^{13}C NMR (75 MHz, CDCl_3 , major/minor = 58/42) δ 11.39, 16.75, 46.32, 46.74, 59.29, 61.26, 114.48, 114.88, 116.16, 120.18, 121.74, 122.27, 126.65, 126.74, 127.38, 127.39, 128.10, 128.20, 128.54, 128.60, 128.69, 128.73, 128.78, 128.83, 129.05, 133.22, 133.35, 136.10, 137.00, 140.97, 141.37, 145.74, 145.77, 202.59, 204.05; IR (film) 3401, 1675, 1597, 1499 cm^{-1} ; MS (EI) m/z 349 (M^+).

2-[1'-(2-Furyl)-1'-*N*-phenylamino]methylcyclohexanone (entry 9): ^1H NMR (300 MHz, CDCl_3 , major/minor = 67/33) δ 1.60–2.40 (8H, m), 2.89–2.99 (1H, m), 4.5 (1H, br), 4.81 (0.67H, d, $J = 5.3$ Hz), 4.87 (0.33H, d, $J = 4.7$ Hz), 6.17–6.26 (2H, m), 6.61–6.71 (3H, m), 7.10–7.29 (3H, m); ^{13}C

NMR (75 MHz, CDCl₃, major/minor = 67/33) δ 24.23, 24.65, 26.82, 27.56, 29.63, 30.76, 42.04, 42.18, 51.88, 52.14, 54.02, 54.41, 106.83, 107.11, 110.28, 113.65, 113.96, 117.95, 118.11, 129.11, 129.13, 141.11, 141.24, 147.12, 147.16, 154.60, 154.83, 210.93, 211.76; IR (neat) 3362, 2938, 1673, 1597, 1500 cm⁻¹; MS (EI) m/z 269 (M⁺).

2-[1'-N-phenylamino-1'-(2-pyridyl)]methylcyclohexanone (entry 10): The major isomer: ¹H NMR (400 MHz, CDCl₃) δ 1.66–1.72 (3H, m), 1.90–2.10 (3H, m), 2.28–2.37 (2H, m), 3.30–3.34 (1H, m), 4.79 (1H, d, J = 3.9 Hz), 5.18 (1H, br), 6.60 (2H, d, J = 8.3 Hz), 6.65 (1H, t, J = 8.3 Hz), 7.08–7.13 (3H, m), 7.47 (1H, d, J = 7.8 Hz), 7.57 (1H, t, J = 7.8 Hz), 8.51 (1H, d, J = 4.6 Hz); ¹³C NMR (100 MHz, CDCl₃) δ 24.68, 27.74, 31.64, 42.51, 55.42, 58.71, 113.12, 117.35, 121.81, 121.90, 129.31, 136.46, 147.38, 148.75, 161.28, 213.07; IR (film) 3396, 2936, 1703, 1603, 1501 cm⁻¹; MS (EI) m/z 280 (M⁺). The minor isomer: ¹H NMR (400 MHz, CDCl₃) δ 1.61–1.69 (3H, m), 1.89–1.91 (1H, m), 2.04–2.07 (1H, m), 2.25–2.42 (3H, m), 3.08 (1H, dt, J = 11.7, 6.3 Hz), 4.54 (1H, br), 4.96 (1H, d, J = 6.3 Hz), 6.63–6.68 (3H, m), 7.08–7.12 (3H, m), 7.41 (1H, d, J = 7.8 Hz), 7.56 (1H, t, J = 7.8 Hz), 8.51 (1H, d, J = 4.6 Hz); ¹³C NMR (100 MHz, CDCl₃) δ 25.02, 27.68, 29.82, 42.49, 56.05, 57.87, 113.99, 117.77, 122.00, 123.09, 129.14, 136.32, 147.62, 149.02, 161.51, 211.67; IR (film) 3391, 2934, 1706, 1599, 1502 cm⁻¹; MS (EI) m/z 280 (M⁺).

2-[3'-Methyl-1'-N-phenylamino]butylcyclohexanone (entry 11): ¹H NMR (300 MHz, CDCl₃, major/minor = 65/35) δ 0.86–0.93 (6H, m), 1.23–2.61 (12H, m), 3.58–3.64 (0.35H, m), 3.77–3.82 (0.65H, m), 3.90 (1H, br), 6.54 (2H, d, J = 8.6 Hz), 6.61 (1H, t, J = 8.6 Hz), 7.12 (2H, t, J = 8.6 Hz); ¹³C NMR (75 MHz, CDCl₃, major/minor = 65/35) δ 21.75, 22.19, 23.38, 23.73, 24.96, 25.04, 25.21, 25.30, 27.11, 27.36, 29.82, 30.56, 42.01, 42.59, 42.65, 42.80, 51.03, 51.80, 53.38, 54.00, 112.53, 112.81, 116.48, 116.70, 129.34, 148.09, 148.20, 212.58, 213.01; IR (neat) 3386, 2939, 1689, 1600, 1500 cm⁻¹; MS (EI) m/z 259 (M⁺).

2-[1'-(N-p-Chlorophenylamino)-3'-methyl]butylcyclohexanone (entry 12): ¹H NMR (400 MHz, CDCl₃, major/minor = 62/38) δ 0.86–0.91 (6H, m), 1.23–2.57 (12H, m), 3.55–3.58 (0.38H, m), 3.67–3.69 (0.62H, m), 4.0 (1H, br), 6.46 (1.24H, d, J = 8.8 Hz), 6.51 (0.76H, d, J = 8.8 Hz), 7.05 (1.24H, d, J = 8.8 Hz), 7.06 (0.76H, d, J = 8.8 Hz); ¹³C NMR (75 MHz, CDCl₃, major/minor = 62/38) δ 21.70, 22.17, 22.52, 23.23, 23.59, 24.94, 25.04, 25.15, 25.24, 26.99, 27.40, 30.32, 41.83, 42.52, 42.69, 42.85, 51.76, 52.14, 53.49, 53.81, 113.58, 114.04, 129.11, 146.58, 146.67, 212.40, 212.99; IR (neat) 3387, 2951, 2865, 1703, 1597, 1500 cm⁻¹; MS (EI) m/z 293 (M⁺).