Supporting Information

Metal-Free One-Pot Oxidative Amination of Aldehydes to Amides

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Experimental Procedures

General Procedures. All chemicals used were of reagent grade and reactions were carried out under nitrogen. Flash chromatography was performed on Kieselgel 60, particle size 0.032-0.063 mm. NMR spectra were obtained at 300 MHz (^1H NMR) and 75 MHz (^{13}C NMR) using CDCl_3 as solvent unless indicated otherwise. Chemical shifts are reported in ppm relative to TMS. Noteworthy, some of the products consist of a mixture of stereolabile *cis/trans*-diastereomers due to facile rotation about the amide bond. Analysis of the stereochemical purity of *tert*-butyl prolinates and amides **50** and **51**, was performed by HPLC on Chiralcel OD using hexanes:EtOH (9:1) as mobile phase.

General Procedure for Oxidative Amidation.

A mixture of aldehyde (100mg), amine (1.3 equivalents), *tert*-butyl hydroperoxide (1.3 equivalents), was stirred in 3 mL of anhydrous acetonitrile at 80 °C for 5 hours. The reaction mixture was allowed to cool to room temperature, quenched with water, and extracted with CH_2Cl_2 . The combined organic layers were washed with water, dried over MgSO_4 , and the solvents were removed under vacuum. The crude products were purified by flash chromatography on silica gel.

***N,N*-Dimethyl benzamide, 2.**¹ Flash chromatography (CH_2Cl_2 :hexanes:Et₃N 10:20:1) gave 139 mg (0.93 mmol, 99%) of a colorless oil. ^1H NMR: δ 2.98 (bs, 3H), 3.11 (bs, 3H), 7.32-7.48 (m, 5H). ^{13}C NMR: δ 35.6, 39.8, 127.3, 128.6, 129.7, 136.6, 171.9.

***N,N*-Dimethyl 4-chlorobenzamide, 7.**² Flash chromatography (CH_2Cl_2 :EtOAc: Et₃N 20:10:1) gave 121 mg (0.66 mmol, 93%) of a yellow oil. ^1H NMR: δ 2.98 (bs, 3H), 3.11 (bs, 3H), 7.36-7.42 (m, 4H). ^{13}C NMR: δ 35.6, 39.8, 128.7, 128.5, 134.9, 135.8, 170.8.

***N,N*-Dimethyl 4-fluorobenzamide, 8.**² Flash chromatography (CH_2Cl_2 :EtOAc: Et₃N 15:10:1) gave 132 mg (0.79 mmol, 98%) of a yellow oil. ^1H NMR: δ 2.98 (bs, 3H), 3.08 (bs, 3H), 7.01-7.12 (m, 2H), 7.38-7.49 (m, 2H). ^{13}C NMR: δ 35.7, 39.9, 115.5 ($J_{\text{C,F}}$ = 21.5 Hz), 129.5 ($J_{\text{C,F}}$ = 8.6 Hz), 132.5 ($J_{\text{C,F}}$ = 3.5 Hz), 163.5 ($J_{\text{C,F}}$ = 247.8 Hz), 170.7.

***N,N*-Dimethyl 4-nitrobenzamide, 9.**³ Flash chromatography (CH_2Cl_2 :EtOAc: Et₃N 30:10:1) gave 117 mg (0.59 mmol, 97%) of a yellow crystal. ^1H NMR: δ 2.96 (bs, 3H), 3.13 (bs, 3H), 7.58 (d, J = 8.7 Hz, 2H), 8.25 (d, J = 8.7 Hz, 2H). ^{13}C NMR: δ 35.6, 39.5, 124.0, 128.3, 142.8, 148.5, 169.5.

***N,N*-Dimethyl 3-methoxybenzamide, 10.**⁴ Flash chromatography (CH_2Cl_2 :EtOAc: Et₃N 10:10:1) gave 126 mg (0.70 mmol, 95%) of a colorless oil. ^1H NMR: δ 3.00 (bs, 3H), 3.13 (bs, 3H), 3.85 (s, 3H), 6.91-7.05 (m, 3H), 7.35 (m, 1H). ^{13}C NMR: δ 35.5, 39.6, 55.5, 112.6, 115.6, 119.4, 129.7, 137.9, 159.8, 171.8.

***N*-(4-Chlorobenzoyl)pyrrolidine, 12.**⁵ Flash chromatography (CH_2Cl_2 :EtOAc 25:10) gave 145 mg (0.69 mmol, 98%) of a colorless oil. ^1H NMR: δ 1.78-2.45 (m, 4H), 3.41 (t, J = 6.4 Hz, 2H), 3.63 (t, J = 7.1 Hz, 2H), 7.37 (d, J = 8.7 Hz, 2H), 7.47 (d, J = 8.7 Hz, 2H). ^{13}C NMR: δ 24.6, 26.6, 46.5, 49.8, 128.7, 128.9, 135.8, 136.0, 168.7.

***N*-(4-Bromobenzoyl)pyrrolidine, 13.**⁶ Flash chromatography (CH_2Cl_2 :EtOAc 35:10) gave 121 mg (0.47 mmol, 94%) of white crystals. ^1H NMR: δ 1.81-2.05 (m, 4H), 3.41 (t, J = 7.9 Hz, 2H), 3.63 (t, J = 6.7 Hz, 2H), 7.40 (d, J = 7.8 Hz, 2H), 7.53 (d, J = 7.8 Hz, 2H). ^{13}C NMR: δ 24.7, 26.7, 46.5, 49.8, 124.3, 129.1, 131.7, 136.3, 168.5.

***N*-(4-Fluorobenzoyl)pyrrolidine, 15.**⁷ Flash chromatography (CH₂Cl₂:EtOAc 30:10) gave 127 mg (0.67 mmol, 86%) of a yellow oil. ¹H NMR: δ 1.75-2.04 (m, 4H), 3.42 (t, *J* = 6.4 Hz, 2H), 3.63 (t, *J* = 6.7 Hz, 2H), 7.06 (m, 2H), 7.52 (m, 2H). ¹³C NMR: δ 24.7, 26.7, 46.5, 50.0, 115.4 (*J*_{C,F} = 21.6 Hz), 129.6, (*J*_{C,F} = 9.4 Hz), 134.3 (*J*_{C,F} = 3.0 Hz), 164.8 (*J*_{C,F} = 249.3 Hz), 168.9.

***N*-(3-Fluorobenzoyl)pyrrolidine, 17.**⁸ Flash chromatography (CH₂Cl₂:EtOAc 30:10) gave 150 mg (0.77 mmol, 96%) of a yellow oil. ¹H NMR: δ 1.80-2.04 (m, 4H), 3.32 (t, *J* = 6.6 Hz, 2H), 3.66 (t, *J* = 6.7 Hz, 2H), 7.09 (ddd, *J* = 1.2 Hz, 8.3 Hz, 8.3 Hz, 1H), 7.21 (ddd, *J* = 1.2 Hz, 7.6 Hz, 7.6 Hz, 1H), 7.33-7.46 (m, 2H). ¹³C NMR: δ 24.7, 26.1, 46.1, 48.1, 116.1 (*J*_{C,F} = 21.6 Hz), 124.7 (*J*_{C,F} = 3.5 Hz), 126.0 (*J*_{C,F} = 18.1 Hz), 129.0 (*J*_{C,F} = 4.0 Hz), 131.3 (*J*_{C,F} = 8.1 Hz), 158.5 (*J*_{C,F} = 247.8 Hz), 165.4.

***N*-(4-Nitrobenzoyl)pyrrolidine, 18.**⁹ Flash chromatography (CH₂Cl₂:EtOAc 50:10) gave 140 mg (0.64 mmol, 97%) of yellow crystals. ¹H NMR: δ 1.82-2.12 (m, 4H), 3.36 (t, *J* = 6.4 Hz, 2H), 3.63 (t, *J* = 6.7 Hz, 2H), 7.66 (d, *J* = 8.7 Hz, 2H), 8.23 (d, *J* = 8.7 Hz, 2H). ¹³C NMR: δ 24.5, 26.6, 46.6, 49.7, 123.9, 128.4, 143.4, 148.6, 167.6.

***N*-(2-Nitrobenzoyl)pyrrolidine, 20.**¹⁰ Flash chromatography (CH₂Cl₂:EtOAc 50:10) gave 137 mg (0.62 mmol, 95%) of yellow crystals. ¹H NMR: δ 1.78-2.08 (m, 4H), 3.13 (t, *J* = 6.6 Hz, 2H), 3.68 (t, *J* = 8.4 Hz, 2H), 7.42 (d, *J* = 7.3 Hz, 1H), 7.55 (dd, *J* = 7.3 Hz, 8.3 Hz, 1H), 7.69 (dd, *J* = 7.3 Hz, 8.3 Hz, 1H), 8.16 (d, *J* = 7.3 Hz, 1H). ¹³C NMR: δ 24.7, 26.1, 46.0, 48.5, 124.9, 128.4, 130.0, 134.3, 134.9, 145.2, 166.4.

***N*-(4-Cyanobenzoyl)pyrrolidine, 22.**¹¹ Flash chromatography (CH₂Cl₂:EtOAc 40:10) gave 134 mg (0.68 mmol, 90%) 0.68 mmols of clear oil. ¹H NMR: δ 1.82-2.08 (m, 4H), 3.37 (t, *J* = 6.4 Hz, 2H), 3.63 (t, *J* = 6.7 Hz, 2H), 7.62 (d, *J* = 9.0 Hz, 2H), 7.69 (d, *J* = 9.0 Hz, 2H). ¹³C NMR: δ 24.6, 26.6, 46.6, 49.7, 113.7, 118.4, 128.0, 132.5, 141.6, 167.9.

***N*-(3-Methoxybenzoyl)pyrrolidine, 23.**¹² Purification by flash chromatography (CH₂Cl₂:EtOAc 40:10) gave 136 mg (0.59 mmol, 92%) of a colorless oil. ¹H NMR: δ 1.78-2.04 (m, 4H), 3.42 (t, *J* = 6.6 Hz, 2H), 3.64 (t, *J* = 6.9 Hz, 2H), 3.82 (s, 3H), 6.94 (dd, *J* = 1.2 Hz, 8.4 Hz, 1H), 7.25-7.10 (m, 2H), 7.30 (dd, *J* = 8.4 Hz, 8.4 Hz, 1H). ¹³C NMR: δ 24.7, 26.6, 46.4, 49.8, 55.5, 112.6, 115.9, 119.4, 129.6, 138.7, 159.7, 169.7.

***N*-(4-Methoxybenzoyl)pyrrolidine, 25.**¹³ Purification by flash chromatography (CH₂Cl₂:EtOAc 40:10) gave 142 mg (0.61 mmol, 94%) of a colorless oil. ¹H NMR: δ 1.78-2.04 (m, 4H), 3.42 (t, *J* = 6.6 Hz, 2H), 3.64 (t, *J* = 6.9 Hz, 2H), 3.82 (s, 3H), 6.89 (d, *J* = 8.7 Hz, 2H), 7.51 (d, *J* = 8.7 Hz, 2H). ¹³C NMR: δ 24.7, 26.6, 46.4, 49.8, 55.5, 115.9, 129.6, 129.8, 161.1, 169.9.

***N*-(2-Naphthoyl)pyrrolidine, 27.**¹⁴ Purification by flash chromatography (CH₂Cl₂:EtOAc 50:10) gave 126 mg (0.56 mmol, 85%) of a yellow oil. ¹H NMR: δ 1.74-1.91 (m, 2H), 1.92-2.09 (m, 2H), 3.12 (t, *J* = 6.9 Hz, 2H), 3.81 (t, *J* = 7.0 Hz, 2H), 7.42-7.58 (m, 4H), 7.82-7.95 (m, 3H). ¹³C NMR: δ 24.9, 26.3, 45.9, 48.7, 124.0, 125.2, 125.5, 126.5, 127.2, 128.6, 129.3, 129.5, 133.8, 136.1, 170.8.

***N*-(1-Naphthoyl)pyrrolidine, 29.**¹⁵ Purification by flash chromatography (CH₂Cl₂:EtOAc 50:10) gave 130 mg (0.58 mmol, 89%) of a yellow oil. ¹H NMR: δ 1.72-1.88 (m, 2H), 1.89-2.10 (m, 2H), 3.11 (t, *J* = 7.9 Hz, 2H), 3.80 (t, *J* = 7.9 Hz, 2H), 7.38-7.60 (m, 4H), 7.78-7.97 (m, 3H). ¹³C NMR: δ 24.9, 26.3, 45.9, 48.7, 124.0, 125.2, 125.5, 126.5, 127.2, 128.7, 129.3, 133.8, 136.1, 169.5.

***N*-(4-Toluoyl)pyrrolidine, 31.**¹⁶ Flash chromatography (CH₂Cl₂:EtOAc 25:10) gave 134 mg (0.71 mmol, 86%) of a colorless oil. ¹H NMR: δ 1.75-2.00 (m, 4H), 2.33 (s, 3H), 3.40 (t, *J* = 6.4 Hz, 2H), 3.63 (t, *J* = 7.1 Hz, 2H), 7.15 (d, *J* = 7.8 Hz, 2H), 7.40 (d, *J* = 7.8 Hz, 2H). ¹³C NMR: δ 21.6, 24.7, 26.7, 46.4, 49.9, 127.4, 129.0, 134.6, 140.1, 170.0.

***N*-(3-Furanoyl)pyrrolidine, 33.** Purification by flash chromatography (CH₂Cl₂:EtOAc 60:10) gave 135 mg (0.82 mmol, 90%) of a yellow crystal. ¹H NMR: δ 1.80-1.98 (m, 4H), 3.48-3.68 (m, 4H), 7.26 (dd, *J* = 2.9 Hz, 4.9 Hz, 1H), 7.32 (dd, *J* = 1.2 Hz, 4.9 Hz, 1H), 7.62 (dd, *J* = 1.2 Hz, 2.9 Hz, 1H). ¹³C NMR: δ 24.5, 26.7, 46.7, 49.4, 125.5, 127.4, 127.9, 138.2, 164.6. Anal. calcd. for C₉H₁₁NO₂: C, 65.44; H, 6.71; N, 8.41. Found: C, 65.74; H, 6.59; N, 8.48.

***N*-(3-Pyridinoyl)pyrrolidine, 35.**¹⁷ Purification by flash chromatography (CH₂Cl₂:EtOAc 30:10) gave 160 mg (0.91 mmol, 97%) of a colorless oil. ¹H NMR: δ 1.80-2.01 (m, 4H), 3.40 (t, *J* = 6.3 Hz, 2H), 3.60 (t, *J* = 6.9 Hz, 2H), 7.30 (ddd, *J* = 0.8 Hz, 5.4 Hz, 8.0 Hz, 1H), 7.82 (ddd, *J* = (2.2 Hz, 3.2 Hz, 8.0 Hz, 1H), 8.59 (dd, *J* = 2.2 Hz, 5.4 Hz, 1H), 8.72 (dd, *J* = 0.8 Hz, 3.2 Hz, 1H). ¹³C NMR: δ 24.5, 26.7, 46.7, 49.4, 122.5, 132.9, 135.2, 148.3, 151.5, 167.8.

***N*-(4-Chlorobenzoyl)piperidine, 39.**¹⁸ Flash chromatography (CH₂Cl₂:EtOAc 70:10) gave 140 mg (0.64 mmol, 92%) of a colorless oil. ¹H NMR: δ 1.19-1.78 (m, 6H), 3.36 (bs, 2H), 3.69 (bs, 2H), 7.31-7.42 (m, 4H). ¹³C NMR: δ 24.4, 25.8, 26.2, 43.6, 48.5, 128.6, 128.9, 135.1, 135.6, 169.4.

***N*-(4-Nitrobenzoyl)piperidine, 40.**¹⁹ Flash chromatography (CH₂Cl₂:EtOAc 80:10) gave 148 mg (0.63 mmol, 98%) of yellow crystals. ¹H NMR: δ 1.42-1.78 (m, 6H), 3.29 (bs, 2H), 3.73 (bs, 2H), 7.66 (dd, *J* = 2.1 Hz, 8.7 Hz, 2H), 8.23 (dd, *J* = 2.1 Hz, 8.7 Hz, 2H). ¹³C NMR: δ 24.5, 25.7, 26.6, 43.6, 48.7, 124.0, 128.0, 143.0, 148.6, 168.0.

***N*-(3-Methoxybenzoyl)piperidine, 41.**²⁰ Purification by flash chromatography (CH₂Cl₂:EtOAc 40:10) gave 159 mg (0.72 mmol, 99%) of a colorless oil. ¹H NMR: δ 1.35-1.78 (m, 6H), 3.33 (bs, 2H), 3.69 (bs, 2H), 3.81 (s, 3H), 6.82-7.00 (m, 3H), 7.29 (m, 1H). ¹³C NMR: δ 24.8, 25.9, 26.8, 43.3, 48.9, 112.4, 115.4, 119.1, 129.7, 138.1, 159.8, 170.2.

***N*-(4-Chlorobenzoyl)morpholine, 42.**²¹ Flash chromatography (CH₂Cl₂:EtOAc 50:10) gave 155 mg (0.69 mmol, 98%) of a colorless oil. ¹H NMR: δ 3.30-3.88 (m, 8H), 7.25-7.52 (m, 4H). ¹³C NMR: δ 42.9, 48.5, 67.1, 128.9, 129.1, 133.9, 136.2, 169.5.

***N*-(3-Methoxybenzoyl)morpholine, 43.**²² Purification by flash chromatography (CH₂Cl₂:EtOAc 4:1) gave 159 mg (0.72 mmol, 99%) of a yellow oil. ¹H NMR: δ 3.38-3.81 (m, 8H), 3.82 (s, 3H), 6.94 (m, 3H), 7.35 (m, 1H). ¹³C NMR: δ 42.9, 48.5, 55.6, 67.1, 112.7, 115.9, 119.3, 129.9, 136.8, 159.9, 170.4.

***N*-(4-Nitrobenzoyl)morpholine, 44.**²³ Purification by flash chromatography (CH₂Cl₂:EtOAc 4:1) gave 152 mg (0.64 mmol, 98%) of a yellow crystal. ¹H NMR: δ 3.25-3.98 (m, 8H), 7.59 (d, *J* = 6.9 Hz, 2H), 8.29 (d, *J* = 6.9 Hz, 2H). ¹³C NMR: δ 42.9, 48.5, 67.0, 124.2, 128.4, 141.7, 148.7, 168.3.

***N*-(4-Toluoyl)morpholine, 45.**²⁴ Purification by flash chromatography (CH₂Cl₂:EtOAc 4:1) gave 161 mg (0.79 mmol, 95%) of a yellow oil. ¹H NMR: δ 2.37 (s, 3H), 3.37-3.90 (m, 8H), 7.59 (d, *J* = 8.4 Hz, 2H), 8.29 (dd, *J* = 8.4 Hz, 2H). ¹³C NMR: δ 21.6, 42.9, 48.5, 67.0, 127.4, 129.4, 132.6, 140.4, 170.8.

3-Methoxy-*N*-benzyl-*N*-methylbenzamide, 46. Purification by flash chromatography (CH₂Cl₂:EtOAc:Hexane 6:1:1) gave 182 mg (0.70 mmol, 96%) of a colorless oil. ¹H NMR: δ 2.88 (bs, 3H), 3.06 (bs, 3H), 3.74 (bs, 3H), 3.84 (bs, 3H), 4.54 (bs, 2H), 4.78 (bs, 2H), 6.85-7.12 (m, 4H), 7.13-7.58 (m, 14H). ¹³C NMR: δ 33.5, 37.3, 51.4, 55.4, 112.3, 112.7, 115.6, 116.0, 119.2, 119.3, 127.0, 127.8, 128.4, 128.7, 129.1, 129.9, 137.0, 137.3, 137.8, 159.8, 171.6, 172.3. Anal. calcd. for C₁₆H₁₇NO₂: C, 75.27; H, 6.71; N, 5.49. Found: C, 75.48; H, 6.88; N, 5.99.

4-Cyano-*N*-benzyl-*N*-methylbenzamide, 47. Purification by flash chromatography (CH₂Cl₂:EtOAc:Hexane 5:1:1) gave 174 mg (0.69 mmol, 90%) of a colorless oil. ¹H NMR: 2.85 (bs, 3H), 3.08 (bs, 3H), 4.47 (bs, 2H), 4.78 (bs, 2H), 7.15 (d, *J* = 7.1 Hz, 2H), 7.2-7.54 (m, 8H), 7.56 (d, *J* = 8.1 Hz, 4H), 7.70 (dd, *J* = 7.1 Hz, 8.1 Hz, 4H). ¹³C NMR: δ 33.7, 37.1, 51.1, 55.2, 113.7, 118.4, 126.8, 127.9, 127.9, 128.0, 128.5, 129.1, 129.3, 132.7, 136.1, 136.7, 140.9, 169.8, 170.5. Anal. calcd. for C₁₆H₁₄N₂O: C, 76.78; H, 5.64; N, 11.19. Found: C, 76.27; H, 5.74; N, 10.59.

4-Methyl-*N*-benzyl-*N*-methylbenzamide, 48.²⁵ Purification by flash chromatography (CH₂Cl₂:EtOAc:Hexane 6:1:1) gave 195 mg (0.82 mmol, 98%) of a colorless oil. ¹H NMR: δ 2.38 (s, 6H), 2.90 (bs, 3H), 3.04 (bs, 3H), 4.56 (bs, 2H), 4.78 (bs, 2H), 7.12-7.23 (m, 6H), 7.23-7.47 (m, 12H). ¹³C NMR: δ 21.6, 33.5, 37.3, 51.1, 55.5, 127.3, 127.8, 128.4, 128.7, 129.0, 129.3, 129.9, 133.6, 137.4, 140.0, 171.3, 172.7.

(*S*)-*tert*-Butyl *N*-(4-cyanobenzoyl)prolinate, 37. Purification by flash chromatography (CH₂Cl₂:EtOAc:hexanes 60:10:10) gave 215 mg (0.72 mmol, 92%) of a yellow crystal. ¹H NMR (CD₃OD): δ 1.29 (s, 9H), 1.49 (s, 18H), 1.76-2.44 (m, 12H), 3.42 (m, 2H), 3.58 (m, 2H), 3.76 (m, 2H), 4.15 (m, 1H), 4.54 (m, 2H), 7.52 (d, *J* = 7.6 Hz, 2H), 7.60-7.78 (m, 10H). ¹³C NMR (CD₃OD): δ 22.8, 25.5, 28.0, 28.2, 29.6, 31.8, 47.1, 50.0, 60.2, 62.0, 81.9, 82.5, 114.0, 118.4, 127.8, 128.1, 132.5, 140.9, 141.6, 167.8, 171.2. Anal. calcd. for C₁₇H₂₀N₂O₃: C, 67.98; H, 6.71; N, 9.33. Found: C, 67.36; H, 6.38; N, 9.53.

(*S*)-*tert*-Butyl *N*-4-toluoylprolinate, 38. Purification by flash chromatography (CH₂Cl₂:EtOAc:Hexane 50:10:15) gave 205 mg (0.69 mmol, 86%) of a colorless oil. ¹H NMR: δ 1.31 (s, 9H), 1.52 (s, 27H), 1.72-2.08 (m, 12H), 2.20-2.45 (m, 16H), 3.48-3.80 (m, 8H), 4.32-4.56 (m, 3H), 7.21-7.40 (m, 10H), 7.47 (d, *J* = 7.8 Hz, 6H). ¹³C NMR: δ 20.3, 22.5, 25.1, 26.8, 27.1, 29.3, 31.3, 50.2, 60.5, 62.3, 81.5, 81.8, 126.9, 127.1, 128.9, 133.3, 140.9, 170.8, 172.0. Anal. calcd. for C₁₇H₂₃NO₃: C, 70.56; H, 8.01; N, 4.84. Found: C, 69.98; H, 7.57; N, 5.23.

HPLC Analysis: Both the (*S*)- and the (*R*)-enantiomer of *tert*-butyl *N*-4-toluoylprolinate were prepared to develop a chiral HPLC separation method. Injection of a scalemic mixture having excess of (*S*)-**38** on a Chiralcel OD column showed that this can be accomplished using hexanes/ethanol (9:1) as the mobile phase. Under these conditions, the (*R*)-enantiomer is more strongly retained, Figure 1.

Figure 1. HPLC separation of **38** on Chiralcel OD. Mobile phase: hexanes/ethanol (9:1), 1 mL/min, 254 nm.

Analysis of **38** prepared from (*S*)-*tert*-butyl prolinolate with our method using TBHP at 60 °C revealed an ee of 91% which is in good agreement with the enantiomeric purity of the starting material used, Figure 2.

Figure 2. HPLC analysis of (*S*)-**38** on Chiralcel OD.

***N,N*-Dimethyl benzamide 2**

***N,N*-Dimethyl 4-chlorobenzamide 7**

***N,N*-Dimethyl 4-fluorobenzamide 8**

***N,N*-Dimethyl 4-nitrobenzamide 9**

***N,N*-Dimethyl 3-methoxybenzamide 10**

***N*-(4-Chlorobenzoyl)pyrrolidine 12**

***N*-(4-Bromobenzoyl)pyrrolidine 13**

***N*-(4-Fluorobenzoyl)pyrrolidine 15**

***N*-(3-Fluorobenzoyl)pyrrolidine 17**

***N*-(4-Nitrobenzoyl)pyrrolidine 18**

***N*-(2-Nitrobenzoyl)pyrrolidine 20**

***N*-(4-Cyanobenzoyl)pyrrolidine 22**

***N*-(3-Methoxybenzoyl)pyrrolidine 23**

***N*-(4-Methoxybenzoyl)pyrrolidine 25**

***N*-(2-Naphthoyl)pyrrolidine 27**

***N*-(1-Naphthoyl)pyrrolidine 29**

***N*-(4-Toluoyl)pyrrolidine 31**

***N*-(3-Furanoyl)pyrrolidine 33**

***N*-(3-Pyridinoyl)pyrrolidine 35**

***N*-(4-Chlorobenzoyl)piperidine 39**

***N*-(4-Nitrobenzoyl)piperidine 40**

***N*-(3-Methoxybenzoyl)piperidine 41**

***N*-(4-Chlorobenzoyl)morpholine 42**

***N*-(3-Methoxybenzoyl)morpholine 43**

***N*-(4-Nitrobenzoyl)morpholine 44**

***N*-(4-Toluoyl)morpholine 45**

4-Cyano-*N*-benzyl-*N*-methylbenzamide 47

4-Methyl-N-benzyl-N-methylbenzamide 48

(S)-tert-Butyl N-4-toluoylprolinate, 38

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