N-Functionalized Organolithium Compounds via Tellurium/Lithium Exchange Reaction

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Experimental

General

Elemental tellurium was purchased from Sigma Aldrich. All reagents and solvents were purified and dried using procedures described in the literature.1 THF was distilled under nitrogen from sodium/benzophenone just before use. N-Butyllithium was titrated using 1,10-phenanthroline as indicator prior to use. Lithium-naphthalenide (LiNp) was prepared according to the procedure described in the literature.2 All operations were carried out in flame-dried glassware. Column chromatographic separations were performed over Acros Organics silica gel (0.035-0.075 mm; pore diameter ca. 6 nm). The melting points were determined using a Büchi, model B-545. Optical rotations were determined on a Perkin Elmer 343 polarimeter and IR spectra were recorded on a Bomem MB-100 spectrophotometer. NMR spectra were recorded on Varian-Inova (300 MHz, 1H; 75 MHz, 13C) or Bruker model DRX-500 (500 MHz, 1H; 125 MHz, 13C) spectrometers using CDCl3 as solvent. The internal references were TMS (1H NMR), the central peak of the CDCl3 signal (13C NMR) and a capillary of diphenyl ditelluride 1 mol-1 (125Te NMR). High resolution mass spectroscopy was performed using a LC-MS - Bruker Daltonics instrument at the Microanalytical Laboratory of the Institute of Chemistry, University of São Paulo.

General procedure for the preparation of tellurium amines

n-Butyllithium (1 mmol, 1.5 mol L-1 in hexane) was slowly added at room temperature to a suspension of elemental tellurium (1.2 mmol) in dry THF (5 mL). Deoxygenated ethanol (2 mL) was added to the light yellow solution of lithium butyl tellurolate so formed, and the resulting red-brown mixture was stirred at room temperature for 10 min and subsequently cooled to 0 °C. The corresponding aziridine or mesylate (1 mmol) was added in a single portion, and the resulting mixture was stirred for 2 h at room temperature. The mixture was quenched with a saturated NH4Cl solution and extracted with CH2Cl2, and the combined organic fractions were dried over MgSO4 and filtered. The solvent was removed in vacuo, yielding the crude products, which were purified by flash chromatography.

BocHN\text{TeBu} \rightarrow tert-Butyl 2-(butyltellanyl)ethylcarbamate (1a)

The N-Boc β-telluro amine 1a was prepared according to the general procedure using BocHNCH2CH2OMs as starting material. Yield: 76%; yellow oil; IR νmax(film)/cm⁻¹: 3349, 2962, 1697, 1539, 1249, 1164; 1H NMR (CDCl3, 500 MHz) δ 4.96 (br s, 1H), 3.43-3.41 (m, 2H), 2.72 (t, J 7.1 Hz, 2H), 2.66 (t, J 7.5 Hz, 2H), 1.72 (qui, J 7.5 Hz, 2H), 1.44 (s, 9H), 1.38 (sex, J 7.5 Hz, 2H), 0.91 (t, J 7.5 Hz, 3H); 13C NMR (CDCl3, 125 MHz) δ 4.96 (br s, 1H), 3.43-3.41 (m, 2H), 2.72 (t, J 7.1 Hz, 2H), 2.66 (t, J 7.5 Hz, 2H), 1.72 (qui, J 7.5 Hz, 2H), 1.44 (s, 9H), 1.38 (sex, J 7.5 Hz, 2H), 0.91 (t, J 7.5 Hz, 3H); 125Te NMR (CDCl3, 157 MHz) δ 155.6, 79.1, 42.4, 34.2, 28.4, 24.9, 13.3, 3.1, 2.7; HRMS-ESI m/z calculated for C11H23NO2Te + Na+ 354.0703.

CbzHN\text{TeBu} \rightarrow Benzyl 2-(butyltellanyl)ethylcarbamate (1b)

The N-Cbz β-telluro amine 1b was prepared according to the general procedure using CbzHNCH2CH2OMs as starting material. Yield: 78%; yellow oil; IR νmax(film)/cm⁻¹: 3331, 2957, 1701, 1523, 1247; 1H NMR (CDCl3, 500 MHz) δ 7.33-7.28 (m, 5H), 5.15 (br s, 1H), 5.10 (s, 2H), 3.48 (qua, J 7.0 Hz, 2H), 2.73 (t, J 7.0 Hz, 2H), 2.63 (t, J 7.0 Hz, 2H),

1.68 (qu, J 7.0 Hz, 2H), 1.37 (sex, J 7.0 Hz, 2H), 0.90 (t, J 7.0 Hz, 3H); 1H NMR (CDCl3, 125 MHz) δ 156.0, 136.3, 128.3, 127.9 (2C), 66.5, 42.7, 34.1, 24.8, 13.2, 2.8, 2.7; 125Te NMR (CDCl3, 157 MHz) δ 183.5; HRMS-ESI m/z calculated for C14H21NO2Te + Na+ 388.0532, found 388.0532.

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\text{TsHN} \xrightarrow{\text{TeBu}} \text{TeBu}
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**N-(2-(Butyltellanyl)ethyl)-4-methylbenzenesulfonamide (1c)**

The N-Ts β-telluro amine 1c was prepared according to the general procedure using N-Ts aziridine as starting material. Yield: 83%; yellow oil; IR νmax(film)/cm⁻¹: 3277, 2957, 2926, 2867, 1597, 1455, 1325, 1156; 1H NMR (CDCl3, 300 MHz) δ 7.80-7.73 (m, 2H), 7.31-7.24 (m, 2H), 3.20 (t, J 7.2 Hz, 2H), 2.63 (t, J 7.2 Hz, 2H), 2.54 (t, J 7.2 Hz, 2H), 2.42 (s, 3H), 1.83 (qui, J 7.2 Hz, 2H), 1.32 (sex, J 7.2 Hz, 2H), 0.88 (t, J 7.2 Hz, 3H); 13C NMR (CDCl3, 75 MHz) δ 143.5, 137.1, 129.8, 127.1, 44.8, 34.2, 29.5, 21.5, 13.4, 3.3, 2.3; 125Te NMR (CDCl3, 157 MHz) δ 192.2; HRMS-ESI m/z calculated for C16H21NO2Te + Na+ 386.0740, found 386.0737.

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\text{BzHN} \xrightarrow{\text{TeBu}} \text{TeBu}
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**N-(2-(Butyltellanyl)ethyl)benzamide (1d)**

The N-Bz β-telluro amine 1d was prepared according to the general procedure using N-Bz aziridine as starting material. Yield: 82%; yellow oil; IR νmax(film)/cm⁻¹: 3308, 2957, 1642, 1306; 1H NMR (CDCl3, 500 MHz) δ 7.79-7.78 (m, 2H), 7.50-7.47 (m, 1H), 7.43-7.39 (m, 2H), 6.80 (br s, 1H), 3.74-3.70 (m, 2H), 2.85 (t, J 7.0 Hz, 2H), 2.67 (t, J 7.0 Hz, 2H), 1.72 (qui, J 7.5 Hz, 2H), 1.36 (sex, J 7.5 Hz, 2H), 0.89 (t, J 7.0 Hz, 3H); 13C NMR (CDCl3, 125 MHz) δ 167.2, 134.4, 131.5, 128.5, 126.9, 41.3, 34.2, 25.0, 13.3, 3.0, 2.6; 125Te NMR (CDCl3, 157 MHz) δ 184.6; HRMS-ESI m/z calculated for C16H17NO2Te + Na+ 374.0534, found 374.0532.

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\text{BzHN} \xrightarrow{\text{TeBu}} \text{TeBu}
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**N-(3-(Butyltellanyl)propyl)benzamide (1e)**

The N-Bz γ-telluro amine 1e was prepared according to the general procedure using N-BzNC6H5CH2CH2OMs as starting material. Yield: 75%; yellow oil; IR νmax(film)/cm⁻¹: 3326, 2955, 1650, 1308; 1H NMR (CDCl3, 500 MHz) δ 7.79-7.77 (m, 2H), 7.74-7.77 (m, 1H), 7.44-7.40 (m, 2H), 6.46 (br s, 1H), 3.47 (qua, J 7.0 Hz, 2H), 2.62 (t, J 7.0 Hz, 4H), 2.04 (qui, J 7.0 Hz, 3H), 1.70 (qui, J 7.5 Hz, 2H), 1.36 (sex, J 7.5 Hz, 2H), 0.89 (t, J 7.0 Hz, 3H); 13C NMR (CDCl3, 125 MHz) δ 167.8, 134.6, 131.6, 128.5, 127.0, 42.0, 34.3, 32.0, 25.1, 13.5, 3.0, -1.3; 125Te NMR (CDCl3, 157 MHz) δ 232.7; HRMS-ESI m/z calculated for C14H21TeNO2 + Na+ 372.0583, found 372.0577.

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**N-(3-Hydroxy-3-phenylpropyl)benzamide (2a)**

Yield: 79%; colorless oil; IR νmax(film)/cm⁻¹: 3343, 1640, 1541, 1310; 1H NMR (CDCl3, 500 MHz) δ 7.75-7.72 (m, 2H), 7.49-7.46 (m, 1H), 7.43-7.37 (m, 2H), 7.35-7.33 (m, 4H), 7.27-7.23 (m, 1H), 7.05 (br s, 1H), 4.80 (dd, J 8.5 Hz, J 4.0 Hz, 1H), 3.84-3.77 (m, 1H), 3.45-3.41 (m, 1H), 1.99-1.93 (m, 2H); 13C NMR (CDCl3, 125 MHz) δ 168.2, 144.1, 134.2, 131.4, 128.5, 128.4, 127.4, 126.9, 125.6, 72.5, 38.4, 37.5; HRMS-ESI m/z calculated for C16H17NO2Te + Na+ 278.1157, found 278.1152.
**N-(3-Hydroxy-3-p-tolylpropyl)benzamide (2b)**

Yield: 72%; orange solid; mp 89.6-91.2 °C; IR ν<sub>max</sub> (KBr)/cm<sup>-1</sup>: 3359, 1639, 1551, 1075, 927; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz) δ 7.74-7.72 (m, 2H), 7.42-7.39 (m, 2H), 7.24 (d, J = 8.0 Hz, 2H), 6.90 (br s, 1H), 4.79 (t, J = 6.5 Hz, 1H), 3.85-3.78 (m, 1H), 3.48-3.42 (m, 1H), 2.32 (s, 3H), 1.98 (qua, J = 6.0 Hz, 2H); 13C NMR (CDCl<sub>3</sub>, 125 MHz) δ 167.9, 141.1, 137.0, 134.2, 131.3, 129.0, 128.4, 126.8, 125.5, 72.5, 38.3, 37.5, 21.0; HRMS-ESI m/z calculated for C<sub>17</sub>H<sub>19</sub>NO<sub>2</sub> + Na<sup>+</sup> 292.1313, found 292.1314.

**N-(3-Hydroxy-3-o-tolylpropyl)benzamide (2c)**

Yield: 82%; white solid; mp 104-106 °C; IR ν<sub>max</sub> (KBr)/cm<sup>-1</sup> 3309, 1628, 1558, 1050; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz) δ 7.79-7.77 (m, 2H), 7.56-7.51 (m, 2H), 7.47-7.44 (m, 2H), 7.27-7.24 (m, 1H), 7.21-7.18 (m, 1H), 7.16 - 7.14 (m, 1H), 6.95 (br s, 1H), 5.11 (dd, J = 8.8 Hz, J = 3.3 Hz, 1H), 3.94-3.91 (m, 1H), 3.53-3.47 (m, 1H), 2.33 (s, 3H), 2.02-1.95 (m, 2H); 13C NMR (CDCl<sub>3</sub>, 125 MHz) δ 168.1, 142.1, 134.3, 133.9, 131.4, 130.4, 128.5, 127.2, 126.9, 126.3, 125.0, 69.4, 37.8, 36.9, 18.9; HRMS-ESI m/z calculated for C<sub>17</sub>H<sub>19</sub>NO<sub>2</sub> + Na<sup>+</sup> 292.1301.

**N-(3-Hydroxy-3-m-tolylpropyl)benzamide (2d)**

Yield: 72%; colorless oil; IR ν<sub>max</sub> (film)/cm<sup>-1</sup> 3354, 2922, 1634, 1549; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz) δ 7.78-7.76 (m, 2H), 7.49-7.46 (m, 1H), 7.40-7.37 (m, 2H), 7.22-7.19 (m, 1H), 7.16-7.12 (m, 2H), 7.07 - 7.06 (m, 1H), 7.03 (br s, 1H), 4.77 (dd, J = 8.0 Hz, J = 4.5 Hz, 1H), 3.83-3.77 (m, 1H), 3.46-3.43 (m, 1H), 2.32 (s, 3H), 1.98-1.95 (m, 2H); <sup>13</sup>C NMR (CDCl<sub>3</sub>, 125 MHz) δ 168.2, 144.1, 137.9, 134.0, 131.3, 128.3, 128.2, 128.0, 126.9, 126.3, 122.6, 72.3, 38.2, 37.5, 21.3; HRMS-ESI m/z calculated for C<sub>17</sub>H<sub>19</sub>NO<sub>2</sub> + Na<sup>+</sup> 292.1313, found 292.1309.

**N-(3-Hydroxy-3-p-tolylpropyl)benzamide (2e)**

Yield: 70%; yellow oil; IR ν<sub>max</sub> (film)/cm<sup>-1</sup> 3341, 1642, 1544, 1310, 1148; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz) δ 7.78-7.76 (m, 2H), 7.49-7.46 (m, 1H), 7.43-7.39 (m, 2H), 7.28-7.25 (m, 2H), 6.91 (br s, 1H), 6.87-6.85 (m, 2H), 4.77 (t, J = 6.5 Hz, 1H), 4.00 (qua, J = 6.5 Hz, 2H), 3.85-3.78 (m, 1H), 3.47-3.41 (m, 1H), 1.97 (qua, J = 6.5 Hz, 2H), 1.40 (t, J = 7.0 Hz, 3H); <sup>13</sup>C NMR (CDCl<sub>3</sub>, 125 MHz) δ 167.9, 158.1, 136.1, 134.1, 131.2, 128.3, 126.8, 126.7, 114.2, 72.1, 63.3, 38.1, 37.4, 14.7; HRMS-ESI m/z calculated for C<sub>16</sub>H<sub>21</sub>NO<sub>3</sub> + Na<sup>+</sup> 268.0950, found 268.0948.

**N-(3-Hydroxydecyl)benzamide (2f)**

Yield: 79%; colorless oil; IR ν<sub>max</sub> (film)/cm<sup>-1</sup> 3305, 2922, 1634, 1549; <sup>1</sup>H NMR (CDCl<sub>3</sub>, 500 MHz) δ 7.78-7.76 (m, 2H), 7.49-7.46 (m, 1H), 7.43-7.39 (m, 2H), 7.05 (br s, 1H), 3.86-3.83 (m, 1H), 3.72-3.68 (m, 1H), 3.39-3.34 (m, 1H), 1.77-1.74 (m, 1H), 1.62-1.58 (m, 1H), 1.52-1.41 (m, 3H), 1.27-1.23 (m, 9H), 0.87 (t, J = 7.0 Hz, 3H); <sup>13</sup>C NMR (CDCl<sub>3</sub>, 125 MHz) δ 168.2, 144.1, 137.9, 134.0, 131.4, 128.5, 126.9, 110.1, 105.7, 65.6, 36.9, 34.8; HRMS-ESI m/z calculated for C<sub>18</sub>H<sub>27</sub>NO<sub>2</sub> + Na<sup>+</sup> 300.1939, found 300.1949.

**N-(3-Hydroxyhexyl)benzamide (2g)**

Yield: 75%; yellow oil; IR ν<sub>max</sub> (film)/cm<sup>-1</sup> 3334, 2957,
1642, 1545; 1H NMR (CDCl3, 500 MHz) δ 7.78-7.76 (m, 2H), 7.49-7.46 (m, 1H), 7.42-7.39 (m, 2H), 7.05 (br s, 1H), 3.87-3.85 (m, 1H), 3.73-3.70 (m, 1H), 3.39-3.34 (m, 1H), 1.76-1.73 (m, 1H), 1.62-1.58 (m, 1H), 1.52-1.42 (m, 4H), 0.91 (t, J = 7.0 Hz, 3H); 13C NMR (CDCl3, 125 MHz) δ 168.4, 134.2, 131.4, 128.4, 127.0, 69.4, 39.5, 37.4, 36.4, 18.9, 14.0; HRMS-ESI m/z calculated for C13H16NO2 + Na+ 244.1313, found 244.1307.

N-(3-Hydroxy-4,4-dimethylpentyl)benzamide (2i)
Yield: 76%; white solid; mp 143-144 °C; IR νmax(KBr)/cm^-1: 3435, 3331, 1650, 1532, 1219; 1H NMR (CDCl3, 500 MHz) δ 7.68-7.77 (m, 2H), 7.49-7.48 (m, 1H), 7.44-7.41 (m, 1H), 6.91 (br s, 1H), 3.96-3.93 (m, 1H), 3.37-3.33 (m, 2H), 1.85-1.81 (m, 1H), 1.57-1.55 (m, 1H), 0.92 (s, 9H); 13C NMR (CDCl3, 125 MHz) δ 168.0, 134.4, 131.4, 128.5, 126.9, 78.3, 38.4, 34.8, 30.8, 25.7; HRMS-ESI m/z calculated for C17H19NO2 + Na+ 292.1313, found 292.1302.

N-(3-Hydroxy-3-phenylbutyl)benzamide (2j)
Yield: 69%; yellow oil; IR νmax(film)/cm^-1: 3344, 1642, 1540, 1494, 1445, 1312; 1H NMR (CDCl3, 500 MHz) δ 7.63-7.61 (m, 2H), 7.47-7.42 (m, 3H), 7.37-7.30 (m, 4H), 7.23-7.20 (m, 1H), 6.93 (br s, 1H), 3.59-3.52 (m, 1H), 3.35-3.29 (m, 1H), 2.87 (s, 1H), 2.19-2.13 (m, 1H), 2.09-2.03 (m, 1H), 1.62 (s, 3H); 13C NMR (CDCl3, 125 MHz) δ 167.3, 147.2, 134.4, 131.2, 128.5, 128.3, 126.8, 126.7, 124.6, 74.9, 42.3, 36.3, 31.1; HRMS-ESI m/z calculated for C19H23NO2 + Na+ 292.1313, found 292.1302.

N-(3-Hydroxy-3-(4-methoxyphenyl)butyl)benzamide (2k)
Yield: 65%; orange oil; IR νmax(film)/cm^-1: 3355, 1643, 1593, 1511, 1299, 1248, 1179; 1H NMR (CDCl3, 500 MHz) δ 7.64-7.61 (m, 2H), 7.46-7.43 (m, 1H), 7.38-7.34 (m, 4H), 6.89 (br s, 1H), 6.86-6.83 (m, 2H), 3.76 (s, 3H), 3.58-3.53 (m, 1H), 3.36-3.32 (m, 1H), 2.84 (br s, 1H), 2.15-2.10 (m, 1H), 2.07-2.01 (m, 1H), 1.60 (s, 3H); 13C NMR (CDCl3, 125 MHz) δ 167.2, 158.1, 139.4, 134.2, 131.1, 128.2, 126.7, 125.7, 113.5, 74.3, 55.1, 42.1, 36.3, 30.9; HRMS-ESI m/z calculated for C17H14NO3 + Na+ 322.1419, found 322.1420.

N-(3-Hydroxy-3,3-diphenylpropyl)benzamide (2l)
Yield: 61%; white solid; mp 149-150 °C; IR νmax(KBr)/cm^-1: 3435, 3331, 1650, 1532, 1219; 1H NMR (CDCl3, 500 MHz) δ 7.62-7.61 (m, 2H), 7.49-7.45 (m, 5H), 7.40-7.37 (m, 2H), 7.34-7.31 (m, 4H), 7.25-7.22 (m, 2H), 6.74 (br s, 1H), 3.55 (qua, J = 6.0 Hz, 2H), 2.65 (t, J = 6.0 Hz, 2H); 13C NMR (CDCl3, 125 MHz) δ 167.4, 146.6, 134.3, 131.2, 128.3, 127.0, 126.8, 125.9, 78.2, 40.7, 36.1; HRMS-ESI m/z calculated for C22H19NOSi + Na+ 354.1470, found 354.1458.

N-(2-(Trimethylsilyl)ethyl)benzamide (2m)
Yield: 67%; yellow oil; IR νmax(film)/cm^-1: 3316, 2953, 1638, 1543, 1249; 1H NMR (CDCl3, 500 MHz) δ 7.75-7.73 (m, 2H), 7.49-7.46 (m, 1H), 7.42-7.40 (m, 2H), 6.12 (br s, 1H), 3.52-3.47 (m, 2H), 0.93-0.90 (m, 2H), 0.06 (s, 9H); 13C NMR (CDCl3, 125 MHz) δ 167.2, 134.8, 131.2, 128.5, 126.7, 36.5, 17.7, -1.6; HRMS-ESI m/z calculated for C12H15NOSi + Na+ 244.1134, found 244.1136.

N-Ethylbenzamide (2n)
Yield: 78%; yellow solid; mp 65.2-65.6 °C; IR νmax(KBr)/cm^-1: 1637, 1549, 1310, 1145; 1H NMR (CDCl3, 500 MHz) δ 7.77-7.75 (m, 2H), 7.50-7.46 (m, 1H), 7.43-7.40 (m, 2H), 6.18 (br s, 1H), 3.49 (qui, J = 7.0 Hz, 2H), 1.25 (t, J = 7.0 Hz, 3H); 13C NMR (CDCl3, 125 MHz) δ 167.4, 134.7, 131.1, 128.3, 126.8, 34.8, 14.7; HRMS-ESI m/z calculated for C8H11NO + Na+ 172.0738, found 172.0731.

N-(4-Hydroxy-4-phenylbutyl)benzamide (2o)
Yield: 72%; white solid; mp 75-76 °C; IR νmax(KBr)/cm^-1: 3327, 1638, 1310, 700; 1H NMR (CDCl3, 500 MHz) δ 7.72-7.70 (m, 2H), 7.45-7.42 (m, 1H), 7.36-7.33 (m, 2H), 7.30-7.29 (m, 4H), 7.25-7.21 (m, 1H), 6.79 (br s, 1H), 4.68 (dd, J = 7.5 Hz, J = 5.0 Hz, 1H), 3.47-3.35 (m, 2H), 1.85-1.52 (m, 4H); 13C NMR (CDCl3, 125 MHz) δ 167.7, 144.6, 134.5, 131.2, 128.4, 128.3, 127.4, 126.9, 125.7, 73.9, 39.8, 36.1, 25.8; HRMS-ESI m/z calculated for C17H16NO2 + Na+ 292.1313, found 292.1314.
N-(5-Hydroxy-5-phenylpentyl)benzamide (2p)
Yield: 70%; yellow oil; IR ν\text{max}\,(KBr)/cm\(^{-1}\): 3357, 1643, 1310, 701; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.70-7.68 (m, 2H), 7.44-7.41 (m, 1H), 7.36-7.33 (m, 2H), 7.28-7.27 (m, 4H), 7.24-7.19 (m, 1H), 6.49 (br s, 1H), 4.62 (dd, J 8.0 Hz, J 5.5 Hz, 1H), 3.36 (qua, J 7.0 Hz, 2H), 1.81-1.75 (m, 1H), 1.72-1.65 (m, 1H), 1.62-1.52 (m, 2H), 1.51-1.42 (m, 1H), 1.38-1.29 (m, 1H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.7, 144.7, 134.6, 131.2, 128.4, 128.3, 127.3, 126.8, 125.7, 74.1, 39.7, 38.4, 29.2, 23.0; HRMS-ESI m/z calculated for C\(_{18}\)H\(_{21}\)NO\(_2\) + Na\(^{+}\) 306.1470, found 306.1461.

N-Phenethylbenzamide (3a)
Yield: 65%; yellowish solid; mp 113-114 °C; IR ν\text{max}\,(KBr)/cm\(^{-1}\): 3344, 1639, 1544, 1312, 1193, 695; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.69-7.67 (m, 2H), 7.49-7.46 (m, 1H), 7.41-7.38 (m, 2H), 7.34-7.31 (m, 2H), 7.26-7.23 (m, 3H), 6.17 (br s, 1H), 3.72 (qua, J 7.0 Hz, 2H), 2.94 (t, J 7.0 Hz, 2H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.5, 138.7, 134.6, 131.3, 128.7, 128.6, 128.5, 126.8, 126.5, 41.1, 35.6; HRMS-ESI m/z calculated for C\(_{15}\)H\(_{17}\)NO + Na\(^{+}\) 248.1051, found 248.1052.

N-(4-Methoxyphenethyl)benzamide (3b)
Yield: 69%; yellowish solid; mp 123-124 °C; IR ν\text{max}\,(KBr)/cm\(^{-1}\): 3320, 1635, 1538, 1308, 1243, 693; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.70-7.68 (m, 2H), 7.50-7.46 (m, 1H), 7.42-7.39 (m, 2H), 7.17-7.14 (m, 2H), 6.88-6.86 (m, 2H), 6.12 (br s, 1H), 3.80 (s, 1H), 3.69 (qua, J 7.0 Hz, 2H), 2.88 (t, J 7.0 Hz, 2H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.5, 158.3, 134.7, 131.4, 130.9, 129.8, 128.5, 126.8, 114.1, 55.3, 41.3, 34.8; HRMS-ESI m/z calculated for C\(_{16}\)H\(_{17}\)NO\(_2\) + Na\(^{+}\) 278.1157, found 278.1150.

N-(4-Methylphenethyl)benzamide (3c)
Yield: 66%; yellowish solid; mp 85-86 °C; IR ν\text{max}(KBr)/cm\(^{-1}\): 3324, 1640, 1544, 1313, 807, 692; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.75-7.68 (m, 2H), 7.49-7.46 (m, 1H), 7.42-7.38 (m, 2H), 7.15-7.11 (m, 4H), 6.15 (br s, 1H), 3.70 (qua, J 7.0 Hz, 2H), 2.89 (t, J 7.0 Hz, 2H), 2.33 (s, 3H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.4, 136.0, 135.7, 134.6, 131.3, 129.3, 128.6, 128.4, 126.8, 41.2, 35.2, 21.0; HRMS-ESI m/z calculated for C\(_{16}\)H\(_{17}\)NO + Na\(^{+}\) 262.1208, found 262.1197.

N-(2-Methylphenethyl)benzamide (3d)
Yield: 42%; yellowish solid; mp 76-77 °C; IR ν\text{max}\,(KBr)/cm\(^{-1}\): 3306, 1632, 1536, 1309, 751, 694; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.72-7.70 (m, 2H), 7.49-7.46 (m, 1H), 7.43-7.39 (m, 2H), 7.19-7.14 (m, 4H), 6.25 (br s, 1H), 3.68 (qua, J 7.0 Hz, 2H), 2.95 (t, J 7.0 Hz, 2H), 2.37 (s, 3H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.6, 137.0, 136.4, 134.6, 131.4, 130.5, 129.4, 128.5, 126.9, 126.7, 126.1, 40.0, 33.1, 19.3; HRMS-ESI m/z calculated for C\(_{16}\)H\(_{17}\)NO + Na\(^{+}\) 262.1208, found 262.1214.

N-(3-Trifluoromethylphenethyl)benzamide (3e)
Yield: 35%; yellowish solid, mp 81-82 °C; IR ν\text{max}\,(KBr)/cm\(^{-1}\): 3304, 1629, 1555, 1337, 1170, 801, 699; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.71-7.69 (m, 2H), 7.50-7.46 (m, 3H), 7.44-7.38 (m, 4H), 6.34 (br s, 1H), 3.70 (qua, J 7.0 Hz, 2H), 2.99 (t, J 7.0 Hz, 2H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.7, 139.9, 134.5, 132.3, 131.6, 131.0 (qua, J 32.0 Hz), 129.2, 128.6, 126.8, 125.6, 125.5, 123.4, 41.0, 35.6; HRMS-ESI m/z calculated for C\(_{16}\)H\(_{14}\)F\(_3\)NO + Na\(^{+}\) 316.0925, found 316.0927.

N-(3-Phenylpropyl)benzamide (3f)
Yield: 35%; yellowish oil, IR ν\text{max}(film)/cm\(^{-1}\): 3318, 1638, 1578, 1309, 1181, 698; ¹H NMR (CDCl\(_3\), 500 MHz) δ 7.69-7.67 (m, 2H), 7.45-7.41 (m, 1H), 7.36-7.33 (m, 2H), 7.27-7.23 (m, 2H), 7.18-7.16 (m, 3H), 6.43 (br s, 1H), 3.44 (qua, J 6.0 Hz, 2H), 2.67 (t, J 7.5 Hz, 2H), 1.92 (qui, J 7.5 Hz, 2H); ¹³C NMR (CDCl\(_3\), 125 MHz) δ 167.5, 141.4, 134.5, 131.1, 128.4, 128.3, 128.2, 126.8, 125.9, 39.7, 33.4, 31.0; HRMS-ESI m/z calculated for C\(_{16}\)H\(_{17}\)NO + Na\(^{+}\) 262.1208, found 262.1204.
Figure S1. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 1a.

Figure S2. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 1a.
Figure S3. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1a.

Figure S4. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 1b.
Figure S5. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 1b.

Figure S6. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1b.
Figure S7. $^1$H NMR (300 MHz, CDCl$_3$) spectrum of 1c.

Figure S8. $^{13}$C NMR (75 MHz, CDCl$_3$) spectrum of 1c.
Figure S9. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1c.

Figure S10. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 1d.
Figure S11. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 1d.

Figure S12. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1d.
Figure S13. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 1e.

Figure S14. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 1e.
Figure S15. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1e.

Figure S16. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 1f.
Figure S17. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 1f.

Figure S18. $^{125}$Te NMR (157 MHz, CDCl$_3$) spectrum of 1f.
Figure S19. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2a.

Figure S20. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2a.
Figure S21. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2b.

Figure S22. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2b.
Figure S23. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2c.

Figure S24. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2c.
Figure S25. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2d.

Figure S26. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2d.
Figure S27. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2e.

Figure S28. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2e.
Figure S29. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2f.

Figure S30. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2f.
Figure S31. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2g.

Figure S32. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2g.
Figure S33. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2h.

Figure S34. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2h.
Figure S35. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2i.

Figure S36. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2i.
Figure S37. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of $2j$. 

Figure S38. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of $2j$. 
Figure S39. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2k.

Figure S40. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2k.
Figure S41. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2l.

Figure S42. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2l.
Figure S43. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2m.

Figure S44. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2m.
Figure S45. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2n.

Figure S46. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2n.
Figure S47. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2o.

Figure S48. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2o.
Figure S49. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2p.

Figure S50. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2p.
Figure S51. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 3a.

Figure S52. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 3a.
Figure S53. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 2b.

Figure S54. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 2b.
Figure S55. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 3c.

Figure S56. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 3c.
Figure S57. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 3d.

Figure S58. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 3d.
Figure S59. $^1$H NMR (500 MHz, CDCl$_3$) spectrum of 3e.

Figure S60. $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of 3e.
**Figure S61.** $^1$H NMR (500 MHz, CDCl$_3$) spectrum of $3f$.  

**Figure S62.** $^{13}$C NMR (125 MHz, CDCl$_3$) spectrum of $3f$.  

*N-Functionalized Organolithium Compounds via Tellurium/Lithium Exchange Reaction*  