Synthesis of Boronocysteine

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Table of Contents
1. General Experimental Information 1
2. Experimental procedures 2
3. $^1$H and $^{13}$C NMR spectra 10
4. References 20
General Experimental Procedures

All solvents and chemicals were used as received. Column chromatography was carried out using either Merck Geduran Si 60 (40-63 µm) silica gel or a Biotage purification system using Biotage or Grace silica columns. Analytical thin layer chromatography was carried out using Merck TLC Silica Gel 60 F$_{254}$ aluminium-backed plates. Components were visualised using combinations of ultra-violet lights, potassium permanganate or ninhydrin.

Proton magnetic resonance spectra ($^1$H NMR) were recorded at 400, 500 or 600 MHz on a Bruker Avance spectrometer and are reported as follows: chemical shift $\delta$ in ppm (number of protons, multiplicity, coupling constant $J$ in Hz, assignment). The solvent used was deuterated chloroform or deuterated methanol unless stated otherwise. Residual protic solvent was used as the internal reference, setting CDCl$_3$ to $\delta$ 7.26 and MeOD-$d_4$ to 3.31. The following abbreviations are used: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet; br, broad or a combination of these. Carbon magnetic resonance spectra ($^{13}$C NMR) were recorded at 100, 125 or 150 MHz on a Bruker Avance spectrometer using deuterated chloroform or deuterated methanol and using the central reference of CDCl$_3$ to $\delta$ 77.0 or MeOD-$d_4$ to $\delta$ 49.15 as the internal standard. Mass Spectrometry data were collected on either TOF or magnetic sector analysers either at the Department of Chemistry, University College London or at the EPSRC UK National Mass Spectroscopy Facility at Swansea University. The ionization method is reported in the experimental data.
(2,2-Diethoxyethyl)(4-methoxybenzyl)sulfane (3b)\textsuperscript{1,2}

To a stirred solution of bromoacetaldehyde diethyl acetal (3.760 mL, 25 mmol) in EtOH (110 mL) and NaOH (1 M, 50 mL) at 0 °C was added para-methoxybenzyl mercaptan (3.831 mL, 27.5 mmol) dropwise and the reaction stirred for 2 days. A precipitate formed which was removed by filtration and the filtrate reduced \textit{in vacuo}. The residue was dissolved in ether (25 mL) and washed with H\textsubscript{2}O (25 mL) and then brine (20 mL). The organic layers were dried (MgSO\textsubscript{4}) and reduced \textit{in vacuo} to give 3b as a light yellow oil (3.56 g, 13.2 mmol, 52%); \textit{R}$_{f}$ 0.28 (3:1 CH\textsubscript{2}Cl\textsubscript{2}:EtOAc); \textbf{\textsuperscript{1}H} NMR (600 MHz, CDCl\textsubscript{3}) \(\delta\) 7.25 (2H, d, \(J = 8.5\), ArH ), 6.83 (2H, d, \(J = 8.5\), ArH), 4.54 (1H, t, \(J= 5.5\), CH), 3.77 (3H, s, OCH\textsubscript{3} ), 3.74 (2H, s, ArCH\textsubscript{2}), 3.64 (2H, dq, \(J = 9.3, 7.1, 2 \times OCH\textsubscript{2}\)), 3.51 (2H, dq, \(J = 9.3, 7.1, 2 \times OCH\textsubscript{2}\)), 1.21 (6H, t, \(J = 7.1\), \(2 \times CH\textsubscript{2}CH\textsubscript{3}\)); \textbf{\textsuperscript{13}C} NMR \(\delta\) (150 MHz, CDCl\textsubscript{3}) \(\delta\) 158.7, 130.5, 130.3, 114.0, 103.5, 62.3, 55.4, 36.2, 34.0, 15.5; IR \(\nu_{\text{max}}\) 2973 (C-H), 1609 (Ar), 1509 (Ar), 1300 (C-O), 1244 (ArO-C).

2-((4-Methoxybenzyl)thio)acetaldehyde (4)\textsuperscript{2}

Dilute HCl (2 M, 15 mL) was added to 3b (1.9336 g, 7.158 mmol) in acetone (15 mL) and the reaction stirred overnight. The solution was extracted (EtOAc, 2 \times 10 mL) and the organic layer washed with H\textsubscript{2}O (10 mL) and then brine (10 mL). The organic layer was dried (MgSO\textsubscript{4}), filtered, and reduced \textit{in vacuo} to give 20 as a colourless oil (1.39 g, 7.08 mmol, 99%). \textit{R}$_{f}$ 0.4 (9:1 petrol:EtOAc); \textbf{\textsuperscript{1}H} NMR (600 MHz, CDCl\textsubscript{3}) \(\delta\) 9.40 (1H, t, \(J = 3.5\), CHO), 7.21 (2H, d, \(J = 8.6\), ArH), 6.85 (2H, d, \(J = 8.6\), ArH), 3.79 (3H, s, OCH\textsubscript{3}), 3.58 (2H, s, ArCH\textsubscript{2}), 3.07 (2H, d, \(J = 3.5\), CH\textsubscript{2}CHO); \textbf{\textsuperscript{13}C} NMR (150 MHz, CDCl\textsubscript{3}) \(\delta\) 194.1, 159.0, 130.5, 128.9, 114.2, 55.4, 40.3, 35.1; IR \(\nu_{\text{max}}\) 3006 (C-H), 2834 (C(O)-H), 1714 (C=O), 1609, 1509, 1301, 1241, 1173, 1028.
(E)-N-(2-((4-methoxybenzyl)thio)ethylidene)-2-methylpropane-2-sulfinamide (5)

Copper(II) Sulfate (1.27 g, 7.94 mmol) and aldehyde 4 (779 mg, 3.97 mmol, 1.1 eq) were added to a solution of (±)-tert-buty1 sulfonamide (438 mg, 3.61 mmol) in anhydrous CH$_2$Cl$_2$ (7.2 mL). The reaction was stirred at room temperature for 18 h, before filtering through Celite. The solvents were removed in vacuo and the residue obtained was purified by column chromatography to give 5 as an orange oil (865 mg, 2.89 mmol, 80%). $^1$H NMR (CDCl$_3$, 600 MHz) δ 7.98 (1H, t, $J = 5.6$, NCH), 7.23 (2H, d, $J = 6.5$, ArH), 6.85 (2H, d, $J = 6.5$, ArH), 3.79 (3H, s, OCH$_3$), 3.66 (2H, s, ArCH$_2$), 3.35 (1H, dd, $J = 14.3$, 6.0, 1 × SCH$_2$CH), 3.31 (1H, dd, $J = 14.3$, 5.3, 1 × SCH$_2$CH), 1.22 (9H, s, tBu); $^{13}$C NMR (CDCl$_3$, 150 MHz) δ 164.2, 158.9, 130.3, 129.2, 114.1, 57.0, 55.4, 35.02, 34.3, 22.5; LRMS (CI) 420 (100%), 300 (37%, [M+H]$^+$), 240 (30%), 195 (32%, [M−SO$_{tBu}$]$^+$), 121 (88%, PMB$^+$); HRMS Found 300.10877, C$_{14}$H$_{22}$NO$_2$S$_2$ requires 300.10865; IR $\nu_{\text{max}}$ (film/cm$^{-1}$) 2958 (C-H), 1609 (C=H), 1510 (C=N), 1458 (C=C), 1083 (S=O).

N-(2-((4-Methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)-2-methylpropane-2-sulfinamide (6)

Using flame dried glassware under an argon atmosphere, CuCl (38.4 mg, 0.388 mmol), (±)-BINAP (111.1 mg, 0.1784 mmol) and B$_2$pin$_2$ (1.331 g, 5.242 mmol) were dissolved in anhydrous THF (4 mL). KOtBu (1 M in THF, 1.4 mL, 1.4 mmol) was added whilst stirring at room temperature. After 10 min, the reaction was cooled to −20 °C and aldehyde 5 (1.0338 g, 3.4522 mmol) was added followed by MeOH (300 µL, 7.41 mmol) and the reaction stirred overnight. The solvent was removed in vacuo and the resultant oil purified by flash column chromatography using EtOAc in CH$_2$Cl$_2$ (20 → 35%) to give 6 as an
orange oil (878 mg, 2.06 mmol, 60%). **¹H NMR** (CDCl₃, 600 MHz) δ 7.24 (2H, d, J = 8.6, ArH), 6.82 (2H, d, J = 8.6, ArH), 3.78 (3H, s, OCH₃), 3.71 (1H, d, J = 5.6, NH), 3.69 (2H, s, ArCH₂S), 3.22-3.17 (1H, m, CHB), 2.77 (1H, dd, J = 13.4, 6.3, 1 × SCH₂CH), 2.72 (1H, dd, J = 13.4, 7.9, 1 × SCH₂CH), 1.25 (s, 6H, 2 × pinacol-CH₃), 1.23 (s, 9H, tBu), 1.20 (s, 6H, 2 × pinacol-CH₃); **¹³C NMR** (CDCl₃, 150 MHz) δ 158.7, 130.1, 130.0, 114.0, 84.3, 56.2, 55.3, 41.3 (br), 35.2, 34.6, 25.0, 24.9, 22.6; **LRMS** (Cl) 428 (41%, [M+H]+), 371 (18%, [M−tBu]+), 322 (38%, [M=SO₂Bu]+), 121 (100%, PMB+); **HRMS** Found 428.2095, C₂₀H₃₄BNO₄S₂ requires 428.2095; **IR** νmax (film/cm⁻¹) 2977 (C-H), 2930 (C-H), 1609 (C=C), 1511 (C=C), 1544(C=C), 1369 (B-O).

2-((4-Methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethanamine hydrochloride (7)

![Chemical Structure Image]

A solution of HCl in dioxane (4 M, 585 µL, 2.34 mmol) was added to 6 (99.7 mg, 0.233 mmol) dissolved in anhydrous MeOH (3 mL) to give a pale yellow solution. The reaction was stirred for 3 h. The solvent was removed *in vacuo* to give an orange residue (75.3 mg). The residue was washed with ether, sonicated, and centrifuged to give 7 as a light brown solid (68 mg, 0.190 mmol, 82%); mp 166-168 °C. **¹H NMR** (MeOD-d₄, 400 MHz) δ 7.29 (2H, d, J = 8.7, ArH), 6.89 (2H, d, J = 8.7, ArH) 3.80 (3H, s, OCH₃), 3.79 (2H, s, ArCH₂), 3.01 (1H, dd, J = 8.7, 4.7, CHB), 2.85 (1H, dd, J = 14.3, 4.8, 1 × CH₂CH), 2.73 (1H, dd, J = 14.3, 8.8, 1 × CH₂CH), 1.33 (12H, s, 4 × CH₃); **¹³C NMR** (MeOD-d₄, 100 MHz) δ 159.1, 129.9, 129.5, 113.7, 85.5, 74.4, 54.5, 35.1, 30.4, 23.8, 23.7; **LRMS** (Cl) 323 (100%, [M+H]+), 198 (18%, [M−Bpin]+); **HRMS** Found 323.18359, C₁₆H₂₇BNO₃S requires 323.1836; **IR** νmax (solid/cm⁻¹) 2975 (C-H), 2958 (C-H), 2831 (C-H), 1607, 1583, 1411.
2-((4-Methoxybenzyl)thio)ethanamine hydrochloride (8)

Following procedure for 7, leaving the reaction mixture overnight gave 8. mp 136.9-138.3 °C; \textsuperscript{1}H NMR (600 MHz, MeOD) \( \delta \) 7.27 (2H, d, \( J = 8.7 \), ArH), 6.87 (2H, d, \( J = 8.7 \), ArH), 3.77 (3H, s, OCH\(_3\)), 3.74 (2H, s, ArCH\(_2\)), 3.01 (2H, t, \( J = 6.9 \), CH\(_2\)N), 2.68 (2H, t, \( J = 6.9 \), SCH\(_2\)CH\(_2\)); \textsuperscript{13}C NMR (150 MHz, MeOD) \( \delta \) 160.5, 131.2, 131.0, 115.1, 55.7, 39.7, 35.9, 29.1; LRMS (Cl) m/z 198 (M+H\(^+\)), 121 (PMB\(^+\)). Data in accordance with the literature.\(^3\)

(9H-Fluoren-9-yl)methyl (2-fluoro-2-oxoethyl)carbamate (FMoc-Gly-F)\(^4\)

Using flame dried glassware and under an argon atmosphere, to a solution of FMoc-Gly-OH (2.973 g, 10.0 mmol) in anhydrous CH\(_2\)Cl\(_2\) (50 mL) and anhydrous THF (15 mL) was added pyridine (810 \( \mu \)L, 10 mmol) followed by the dropwise addition of cyanuric fluoride (1.72 mL, 20 mmol). The reaction was stirred overnight. The precipitate and yellow solution were washed with ice water (2 \( \times \) 50 mL) and then brine (50 mL). The organic layer was reduced \textit{in vacuo}. Addition of CH\(_2\)Cl\(_2\) and hexane precipitated FMoc-Gly-F as a yellow solid (2.5903 g, 8.654 mmol, 87%); \( R_f \) 0.26 (1:9 MeOH:CHCl\(_3\)); mp 127.5-128.4 °C (lit. 134-135 °C\(^4\)); \textsuperscript{1}H NMR (600 MHz, CDCl\(_3\)) \( \delta \) 7.77 (2H, d, \( J = 7.6 \), ArH), 7.59 (2H, d, \( J = 7.4 \), ArH), 7.41 (2H, td, \( J = 7.4 \), 1.4, ArH), 7.32 (2H, td, \( J = 7.5 \), 1.0, ArH), 5.24 (1H, br s, NH), 4.47 (2H, d, \( J = 6.9 \), FMocCH\(_2\)), 4.24 (1H, t, \( J = 6.9 \), FMocCHCH\(_2\)), 4.18 (2H, m, NHCH\(_2\)); \textsuperscript{13}C NMR (150 MHz, CDCl\(_3\)) \( \delta \) 160.7 (d, \( J_{\text{CF}} = 363 \) Hz), 156.1, 143.6, 141.4, 127.9, 127.2, 125.0, 120.1, 67.6, 47.1, 41.2 (d, \( J_{\text{CF}} = 87 \) Hz); IR \( \nu_{\text{max}} \) 3333 (N-H), 3212,
2970 (C-H), 1865, 1840 (C=O), 1678 (C=O), 1534, 1262, 734 (C-F).

**N-(2-((4-Methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)acetamide (9a)**

![Chemical Structure](image)

Acetyl chloride (65 µL, 0.42 mmol) was added to a solution of 7 (30 mg, 84 µmol) in acetonitrile (1 mL) followed by pyridine (40 µL, 0.50 mmol). The reaction was stirred for 18 h. Solvent was removed *in vacuo* and EtOAc (3 mL) added. The reaction mixture was filtered and the filtrate washed with H₂O (3 mL), phosphoric acid (1% in H₂O, 3 mL), potassium carbonate (2% in H₂O, 3 mL) and then brine (3 mL). All aqueous layers were back extracted with EtOAc. Removal of solvent *in vacuo* gave an orange oil which was purified by column chromatography (20% EtOAc in CH₂Cl₂) to give 9a as an orange oil (6.7 mg, 22%). ¹H NMR (CDCl₃, 600 MHz) 7.21 (2H, d, J = 8.6, ArH), 7.00 (1H, br s, NH), 6.83 (2H, d, J = 8.6, ArH), 3.78 (3H, s, OCH₃), 3.66 (1H, d, J = 13.6, 1 × ArCH₂), 3.63 (1H, d, J = 13.6, 1 × ArCH₂), 2.81 (1H, dd, J =14.3, 2.8, 1 × CH₂CH), 2.65 (1H, br d, J = 12.2, CHB), 2.45 (1H, dd, J = 14.3, 12.8, 1 × CH₂CH), 2.05 (3H, s, C(O)CH₃), 1.16 (6H, s, 2 × pinacol-CH₃), 1.15 (6H, s, 2 × pinacol-CH₃); ¹³C NMR (CDCl₃, 150 MHz) δ 176.0, 158.8, 130.7, 130.1, 114.1, 80.4, 55.4, 44.4, 35.2, 34.2, 25.3, 24.9, 18.1; LRMS (Cl) 366 (40%, [M+H]⁺), 266 (51%), 243 (33%), 212 (57%, [M−SPMB]⁺), 121 (100%, PMB⁺); HRMS Found 366.19151, C₁₈H₂₈BNO₄S requires 366.19103; IR νmax (film/cm⁻¹) 3260 (N-H), 2960(C-H), 2924 (C-H), 2853 (C-H), 1609 (C=O), 1511.
2-Chloro-N-(2-((4-methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)acetamide (9b)

Using flame dried glassware and under an argon atmosphere, a solution of 7 (82.3 mg, 0.193 mmol) in anhydrous CH$_2$Cl$_2$ (1 mL) was cooled to 0 °C. Chloroacetyl chloride (17 µL, 0.231 mmol) was added followed by the dropwise addition of NMM (30 µL, 0.270 mmol). The solution was allowed to warm to room temperature and stirred for 90 min. The reaction was cooled to 0 °C and HCl (0.2 M, 7 mL) added. The reaction mixture was diluted with EtOAc and the organic layer was separated, dried (MgSO$_4$), filtered and concentrated in vacuo to give a brown oil. On addition of Et$_2$O a brown solid formed which was filtered. The filtrate was concentrated in vacuo to give 9b as a brown oil (65.4 mg, 85%). $^1$H NMR (CDCl$_3$, 600 MHz) δ 7.66 (1H, br s, NH), 7.21 (2H, d, J = 8.7, ArH), 6.83 (2H, d, J = 8.7, ArH), 4.15 (2H, s, CH$_2$Cl), 3.78 (3H, s, OCH$_3$), 3.67 (2H, s, ArCH$_2$), 2.97 (1H, br d, J = 11.1, CHB), 2.76 (1H, dd, J = 14.0, 3.0, 1 × CH$_2$CHB), 2.52 (1H, dd, J = 14.0, 11.6, 1 × CH$_2$CHB), 1.21 (6H, s, 2 × pinacol-CH$_3$), 1.19 (6H, s, 2 × pincaol-CH$_3$); $^{13}$C NMR (CDCl$_3$, 150 MHz) δ 171.1, 158.8, 130.1 (2C), 114.1, 82.5, 55.4, 41.6 (br), 41.3, 35.4, 33.0, 24.9, 24.63; LRMS (CI) 402 (41%, [M+H]$^+$, Cl$_{37}$), 404 (100%, [M+H]$^+$, Cl$_{35}$); HRMS Found 399.1552, C$_{18}$H$_{28}$BCINO$_4$S requires 399.1551; IR $\nu_{\text{max}}$ (film/cm$^{-1}$) 2923 (C-H), 1733 (C=O), 1661, 1593, 1494, 1434.
tert-Butyl (2-((2-((4-methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)amino)-2-oxoethyl)carbamate (10a)

Using flame dried glassware under an argon atmosphere, Boc-Gly-OH (87.5 mg, 0.50 mmol) was dissolved in anhydrous CH₂Cl₂ (1.5 mL) and cooled to −20 °C. NMM (66 µL, 0.60 mmol) was added followed by IBCF (58 µL, 0.45 mmol) and the reaction stirred for 5 h at −20 °C. HCl salt 23 (23.4 mg, 65.1 µmol) was added followed by NMM (7 µL, 65 µmol) and the reaction allowed to warm to rt and stirred for 18 h. The reaction mixture was concentrated in vacuo and the resultant oil purified by column chromatography (2% MeOH in EtOAc) using deactivated silica (35% H₂O w/w) to give 36 as a pale yellow oil (27.9 mg, 89%).

**¹H NMR** (CDCl₃, 600 MHz) δ 7.51 (1H, br s, CHN), 7.21 (2H, d, J = 8.7, ArH), 6.82 (2H, d, J = 8.7, ArH), 5.29 (1H, br s, CH₂NH), 3.93 (2H, d, J = 5.7, NHCH₂), 3.78 (3H, s, OCH₃), 3.65 (2H, s, ArCH₂), 2.81 (1H, br d, J = 11.5, CHB), 2.75 (1H, dd, J = 14.1, 3.2, 1 × SCH₂CH), 2.46 (1H, dd, J = 14.1, 11.5, 1 × SCH₂CH), 1.44 (9H, s, Bu), 1.18 (6H, s, 2 × pinacol-CH₃), 1.16 (6H, s, 2 × pinacol-CH₃); **¹³C NMR** (CDCl₃, 150 MHz) δ 174.9, 158.7, 130.3, 130.1, 114.1, 81.6, 55.4, 54.0, 41.4, 35.2, 33.6, 29.8, 28.4, 25.0, 24.9, 14.3; **LRMS** (CI) 481 (100%, [M+H]+); **HRMS** Found 480.2575, C₂₃H₃₇BN₂O₆S requires 480.2574; **IR** (film/cm⁻¹) 2970 (C-H), 2926 (C-H), 1697 (br, C=O), 1609 (C=O), 1511, 1456.
Using flame dried glassware and under an argon atmosphere FMoc-Gly-F (15.9 mg, 53.0 µmol) was added to a solution of HCl salt 7 (15.9 mg, 44.2 µmol) in anhydrous CH₂Cl₂ (1.5 mL) followed by DIPEA (15 µL, 88 µmol). The reaction was stirred for 18 h. The solution was washed with HCl (2 M, 2 × 3 mL), H₂O (2 × 3 mL), sodium bicarbonate (2 × 3 mL) and H₂O (2 × 3 mL). All aqueous layers were back extracted with CH₂Cl₂. The combined organic layers were dried (MgSO₄), filtered and concentrated in vacuo to give an orange residue which was purified by column chromatography (1% MeOH in CHCl₃) using deactivated silica (35% H₂O w/w) to give 39 as an orange gum (16.0 mg, 60%).

**¹H NMR** (CDCl₃, 600 MHz) δ 7.77 (2H, d, J = 7.6, FmocH), 7.58 (2H, d, J = 7.4, FmocH), 7.40 (2H, t, J = 7.6, FmocH), 7.31 (2H, t, J = 7.4, FmocH), 7.18 (2H, d, J = 8.6, ArH), 7.03 (1H, br s, CHNH), 6.79 (2H, d, J = 8.6, ArH), 5.33 (1H, br s, CH₂NH), 4.46 (2H, d, J = 6.7, FmocCH₂), 4.22 (1H, d, J = 6.7, FmocCH₂CH), 3.98 (1H, dd, J = 17.3, 5.8, 1 × CH₂NH), 3.92 (1H, dd, J = 17.3, 5.7, 1 × CH₂NH), 3.74 (3H, s, OCH₃), 3.63 (2H, s, ArCH₂S), 2.89 (1H, br d, J = 10.0, CHB), 2.80 (1H, dd, J = 13.7, 3.4, 1 × CH₂CHB), 2.50 (1H, dd, J = 13.7, 11.6, 1 × CH₂CHB), 1.20 (6H, s, 2 × pinacol-CH₃), 1.19 (6H, s, 2 × pinacol-CH₃); **¹³C NMR** (CDCl₃, 150 MHz) δ 173.0, 158.7, 156.5, 143.7, 141.4, 130.4, 130.1, 127.9, 127.3, 125.1, 120.2, 114.1, 82.2, 67.4, 55.4, 47.2, 42.3, 41.0 (br), 35.5, 33.7, 25.1, 24.9; **LRMS** (Cl) 603 (3%, [M+H]⁺), 503 (3%), 381 (9%), 325 (8%), 281 (7%), 207 (7%), 179 (100%, [Fmoc–CO₂⁺]), 147 (8%), 121 (36%, PMB⁺), 103 (17%); **HRMS** Found 603.27061, C₃₃H₃₉BN₂O₆S requires 603.27001; **IR** νmax (film/cm⁻¹) 3300 (N-H), 2970 (C-H), 2928 (C-H), 1711 (C=O), 1680 (C=O), 1610, 1536, 1511, 1462, 1450.
(2,2-Diethoxyethyl)(4-methoxybenzyl)sulfane (3b)
2-((4-methoxybenzyl)thio)acetaldehyde (4)
(E)-N-(2-((4-Methoxybenzyl)thio)ethylidene)-2-methylpropane-2-sulfinamide (5)
N-((2-(4-Methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)-2-methylpropane-2-sulfinamide (6)
2-((4-Methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethanamine hydrochloride (7)
2-((4-Methoxybenzyl)thio)ethanamine hydrochloride (8)
$N$-(2-[(4-Methoxybenzyl)thio]-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)acetamide (9a)
2-Chloro-\(N\)-(2-((4-methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)acetamide (9b)
tert-Butyl (2-((2-((4-methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)amino)-2-oxoethyl)carbamate (10a)
(9H-Fluoren-9-yl)methyl(2-((2-((4-methoxybenzyl)thio)-1-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)ethyl)amino)-2-oxoethyl)carbamate (10b)
References


