Supporting Information

Convenient Access to Conformationally Rigid Sultams

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Experimental part and data description

General information. All chemicals were provided by Enamine Ltd. (www.enamine.net). All solvents were treated according to standard methods. All reactions were monitored by thin-layer chromatography (TLC) and were visualized using UV light. Product purification was performed using silica gel column chromatography. TLC-characterization was performed with pre-coated silica gel GF254 (0.2 mm), while column chromatography characterization was performed with silica gel (100-200 mesh). $^1$H-NMR, $^{19}$F-NMR, $^{13}$C-NMR spectra were recorded with tetramethylsilane (TMS, $\delta = 0.00$ ppm) as the internal standard. $^1$H-NMR spectra were recorded at 400 or 500 MHz (Varian); $^{19}$F-NMR spectra were recorded at 376 MHz (Varian) and $^{13}$C NMR spectra were recorded at 100 or 126 MHz (Varian). $^1$H-NMR chemical shifts are reported downfield from CDCl$_3$ ($\delta = 7.26$ ppm) or DMSO-d$_6$ ($\delta = 2.50$ ppm). $^{13}$C-NMR chemical shifts for $^{13}$C-NMR are reported relative to the central CDCl$_3$ ($\delta = 77.16$ ppm) or DMSO-d$_6$ ($\delta = 39.52$ ppm). Coupling constants are given in Hz. High-resolution mass spectra (HRMS) were recorded on an Agilent LC/MSD TOF mass spectrometer by electrospray ionization time of flight reflectron experiments.

General procedure for synthesis of 2-7, 17, 18 and 22-25 (2 as an example)

$N$-allyl-2-phenylethene-1-sulfonamide (2)

![Structure of N-allyl-2-phenylethene-1-sulfonamide (2)]

Et$_3$N (0.56 g, 5.5 mmol, 1.1 equiv) was added to the solution of 2-phenylethene-1-sulfonyl chloride (1 g, 4.95 mmol, 1 equiv) in dry CH$_2$Cl$_2$ (20 mL). The resulting mixture was cooled to -20 °C. A solution of allylamine (0.28 g, 4.95 mmol, 1 equiv) in CH$_2$Cl$_2$ (10 mL) was added dropwise at an average rate. The reaction mixture was maintained for 4 h, then washed with a 1 M solution of HCl (20 mL), saturated aqueous solution of NaHCO$_3$ (2 × 20 mL), dried over Na$_2$SO$_4$, filtered and evaporated under reduced pressure. The product was purified via reverse phase chromatography (CH$_3$CN/H$_2$O, 99/1) to give the desired product as a yellow solid, m.p. 42-43 °C. Yield 0.75 g, 68%.

$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 7.71 – 7.69 (m, 2H), 7.51 (t, $J = 5.9$ Hz, 1H), 7.44 – 7.42 (m, 3H), 7.34 (d, $J = 15.5$ Hz, 1H), 7.17 (d, $J = 15.5$ Hz, 1H), 5.81 (ddd, $J = 22.6$, 10.7, 5.5 Hz, 1H), 5.23 (ddd, $J = 17.1$, 1.4 Hz, 1H), 5.09 (ddd, $J = 10.3$, 1.1 Hz, 1H), 3.55 (t, $J = 5.7$ Hz, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) $\delta$ 139.0, 134.8, 132.9, 130.4, 128.9, 128.4, 127.1, 116.4, 44.8. HRMS (ESI): calc’d for C$_{11}$H$_{14}$NO$_2$S [M+H]$^+$ 224.0745; found 224.0744.
**N-allyl-2-(4-fluorophenyl)ethene-1-sulfonamide (3)**

Yield 0.81 g, 75%, white solid, m.p. 81-83 °C.

$^1$H NMR (500 MHz, DMSO-d$_6$) δ 7.78 (t, $J = 6.0$ Hz, 2H), 7.50 (t, $J = 5.5$ Hz, 1H), 7.34 (d, $J = 15.5$ Hz, 1H), 7.27 (t, $J = 8.1$ Hz, 2H), 7.15 (d, $J = 15.5$ Hz, 1H), 5.81 (ddd, $J = 21.4$, 10.4, 5.3 Hz, 1H), 5.23 (d, $J = 17.2$ Hz, 1H), 5.09 (d, $J = 10.2$ Hz, 1H), 3.55 (t, $J = 4.9$ Hz, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) δ 163.2 (d, $J = 248.7$ Hz), 137.9, 134.8, 130.7 (d, $J = 8.6$ Hz), 129.5 (d, $J = 3.0$ Hz), 127.0, 116.4, 115.9 (d, $J = 21.9$ Hz), 44.8. LCMS (m/z): 242 (M+H$^+$). HRMS (ESI): calc’d for C$_{11}$H$_{13}$FNO$_2$S [M+H]$^+$ 242.0651; found 242.0654.

**N-allyl-2-(4-chlorophenyl)ethene-1-sulfonamide (4)**

Yield 0.79 g, 75%, white solid, m.p. 81-82 °C.

$^1$H NMR (500 MHz, DMSO-d$_6$) δ 7.74 (d, $J = 8.4$ Hz, 2H), 7.54 (t, $J = 5.9$ Hz, 1H), 7.49 (d, $J = 8.4$ Hz, 2H), 7.34 (d, $J = 15.5$ Hz, 1H), 7.22 (d, $J = 15.5$ Hz, 1H), 5.81 (ddd, $J = 22.5$, 10.7, 5.5 Hz, 1H), 5.23 (dd, $J = 17.2$, 1.3 Hz, 1H), 5.09 (d, $J = 10.3$ Hz, 1H), 3.56 (t, $J = 5.6$ Hz, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) δ 137.6, 134.9, 134.7, 131.9, 130.1, 129.0, 127.9, 116.4, 44.8. HRMS (ESI): calc’d for C$_{11}$H$_{13}$ClNO$_2$S [M+H]$^+$ 258.0356; found 258.0358.

**N-allyl-2-(p-tolyl)ethene-1-sulfonamide (5)**

Yield 0.86 g, 78%, white solid, m.p. 67-69 °C.
$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 7.58 (d, $J = 8.0$ Hz, 2H), 7.46 (t, $J = 5.9$ Hz, 1H), 7.29 (d, $J = 15.5$ Hz, 1H), 7.24 (d, $J = 7.9$ Hz, 2H), 7.09 (d, $J = 15.5$ Hz, 1H), 5.80 (ddd, $J = 22.6$, 10.7, 5.5 Hz, 1H), 5.22 (dd, $J = 17.2$, 1.4 Hz, 1H), 5.08 (dd, $J = 10.3$, 1.1 Hz, 1H), 3.54 (t, $J = 5.7$ Hz, 2H), 2.33 (s, 3H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) $\delta$ 140.3, 139.0, 134.8, 130.1, 129.5, 128.4, 125.9, 116.3, 44.8, 21.0. LCMS (m/z): 238 (M+H$^+$). HRMS (ESI): calc’d for C$_{12}$H$_{16}$NO$_2$S [M+H]$^+$ 238.0902; found 238.0905.

![N-allyl-2-(2-fluorophenyl)ethene-1-sulfonamide (6)](image)

Yield 0.76 g, 69%, yellow oil.

$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 7.85 (t, $J = 7.2$ Hz, 1H), 7.60 (t, $J = 5.8$ Hz, 1H), 7.50 (dd, $J = 13.6$, 6.1 Hz, 1H), 7.39 (d, $J = 15.7$ Hz, 1H), 7.36 – 7.26 (m, 2H), 7.22 (d, $J = 15.6$ Hz, 1H), 5.81 (ddd, $J = 22.6$, 10.7, 5.6 Hz, 1H), 5.23 (dd, $J = 17.2$, 1.4 Hz, 1H), 5.10 (dd, $J = 10.3$, 1.2 Hz, 1H), 3.56 (t, $J = 5.7$ Hz, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) $\delta$ 160.4 (d, $J = 251.2$ Hz), 134.6, 132.5 (d, $J = 8.7$ Hz), 130.9 (d, $J = 3.8$ Hz), 129.7 (d, $J = 5.4$ Hz), 129.5 (d, $J = 2.3$ Hz), 125.1 (d, $J = 3.4$ Hz), 116.4, 116.1 (d, $J = 21.5$ Hz), 44.8. LCMS (m/z): 242 (M+H$^+$). HRMS (ESI): calc’d for C$_{11}$H$_{13}$FNO$_2$S [M+H]$^+$ 242.0651; found 242.0652.

![N-allyl-2-(2-chlorophenyl)ethene-1-sulfonamide (7)](image)

Yield 0.78 g, 72%, yellow oil.

$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 7.92 (d, $J = 7.6$ Hz, 1H), 7.66 (t, $J = 5.6$ Hz, 1H), 7.60 (d, $J = 15.5$ Hz, 1H), 7.56 (d, $J = 7.9$ Hz, 1H), 7.51 – 7.38 (m, 2H), 7.30 (d, $J = 15.5$ Hz, 1H), 5.81 (ddd, $J = 22.5$, 10.7, 5.5 Hz, 1H), 5.24 (dd, $J = 17.1$, 1.3 Hz, 1H), 5.10 (dd, $J = 10.2$, 1.0 Hz, 1H), 3.58 (t, $J = 5.5$ Hz, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) $\delta$ 134.6, 133.9, 133.5, 131.9, 130.5, 130.2, 130.0, 128.6, 127.8, 116.5, 44.8. HRMS (ESI): calc’d for C$_{11}$H$_{13}$ClNO$_2$S [M+H]$^+$ 258.0356; found 258.0357.

**General procedure for synthesis of 8-16 (8 as an example)**
N-allyl-2-(pyridin-2-yl)ethene-1-sulfonamide (8)

A suspension of NaH (60% in oil) (0.56 g, 13.95 mmol, 1.5 equiv) in 20 mL of DMF was cooled to 0 °C. The solution of 21 (3.62 g, 9.765 mmol, 1.05 equiv) in 30 mL of DMF was added dropwise at an average rate. After that, the mixture was stirred for 1.5 h at the same temperature. A solution of picolinaldehyde (1 g, 9.3 mmol, 1 equiv) in DMF (10 mL) was added dropwise over 0.5 h. After 12 h, a saturated solution of NH₄Cl was added dropwise. The reaction mixture was extracted with hexanes, and evaporated under reduced pressure. The resulting residue was partitioned between water and MTBE. The organic layer was dried over Na₂SO₄, filtered and evaporated under reduced pressure. The resulted product was dissolved in 10 M HCl. After cessation of gas evolution, the solution was concentrated under reduced pressure. Then the precipitate was washed with acetonitrile and dissolved in water. To an aqueous solution was added NaHCO₃ (0.78 g, 9.3 mmol, 1 equiv) in small portions. The resulting precipitate was filtered and dried to obtain the desired pure sulfonamide. Yield 1.52 g, 73%, brown solid. 

¹H NMR (500 MHz, DMSO-d₆) δ 8.64 (d, J = 4.3 Hz, 1H), 7.88 (t, J = 7.7 Hz, 1H), 7.74 (d, J = 7.7 Hz, 1H), 7.62 (t, J = 5.8 Hz, 1H), 7.42 (dd, J = 7.1, 5.5 Hz, 1H), 7.39 (d, J = 15.4 Hz, 1H), 7.34 (d, J = 15.1 Hz, 1H), 5.80 (ddd, J = 21.8, 10.7, 5.5 Hz, 1H), 5.23 (dd, J = 17.1, 1.4 Hz, 1H), 5.09 (d, J = 10.3 Hz, 1H), 3.56 (t, J = 5.6 Hz, 2H). ¹³C NMR (126 MHz, DMSO-d₆) δ 151.2, 150.0, 138.3, 137.4, 134.6, 130.3, 124.85, 124.88, 116.5, 44.8. HRMS (ESI): calc’d for C₁₀H₁₃N₂O₂S [M+H]+ 225.0698; found 225.0695.

N-allyl-2-(pyridin-3-yl)ethene-1-sulfonamide (9)

Yield 1.62 g, 78%, white solid, m.p. 134-135 °C.

¹H NMR (500 MHz, DMSO-d₆) δ 8.87 (s, 1H), 8.59 (d, J = 3.4 Hz, 1H), 8.17 (d, J = 7.9 Hz, 1H), 7.60 (s, 1H), 7.46 (dd, J = 7.5, 5.0 Hz, 1H), 7.40 (d, J = 15.6 Hz, 1H), 7.35 (d, J = 15.6 Hz, 1H), 5.81 (ddd, J = 22.5, 10.7, 5.5 Hz, 1H), 5.23 (dd, J = 17.2, 1.3 Hz, 1H), 5.09 (dd, J = 10.2, 1.1 Hz, 1H), 3.57 (br s, 2H). ¹³C NMR (126 MHz, DMSO-d₆) δ 150.9, 149.8, 135.8, 134.8, 134.7, 129.1,
N-allyl-2-(pyridin-4-yl)ethene-1-sulfonamide (10)

Yield 1.55 g, 74%, grey solid, m.p. 101-103 °C.

$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 8.64 (d, $J$ = 5.8 Hz, 2H), 7.68 (d, $J$ = 5.8 Hz, 3H), 7.48 (d, $J$ = 15.5 Hz, 1H), 7.33 (d, $J$ = 15.6 Hz, 1H), 5.81 (ddd, $J$ = 22.6, 10.7, 5.5 Hz, 1H), 5.23 (dd, $J$ = 17.1, 1.5 Hz, 1H), 5.10 (dd, $J$ = 10.3, 1.3 Hz, 1H), 3.58 (t, $J$ = 5.3 Hz, 2H). 13C NMR (126 MHz, DMSO-d$_6$) $\delta$ 150.4, 140.2, 136.3, 134.7, 131.8, 122.3, 116.5, 44.7. LCMS (m/z): 225 (M+H$^+$). HRMS (ESI): calc’d for C$_{10}$H$_{13}$N$_2$O$_2$S [M+H]$^+$ 225.0698; found 225.0698.

N-allyl-2-(1-methyl-1H-pyrazol-5-yl)ethene-1-sulfonamide (11)

Yield 1.36 g, 67%, grey solid.

$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 7.47 (s, 1H), 7.38 (d, $J$ = 15.2 Hz, 1H), 6.67 (d, $J$ = 15.2 Hz, 1H), 6.54 (d, $J$ = 1.5 Hz, 1H), 5.91 – 5.78 (m, 1H), 5.28 (d, $J$ = 17.1 Hz, 1H), 5.20 (d, $J$ = 10.2 Hz, 1H), 4.71 (t, $J$ = 5.6 Hz, 1H), 3.95 (s, 3H), 3.72 (t, $J$ = 5.8 Hz, 2H). 13C NMR (126 MHz, CDCl$_3$) $\delta$ 139.1, 136.1, 133.4, 127.3, 127.0, 118.1, 106.4, 45.7, 37.2. LCMS (m/z): 228 (M+H$^+$). HRMS (ESI): calc’d for C$_9$H$_{14}$N$_3$O$_2$S [M+H]$^+$ 228.0807; found 228.0808.

N-allyl-2-(1-methyl-1H-pyrazol-4-yl)ethene-1-sulfonamide (12)

Yield 1.5 g, 74%, grey solid.

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.63 (s, 1H), 7.56 (s, 1H), 7.32 (d, $J$ = 15.4 Hz, 1H), 6.47 (d, $J$ = 15.4 Hz, 1H), 5.89 – 5.75 (m, 1H), 5.24 (d, $J$ = 17.1 Hz, 1H), 5.14 (d, $J$ = 10.2 Hz, 1H), 4.88 (s, 1H), 3.89 (s, 3H), 3.64 (s, 1H). 13C NMR (126 MHz, CDCl$_3$) $\delta$ 138.8, 133.6, 132.5, 130.9, 122.4, 117.7,
N-allyl-2-(1-methyl-1\text{H}-imidazol-4-yl)ethene-1-sulfonamide (13)

Yield 1.54 g, 75%, white solid, m.p. 163-164 °C.

\[^1\text{H} \text{NMR} \ (500 \text{ MHz, DMSO-d}_6)\ \delta \ 7.68 \ (s, \ 1\text{H}), \ 7.55 \ (s, \ 1\text{H}), \ 7.31 \ (s, \ 1\text{H}), \ 7.18 \ (d, \ J = 15.0 \text{ Hz, 1H}), \ 6.67 \ (d, \ J = 15.0 \text{ Hz, 1H}), \ 5.79 \ (dd, \ J = 22.6, 10.7, 5.6 \text{ Hz, 1H}), \ 5.21 \ (dd, \ J = 17.2, 1.5 \text{ Hz, 1H}), \ 5.08 \ (dd, \ J = 10.3, 1.3 \text{ Hz, 1H}), \ 3.66 \ (s, \ 3\text{H}), \ 3.47 \ (d, \ J = 5.5 \text{ Hz, 2H}).\]

\[^{13}\text{C NMR} \ (126 \text{ MHz, DMSO-d}_6)\ \delta \ 139.9, \ 134.7, \ 132.4, \ 124.3, \ 122.1, \ 116.3, \ 44.9, \ 33.1. \] HRMS (ESI): calc’d for C\textsubscript{9}H\textsubscript{14}N\textsubscript{3}O\textsubscript{2}S [M+H]\textsuperscript{+} 228.0807; found 228.0805.

N-allyl-2-(oxazol-5-yl)ethene-1-sulfonamide (14)

Yield 1.37 g, 62%, grey solid.

\[^1\text{H} \text{NMR} \ (500 \text{ MHz, DMSO-d}_6)\ \delta \ 8.50 \ (s, \ 1\text{H}), \ 8.46 \ (s, \ 1\text{H}), \ 7.53 \ (t, \ J = 5.8 \text{ Hz, 1H}), \ 7.30 \ (d, \ J = 15.1 \text{ Hz, 1H}), \ 6.89 \ (d, \ J = 15.1 \text{ Hz, 1H}), \ 5.79 \ (dd, \ J = 22.6, 10.7, 5.5 \text{ Hz, 1H}), \ 5.22 \ (dd, \ J = 17.2, 1.4 \text{ Hz, 1H}), \ 5.09 \ (dd, \ J = 10.3, 1.2 \text{ Hz, 1H}), \ 3.52 \ (t, \ J = 5.7 \text{ Hz, 2H}).\]

\[^{13}\text{C NMR} \ (126 \text{ MHz, DMSO-d}_6)\ \delta \ 153.2, \ 141.1, \ 134.6, \ 134.4, \ 128.2, \ 127.5, \ 116.5, \ 44.8. \] LCMS (m/z): 215 (M+H\textsuperscript{+}). HRMS (ESI): calc’d for C\textsubscript{8}H\textsubscript{11}N\textsubscript{2}O\textsubscript{3}S [M+H]\textsuperscript{+} 215.0490; found 215.0492.

N-allyl-2-(5-chlorothiophen-2-yl)ethene-1-sulfonamide (15)

Yield 1.8 g, 89%, grey solid.
\(^1\)H NMR (500 MHz, DMSO-\(d_6\)) \(\delta\) 7.52 (t, \(J = 5.8\) Hz, 1H), 7.45 (s, 1H), 7.43 (d, \(J = 15.3\) Hz, 1H), 7.18 (d, \(J = 3.9\) Hz, 1H), 6.83 (d, \(J = 15.3\) Hz, 1H), 5.80 (ddd, \(J = 22.6, 10.7, 5.5\) Hz, 1H), 5.22 (dd, \(J = 17.2, 1.4\) Hz, 1H), 5.10 (dd, \(J = 10.3, 1.1\) Hz, 1H), 3.53 (t, \(J = 5.6\) Hz, 2H). \(^{13}\)C NMR (126 MHz, DMSO-\(d_6\)) \(\delta\) 136.2, 134.7, 131.9, 131.5, 131.4, 128.3, 125.7, 116.4, 44.8. LCMS (m/z): 262 (M-H\(^\ddagger\)). HRMS (ESI): calc’d for C\(_9\)H\(_{11}\)ClNO\(_2\)S\(_2\) [M+H\(^\ddagger\)] 263.9920; found 263.9920.

\(N\)-allyl-2-(thiazol-4-yl)ethene-1-sulfonamide (16)

Yield 1.29 g, 65%, yellow oil.

\(^1\)H NMR (500 MHz, CDCl\(_3\)) \(\delta\) 8.85 (s, 1H), 8.03 (s, 1H), 7.64 (d, \(J = 15.2\) Hz, 1H), 6.61 (d, \(J = 15.2\) Hz, 1H), 5.92 – 5.79 (m, 1H), 5.28 (d, \(J = 17.1\) Hz, 1H), 5.20 (d, \(J = 10.2\) Hz, 1H), 4.69 (s, 1H), 3.72 (d, \(J = 5.8\) Hz, 2H). \(^{13}\)C NMR (126 MHz, CDCl\(_3\)) \(\delta\) 155.4, 146.9, 133.4, 132.7, 130.8, 127.8, 118.1, 45.7. LCMS (m/z): 231 (M+H\(^\ddagger\)). HRMS (ESI): calc’d for C\(_8\)H\(_{11}\)N\(_2\)O\(_2\)S\(_2\) [M+H\(^\ddagger\)] 231.0262; found 231.0265.

\(N\)-(but-3-en-1-yl)-2-phenylethene-1-sulfonamide (17)

Yield 0.77 g, 66%, yellow oil.

\(^1\)H NMR (500 MHz, DMSO-\(d_6\)) \(\delta\) 7.71 (dd, \(J = 5.8, 2.4\) Hz, 2H), 7.45 – 7.40 (m, 3H), 7.33 (d, \(J = 15.6\) Hz, 1H), 7.30 (s, 1H), 7.17 (d, \(J = 15.5\) Hz, 1H), 5.83 – 5.73 (m, 1H), 5.06 (d, \(J = 17.2\) Hz, 1H), 5.01 (d, \(J = 10.2\) Hz, 1H), 2.95 (q, \(J = 6.9\) Hz, 2H), 2.22 (q, \(J = 7.0\) Hz, 2H). \(^{13}\)C NMR (126 MHz, DMSO-\(d_6\)) \(\delta\) 138.9, 135.5, 132.9, 130.4, 128.9, 128.4, 127.0, 116.6, 41.9, 33.8. LCMS (m/z): 238 (M+H\(^\ddagger\)). HRMS (ESI): calc’d for C\(_{12}\)H\(_{16}\)NO\(_2\)S [M+H\(^\ddagger\)] 238.0902; found 238.0903.

\(N\)-(pent-4-en-1-yl)-2-phenylethene-1-sulfonamide (18)

Yield 0.65 g, 70%, yellow oil.
\[ {}^1\text{H NMR (400 MHz, CDCl}_3\] δ 7.53 – 7.35 (m, 6H), 6.76 (d, \( J = 15.5 \) Hz, 1H), 5.84 – 5.68 (m, 1H), 5.06 – 4.95 (m, 2H), 4.66 (s, 1H), 3.14 – 3.02 (m, 2H), 2.18 – 2.05 (m, 2H), 1.73 – 1.60 (m, 2H). 
\[ {}^{13}\text{C NMR (126 MHz, CDCl}_3\] δ 141.7, 137.4, 132.7, 130.9, 129.2, 128.4, 125.2, 115.8, 42.6, 30.8, 29.2. LCMS (m/z): 252 (M+H\(^+\)). HRMS (ESI): calc’d for C\(_{13}\)H\(_{18}\)NO\(_2\)S [M+H\(^+\)] 252.1058; found 252.1059.

\[ N-(2-Methylallyl)-2-phenylethene-1-sulfonamide (22) \]
Yield 0.75 g, 68%, yellow oil.
\[ {}^1\text{H NMR (500 MHz, CDCl}_3\] δ 7.52 – 7.36 (m, 5H), 6.77 (d, \( J = 15.5 \) Hz, 1H), 4.97 (s, 1H), 4.91 (s, 1H), 4.57 (s, 1H), 3.62 (d, \( J = 6.1 \) Hz, 2H), 1.77 (s, 3H). \[ {}^{13}\text{C NMR (126 MHz, CDCl}_3\] δ 141.7, 140.9, 132.7, 131.0, 129.2, 128.4, 125.3, 112.9, 49.0, 20.3. HRMS (ESI): calc’d for C\(_{12}\)H\(_{16}\)NO\(_2\)S [M+H\(^+\)] 238.0902; found 238.0900.

\[ 2-Phenyl-N-(2-phenylallyl)ethene-1-sulfonamide (23) \]
Yield 0.91 g, 72%, yellow oil.
\[ {}^1\text{H NMR (500 MHz, CDCl}_3\] δ 7.47 – 7.28 (m, 11H), 6.64 (d, \( J = 15.4 \) Hz, 1H), 5.46 (s, 1H), 5.35 (s, 1H), 4.50 (s, 1H), 4.17 (d, \( J = 5.9 \) Hz, 2H). \[ {}^{13}\text{C NMR (126 MHz, CDCl}_3\] δ 141.8, 131.0, 129.2, 128.8, 128.4, 126.4, 125.4, 115.5, 47.1. HRMS (ESI): calc’d for C\(_{17}\)H\(_{18}\)NO\(_2\)S [M+H\(^+\)] 300.1058; found 300.1055.

\[ N-(2-Phenylallyl)ethenesulfonamide (24) \]
Yield 0.6 g, 65%, yellow oil.
\[ {}^1\text{H NMR (500 MHz, CDCl}_3\] δ 7.43 – 7.25 (m, 5H), 6.49 – 6.38 (m, 1H), 6.26 – 6.19 (m, 1H), 5.91 (d, 1H), 5.47 (s, 1H), 5.33 (s, 1H), 4.52 (s, 1H), 4.09 (d, \( J = 6.0 \) Hz, 2H). \[ {}^{13}\text{C NMR (126 MHz, CDCl}_3\] δ 143.4, 138.1, 136.1, 128.8, 128.5, 126.8, 126.3, 115.3, 47.0. HRMS (ESI): calc’d for C\(_{11}\)H\(_{13}\)NNaO\(_2\)S [M+Na\(^+\)] 246.0565; found 246.0558.
**N-Cinnamylethenesulfonamide (25)**

Yield 0.56 g, 63%, yellow oil.

\[ ^{1}H \text{NMR (500 MHz, CDCl}_3\] \(\delta\) 7.43 – 7.12 (m, 5H), 6.63 (d, \(J = 10.7\) Hz, 1H), 6.55 – 6.45 (m, 1H), 6.24 (d, \(J = 16.6\) Hz, 1H), 5.93 (d, \(J = 9.9\) Hz, 1H), 5.76 – 5.64 (m, 1H), 4.49 (s, 1H), 3.96 – 3.92 (m, 2H). \[ ^{13}C \text{NMR (126 MHz, CDCl}_3\] \(\delta\) 136.0, 132.9, 128.8, 128.6, 127.7, 127.1, 126.9, 41.2. HRMS (ESI): calc’d for C\(_{11}\)H\(_{14}\)NO\(_2\)S \([M+H]^+\) 224.0745; found 224.0742.

**General procedure for [2+2] photocycloaddition (2a as an example)**

7-Phenyl-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (2a)

Benzophenone (8.2 mg, 0.0448 mmol, 0.1 equiv) was added to a solution of 2 (0.1 g, 0.448 mmol, 1 equiv) in dry CH\(_3\)CN (10 mL). The reaction mixture was degassed by bubbling of argon for 15 min and irradiated at 365 nm. The reaction mixture was concentrated under reduced pressure. The final product was purified via reverse column chromatography (H\(_2\)O/CH\(_3\)CN, 3:2). Yield 81 mg, 81%, grey solid, m.p. 96-98 °C. \[^{1}H \text{NMR (400 MHz, CDCl}_3\] \(\delta\) 7.36 – 7.30 (m, 2H), 7.29 – 7.21 (m, 3H), 5.07 (s, 1H), 3.99 – 3.91 (m, 1H), 3.74 – 3.68 (m, 1H), 3.59 – 3.45 (m, 1H), 3.40 (s, 1H), 3.25 (d, \(J = 11.3\) Hz, 1H), 2.70 – 2.53 (m, 1H), 2.48 – 2.35 (m, 1H). \[^{13}C \text{NMR (101 MHz, CDCl}_3\] \(\delta\) 141.8, 128.9, 127.1, 126.4, 59.1, 47.3, 39.3, 35.9, 30.2. LCMS (m/z): 224 (M+H\(^+\)). HRMS (ESI): calc’d for C\(_{11}\)H\(_{14}\)NO\(_2\)S [M+H\(^+\)] 224.0745; found 224.0744.

7-(4-Fluorophenyl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (3a)

Yield 77 mg, 77%, yellow oil.
1H NMR (400 MHz, CDCl₃) δ 7.28 – 7.19 (m, 2H), 7.03 (t, J = 8.3 Hz, 2H), 4.61 (s, 1H), 4.01 – 3.89 (m, 1H), 3.65 (t, J = 6.3 Hz, 1H), 3.57 – 3.47 (m, 1H), 3.40 (s, 1H), 3.30 – 3.21 (m, 1H), 2.66 – 2.55 (m, 1H), 2.46 – 2.35 (m, 1H). 13C NMR (126 MHz, CDCl₃) δ 162.0 (d, J = 246.1 Hz), 137.4 (d, J = 3.1 Hz), 128.0 (d, J = 8.0 Hz), 115.9 (d, J = 21.6 Hz), 59.1, 47.2, 39.0, 35.6, 30.4. 19F NMR (376 MHz, CDCl₃) δ -115.9 (s). HRMS (ESI): calc’d for C₁₁H₁₃FNO₂S [M+H]⁺ 242.0651; found 242.0651.

7-(4-Chlorophenyl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (4a)

Yield 82 mg, 82%, yellow solid, m.p. 103-105 °C.
1H NMR (400 MHz, CDCl₃) δ 7.33 (d, J = 7.7 Hz, 2H), 7.21 (d, J = 7.7 Hz, 2H), 4.69 (s, 1H), 4.00 – 3.89 (m, 1H), 3.68 (t, J = 6.4 Hz, 1H), 3.60 – 3.49 (m, 1H), 3.42 (s, 1H), 3.32 – 3.23 (m, 1H), 2.67 – 2.55 (m, 1H), 2.48 – 2.38 (m, 1H). 13C NMR (101 MHz, CDCl₃) δ 140.1, 133.1, 129.1, 127.8, 58.9, 47.2, 39.0, 35.7, 30.2. HRMS (ESI): calc’d for C₁₁H₁₃ClNO₂S [M+H]⁺ 258.0356; found 258.0351.

7-((p-Tolyl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (5a)

Yield 85 mg, 85%, white solid, m.p. 107-108 °C.
1H NMR (400 MHz, CDCl₃) δ 7.17 (s, 4H), 4.82 (s, 1H), 3.92 (dd, J = 14.3, 7.4 Hz, 1H), 3.70 (t, J = 6.3 Hz, 1H), 3.56 – 3.47 (m, 1H), 3.45 – 3.36 (m, 1H), 3.26 (dd, J = 11.8, 4.2 Hz, 1H), 2.65 – 2.56 (m, 1H), 2.42 (dd, J = 16.0, 6.8 Hz, 1H), 2.34 (s, 3H). 13C NMR (101 MHz, CDCl₃) δ 138.8, 136.9, 129.6, 126.3, 59.2, 47.3, 39.1, 35.9, 30.4, 21.2. LCMS (m/z): 238 (M+H⁺). HRMS (ESI): calc’d for C₁₂H₁₆NO₂S [M+H]⁺ 238.0902; found 238.0901.
7-(2-Fluorophenyl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (6a)
Yield 75 mg, 75%, white solid, m.p. 122-124 °C.
$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.28 – 7.22 (m, 2H), 7.15 – 7.00 (m, 2H), 4.73 (s, 1H), 4.06 – 3.97 (m, 1H), 3.93 – 3.84 (m, 1H), 3.49 (s, 2H), 3.23 (d, $J = 10.2$ Hz, 1H), 2.70 – 2.58 (m, 1H), 2.53 – 2.41 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 161.1 (d, $J = 246.7$ Hz), 129.2 (d, $J = 8.3$ Hz), 128.7 (d, $J = 4.5$ Hz), 128.6 (d, $J = 13.7$ Hz), 124.5 (d, $J = 3.4$ Hz), 116.1 (d, $J = 21.6$ Hz), 57.6, 47.1, 36.1, 35.2, 30.4. $^{19}$F NMR (376 MHz, CDCl$_3$) $\delta$ -116.5 (s). HRMS (ESI): calc’d for C$_{11}$H$_{13}$FNO$_2$S [M+H]$^+$ 242.0651; found 242.0653.

7-(2-Chlorophenyl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (7a)
Yield 82 mg, 82%, yellow solid, m.p. 131-133 °C.
$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.35 (t, $J = 6.5$ Hz, 2H), 7.30 – 7.17 (m, 2H), 4.86 (s, 1H), 4.28 – 4.15 (m, 1H), 3.93 (t, $J = 6.4$ Hz, 1H), 3.53 – 3.38 (m, 2H), 3.24 (d, $J = 11.3$ Hz, 1H), 2.56 – 2.49 (m, 2H). $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$ 138.5, 133.7, 130.3, 128.6, 127.2, 127.1, 56.9, 46.9, 37.3, 36.0, 30.5. LCMS (m/z): 258 (M+H$^+$). HRMS (ESI): calc’d for C$_{11}$H$_{13}$ClNO$_2$S [M+H]$^+$ 258.0356; found 258.0354.

7-(Pyridin-2-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (8a)
Yield 78 mg, 78%, brown solid, m.p. 139-140 °C.
$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 8.59 (s, 1H), 7.61 (t, $J = 7.0$ Hz, 1H), 7.19 – 7.14 (m, 2H), 5.29 (s, 1H), 4.06 – 3.97 (m, 2H), 3.55 – 3.40 (m, 2H), 3.26 (d, $J = 11.2$ Hz, 1H), 2.79 – 2.68 (m, 1H), 2.45 – 2.31 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 160.3, 149.8, 136.9, 122.4, 122.3, 57.2, 47.3, 40.7, 36.2, 29.6. LCMS (m/z): 225 (M+H$^+$). HRMS (ESI): calc’d for C$_{10}$H$_{13}$N$_2$O$_2$S [M+H]$^+$ 225.0698; found 225.0695.
7-(Pyridin-3-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (9a)
Yield 77 mg, 77%, yellow solid, m.p. 156-158 °C.
$^1$H NMR (500 MHz, DMSO-d$_6$) $\delta$ 8.55-8.40 (m, 2H), 7.75-7.69 (m, 1H), 7.54-7.51 (m, 1H), 7.36-7.31 (m, 1H), 3.92-3.81 (m, 2H), 3.21-3.16 (m, 1H), 3.09-3.05 (m, 2H), 2.22-2.15 (m, 2H). $^{13}$C NMR (126 MHz, DMSO-d$_6$) $\delta$ 148.0, 137.7, 134.1, 123.7, 57.6, 46.7, 36.1, 35.9, 30.0. LCMS (m/z): 225 (M+H$^+$). HRMS (ESI): calc’d for C$_{10}$H$_{13}$N$_2$O$_2$S [M+H$^+$] 225.0698; found 225.0698.

7-(Pyridin-4-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (10a)
Yield 77 mg, 77%, orange solid, m.p. 131-133 °C.
$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 8.58 (d, $J$ = 4.8 Hz, 2H), 7.20 (d, $J$ = 4.8 Hz, 2H), 5.33 (br s, 1H), 3.96 (dd, $J$ = 15.4, 7.6 Hz, 1H), 3.72 (t, $J$ = 6.6 Hz, 1H), 3.57 – 3.50 (m, 1H), 3.45 – 3.38 (m, 1H), 3.29 (d, $J$ = 11.9 Hz, 1H), 2.68 – 2.56 (m, 1H), 2.51 – 2.42 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 150.6, 150.3, 121.6, 58.1, 47.1, 38.5, 35.8, 29.5. LCMS (m/z): 225 (M+H$^+$). HRMS (ESI): calc’d for C$_{10}$H$_{13}$N$_2$O$_2$S [M+H$^+$] 225.0698; found 225.0699.

7-(1-Methyl-1H-pyrazol-5-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (11a)
Yield 78 mg, 78%, yellow solid.
$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 7.47 (s, 1H), 7.38 (d, $J$ = 15.2 Hz, 1H), 6.67 (d, $J$ = 15.2 Hz, 1H), 6.54 (d, $J$ = 1.5 Hz, 1H), 5.92 – 5.78 (m, 1H), 5.28 (d, $J$ = 17.1 Hz, 1H), 5.20 (d, $J$ = 10.2 Hz, 1H), 4.71 (t, $J$ = 5.6 Hz, 1H), 3.95 (s, 3H), 3.72 (t, $J$ = 5.8 Hz, 2H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 139.1, 136.1, 133.4, 127.3, 127.0, 118.1, 106.4, 45.7, 37.2. LCMS (m/z): 228 (M+H$^+$). HRMS (ESI): calc’d for C$_{9}$H$_{14}$N$_3$O$_2$S [M+H$^+$] 228.0807; found 225.0806.
**7-(1-Methyl-1H-pyrazol-4-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (12a)**
Yield 69 mg, 69%, yellow solid, m.p. 123-125 °C.

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.39 (s, 1H), 7.25 (s, 1H), 5.10 (br s, 1H), 3.84 (s, 3H), 3.82 – 3.76 (m, 1H), 3.52 (t, $J = 5.4$ Hz, 1H), 3.47 – 3.31 (m, 2H), 3.19 (dd, $J = 11.3$, 2.8 Hz, 1H), 2.47 – 2.33 (m, 2H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 137.1, 127.9, 123.2, 59.8, 47.1, 39.1, 36.0, 31.3, 30.4. LCMS (m/z): 228 (M+H$^+$. HRMS (ESI): calc’d for C$_9$H$_{14}$N$_3$O$_2$S [M+H]$^+$ 228.0807; found 225.0803.

**7-(1-Methyl-1H-imidazol-4-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (13a)**
Yield 67 mg, 67%, white solid, m.p. 125-126 °C.

$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 7.42 (s, 1H), 6.73 (s, 1H), 5.15 (br s, 1H), 3.86 – 3.78 (m, 2H), 3.64 (s, 3H), 3.48 (d, $J = 7.3$ Hz, 2H), 3.21 (d, $J = 10.4$ Hz, 1H), 2.74 – 2.64 (m, 1H), 2.37 – 2.28 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 142.6, 138.1, 116.8, 58.3, 47.3, 36.2, 33.5, 33.1, 30.2. LCMS (m/z): 228 (M+H$^+$. HRMS (ESI): calc’d for C$_9$H$_{14}$N$_3$O$_2$S [M+H]$^+$ 228.0807; found 228.0803.

**7-(Oxazol-5-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (14a)**
Yield 35 mg, 35%, white solid, m.p. 147-149 °C.

$^1$H NMR (500 MHz, CDCl$_3$) $\delta$ 7.89 (s, 1H), 7.53 (s, 1H), 4.71 (br s, 1H), 3.93 – 3.84 (m, 1H), 3.80 (t, $J = 5.5$ Hz, 1H), 3.55 – 3.46 (m, 2H), 3.23 (d, $J = 10.9$ Hz, 1H), 2.73 – 2.59 (m, 1H), 2.45 – 2.33 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 151.9, 140.2, 134.6, 57.3, 47.1, 36.2, 31.0, 29.5. LCMS (m/z): 215 (M+H$^+$. HRMS (ESI): calc’d for C$_9$H$_{11}$N$_2$O$_3$S [M+H]$^+$ 215.0490; found 215.0485.
7-(5-Chlorothiophen-2-yl)-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (15a)
Yield 60 mg, 60%, grey solid, m.p. 93-94 °C.
$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 6.77 (d, $J = 2.5$ Hz, 1H), 6.71 (s, 1H), 4.68 (br s, 1H), 4.10 – 3.99 (m, 1H), 3.69 (t, $J = 5.9$ Hz, 1H), 3.55 – 3.40 (m, 2H), 3.25 (s, 1H), 2.64 – 2.45 (m, 2H). $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$ 144.1, 129.0, 126.3, 123.7, 59.5, 46.9, 35.6, 35.5, 31.9. HRMS (ESI): calc’d for C$_9$H$_{11}$ClNO$_2$S$_2$ [M+H]$^+$ 263.9920; found 263.9917.

8-Phenyl-2-thia-3-azabicyclo[4.2.0]octane 2,2-dioxide (17a)
Yield 62 mg, 62%, yellow oil.
$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.39 – 7.17 (m, 5H), 5.15 (s), 4.66 (s, 1H), 4.04 (q, $J = 9.5$ Hz, 1H), 3.85 – 3.71 (m, 1H), 3.61 – 3.51 (m, 1H), 3.36 (dd, $J = 23.5$, 12.2 Hz, 1H), 3.03 – 2.88 (m, 1H), 2.32 (dd, $J = 17.8$, 10.1 Hz, 1H), 2.12 (t, $J = 9.7$ Hz, 1H), 2.06 – 1.93 (m, 1H), 1.72 – 1.58 (m, 1H). $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$ 141.1, 140.7, 129.1, 128.7, 127.2, 127.0, 126.7, 126.5, 62.9, 57.6, 43.5, 40.4, 40.2, 38.3, 33.1, 32.7, 32.1, 27.2. LCMS (m/z): 238 (M+H$^+$). HRMS (ESI): calc’d for C$_{12}$H$_{16}$NO$_2$S [M+H]$^+$ 238.0902; found 238.0899.

5-Phenyl-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (24a)
Yield 45 mg, 45%, white oil.
$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ 7.44 – 7.24 (m, 5H), 5.27 (s, 1H), 3.87 (t, $J = 6.9$ Hz, 1H), 3.33 (dd, $J = 12.0$, 3.6 Hz, 1H), 3.27 – 3.18 (m, 1H), 2.82 – 2.71 (m, 1H), 2.60 – 2.41 (m, 3H). $^{13}$C NMR (126 MHz, CDCl$_3$) $\delta$ 142.8, 129.0, 127.4, 125.3, 59.2, 55.9, 54.5, 28.8, 18.3. HRMS (ESI): calc’d for C$_{11}$H$_{14}$NO$_2$S [M+H]$^+$ 224.0745; found 224.0740.
6-Phenyl-2-thia-3-azabicyclo[3.2.0]heptane 2,2-dioxide (25a)

Yield 38 mg, 38%, white oil.

$^1$H NMR (500 MHz, CDCl$_3$) δ 7.50 – 7.12 (m, 5H), 3.79 – 3.68 (m, 1H), 3.67 – 3.56 (m, 1H), 3.55 – 3.42 (m, 2H), 3.31 (d, $J = 11.2$ Hz, 1H), 2.98 – 2.85 (m, 1H), 2.67 – 2.54 (m, 1H). $^{13}$C NMR (126 MHz, CDCl$_3$) δ 142.9, 129.0, 127.2, 126.4, 50.6, 47.7, 46.5, 40.8, 28.4. HRMS (ESI): calc’d for C$_{11}$H$_{14}$NO$_2$S [M+H]$^+$ 224.0745; found 224.0742.

Tert-butyl allyl(methylsulfonyl)carbamate (20).

$N$-allylmethanesulfonamide (202.5 g, 1.5 mol, 1 equiv) was dissolved in 2 L of CH$_2$Cl$_2$. To the solution were added Et$_3$N (243 mL, 1.75 mol, 1.16 equiv) and DMAP (12.2 g, 0.1 mol). The mixture was cooled to 0 ºC and a solution of Boc$_2$O (381.5 g, 1.75 mol, 1.16 equiv) in 500 mL of CH$_2$Cl$_2$ was added dropwise. The solution, after heating to RT, was left stirring for 3 h. After that, the mixture was washed with a solution of 1 M HCl, brine, dried over Na$_2$SO$_4$ and evaporated over reduced pressure to obtain the title compound. Yield 335 g, 95%, black solid. $^1$H NMR (400 MHz, CDCl$_3$) δ 5.90 – 5.71 (m, 1H), 5.22 (d, $J = 17.1$ Hz, 1H), 5.17 (d, $J = 10.3$ Hz, 1H), 4.24 (d, $J = 5.3$ Hz, 2H), 3.23 (s, 3H), 1.49 (s, 9H). $^{13}$C NMR (101 MHz, CDCl$_3$) δ 151.4, 132.8, 117.9, 84.6, 48.3, 42.3, 28.0. HRMS (ESI): calc’d for C$_{9}$H$_{18}$NO$_4$S [M+H]$^+$ 236.0957; found 236.0959.

Tert-butyl allyl(((diethoxyphosphoryl)methyl)sulfonyl)carbamate (21)

To a stirred solution of tert-butyl allyl(methylsulfonyl)carbamate 20 (300 g, 1.2 mol, 1 equiv) in 1 L of dry THF was added a solution of 2.5 M BuLi in hexane (560 mL, 1.4 mol, 1.16 equiv) dropwise at -78 ºC. The mixture was stirred for 15 min and diethyl chlorophosphate (241.5 g, 1.4 mol, 1.16 equiv) was added slowly at the same temperature. The solution was allowed to warm to RT. After 24 h the reaction was quenched with a saturated NH$_4$Cl solution. Organic solvents were removed under reduced pressure. The residue was treated with H$_2$O and extracted with CH$_2$Cl$_2$, washed with brine and dried over Na$_2$SO$_4$. Evaporation of the solvent under reduced pressure afforded the crude product which was used in the next steps without further purification. Yield 309 g, 69.5%, black oil.
Photos

Reaction preparation

Starting material

Reaction preparation

Addition of benzophenone

Bubbling of argon

Solution of starting material for \([2+2]\) photocycloaddition

Reactor for \([2+2]\) photocycloaddition

Installation of the flask

The reactor is on

\([2+2]\) photocycloaddition (1 flask inside)

\([2+2]\) photocycloaddition (2 flasks inside)
Figure S1. X-ray structure of compound 11a.

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<td>_diffrn_reflns_limit_l_min</td>
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_diffn_reflns_limit_l_max       20
_diffn_reflns_theta_min         2.368
_diffn_reflns_theta_max         27.610
_diffn_reflns_theta_full        25.242
_diffn_measured_fraction_theta_max   0.997
_diffn_measured_fraction_theta_full  1.000
_diffn_reflns_Laue_measured_fraction_max    0.997
_diffn_reflns_Laue_measured_fraction_full   1.000
_diffn_reflns_point_group_measured_fraction_max   0.997
_diffn_reflns_point_group_measured_fraction_full  1.000
_reflns_number_total             2358
_reflns_number_gt                1834
_reflns_threshold_expression    'I > 2\sigma(I)'
Copies of $^1$H, $^{13}$C and $^{19}$F NMR spectra

Compound 2
Compound 3
Compound 4

\[
\begin{align*}
\text{Cl} & & \text{CH}_3 \\
\text{C} & & \text{C} \\
\text{O} & & \text{O} \\
\text{H} & & \text{H}
\end{align*}
\]
Compound 5
Compound 6
Compound 7
Compound 8
Compound 9
Compound 11
Compound 12

[Chemical Structure Image]

[Graphical Representation Image]
Compound 13
Compound 14
Compound 16
Compound 17
Compound 18

![Chemical Structure of Compound 18](image)

[Chemical Shifts and Spectra]
Compound 20
Compound 22
Compound 22 (after 48 h of irradiation, mixture of Z/E isomers)
Compound 23

[Chemical structure image]

[Chemical spectrum image]
Compound 25

\[ \text{Diagram showing chemical structure of Compound 25} \]

\[ \text{NMR spectrum showing chemical shifts} \]

\[ \text{Additional notes or data not visible in the image} \]
Compound 2a
Compound 3a
Compound 4a
Compound 6a
Compound 7a
Compound 8a
Compound 9a

M382316$1

C10H12N2O2S 224.28
Compound 10a
Compound 11a
Compound 12a
Compound 13a
Compound 14a
Compound 15a
Compound 17a
Compound 24a
Compound 25a