Supporting Information for:

**Dimethylzinc-Mediated Alkynylation of Imines**

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1. General Information

All reactions were carried out under an inert atmosphere of argon or nitrogen, using standard Schlenk techniques. Toluene was purified by distillation over sodium-benzophenone ketyl radical, and CH₂Cl₂ was distilled from calcium hydride prior to use. Ethyl acetate, diethyl ether, petroleum ether (PE) and pentane for flash column chromatography were distilled before use. ¹H-NMR spectra were recorded either on a 300 MHz or 400 MHz spectrometer using TMS as internal standard and CDCl₃ as solvent,
unless otherwise stated. $^{13}$C-NMR spectra were recorded either on a 75 MHz or 100 MHz spectrometer using CDCl$_3$ as solvent, unless otherwise stated. Coupling constants ($J$) are given in Hertz (Hz). IR absorptions are given in wavenumbers (cm$^{-1}$). Mass peaks are identified by the corresponding $m/z$ values. Melting points are reported as intervals and are uncorrected.

2. Alkynylation of N-substituted aromatic imines 1

2.1. Typical procedure for the alkynylation of imines 1.

In an oven-dried Schlenk flask under an inert atmosphere of argon alkyne 2a-d (0.75–1.25 mmol, 1.5–2.5 equiv) was dissolved in anhydrous toluene (4.5 mL). A 2.0 M solution of dimethylzinc in toluene (0.38–0.63 mL, 0.75–1.25 mmol, 1.5–2.5 equiv) was then carefully added, and the resulting mixture was stirred at room temperature for 30 min. The appropriate imine 1 (0.5 mmol) was then added in one portion, and the temperature was increased to the desired value (50–70 °C). The resulting solution was stirred for 24 h, after which a white precipitate appeared in some cases. The reaction was quenched with water (10 mL). The aqueous phase was extracted with CH$_2$Cl$_2$ (3x15 mL) and the organic phase was washed with brine (25 mL) and dried over MgSO$_4$. Evaporation of the solvent under reduced pressure furnished the crude product typically as a solid, which was purified by flash column chromatography and/or by recrystallization.

2.2. Analytical data of compounds 3aa-3md.

N-(p-toluensulfonyl)-3-amino 1,3-diphenylprop-1-yne (3aa). Prepared starting from imine 1a (0.130 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate/pentane 1:4) afforded pure 3aa. Yield 0.145 g (0.4 mmol, 80%); white solid; mp 188-189 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) δ 2.24 (s, 3H), 4.91 (d, $J = 9.2$ Hz, 1H), 5.48 (d, $J = 9.2$ Hz, 1H), 7.01-7.08 (m, 2H), 7.11-7.34 (m, 8H), 7.44-7.52 (m, 2H), 7.70-7.79 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) δ 21.4, 49.8, 85.4, 86.7, 121.9, 127.3, 127.5, 128.1, 128.4, 128.6, 128.7, 129.5, 129.7, 131.5, 137.4, 143.5. IR (KBr): 3265, 2223, 1595, 1431, 1327, 1290, 1154, 1047 cm$^{-1}$. MS (EI, 70 eV): $m/z = 360$ [M-1]$^+$, 222, 206 [M-Ts]$^+$, 191, 105, 91, 77. Anal. Calcd. for C$_{22}$H$_{19}$NO$_2$S: C, 73.31; H, 5.03; N, 3.88. Found: C, 73.09; H, 5.17; N, 3.75.

N-(methansulfonyl)-3-amino 1,3-diphenylprop-1-yne (3ba). Prepared starting from imine 1b (0.092 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column
chromatography (ethyl acetate/pentane 1:4) afforded pure 3ba. Yield 0.112 g (0.39 mmol, 78%); white solid; mp 100-101 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 3.00 (s, 3H), 4.92 (d, $J = 8.2$ Hz, 1H), 5.56 (d, $J = 8.2$ Hz, 1H), 7.23-7.36 (m, 6H), 7.37-7.42 (m, 2H), 7.52-7.57 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 42.0, 49.9, 86.1, 87.1, 121.8, 127.4, 128.5, 128.8, 128.9, 129.0, 131.6, 137.2. IR (KBr): 3198, 2199, 1596, 1490, 1445, 1320, 1146, 1054 cm$^{-1}$. MS (EI, 70 eV): $m/z = 285 [M]^+$, 284 [M-1]$^+$, 222, 206 [M-Ts]$^+$, 191, 178, 105, 77. Anal. Calcd. for C$_{16}$H$_{15}$NO$_2$S: C, 67.34; H, 5.30; N, 4.91. Found: C, 67.02; H, 5.10; N, 4.83.

N-(2,4,6-trimethylbenzensulfonyl)-3-amino 1,3-diphenylprop-1-yne (3ca). Prepared starting from imine 1c (0.144 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate/pentane 1:4) afforded pure 3ca. Yield 0.160 g (0.41 mmol, 82%); yellow oil that solidified upon standing. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 2.11 (s, 3H), 2.60 (s, 6H), 4.94 (d, $J = 8.5$ Hz, 1H), 5.43 (d, $J = 8.8$ Hz, 1H), 6.80 (s, 2H), 7.02-7.07 (m, 2H), 7.14-7.31 (m, 8H), 7.45-7.51 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 21.0, 23.2, 49.5, 84.9, 86.4, 122.0, 127.3, 128.1, 128.49, 128.53, 128.7, 131.6, 131.9, 134.4, 137.3, 139.0, 142.2.

N-(p-nitrobenzensulfonyl)-3-amino 1,3-diphenylprop-1-yne (3da). Prepared starting from imine 1d (0.145 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate/pentane 1:4) afforded pure 3da. Yield 0.175 g (0.45 mmol, 91%); white solid; mp 167-168 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 5.20 (d, $J = 8.7$ Hz, 1H), 5.64 (d, $J = 8.7$ Hz, 1H), 7.04-7.13 (m, 2H), 7.19-7.41 (m, 6H), 7.49-7.57 (m, 2H), 8.02-8.09 (m, 2H), 8.16-8.23 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 50.2, 84.8, 87.6, 121.3, 124.1, 127.4, 128.4, 128.8, 128.9, 129.2, 131.3, 136.5, 146.2, 149.9. IR (KBr): 3269, 1693, 1605, 1528, 1343, 1310, 1162, 1040 cm$^{-1}$. MS (EI, 70 eV): $m/z = 391 [M-1]^+$, 222, 206 [M-Ts]$^+$, 191, 128, 105, 77. Anal. Calcd. for C$_{21}$H$_{16}$N$_2$O$_4$S: C, 64.27; H, 4.11; N, 6.95.

N-(diphenylphosphoryl)-3-amino 1,3-diphenylprop-1-yne (3ea). Prepared starting from imine 1e (0.122 g, 0.4 mmol) and phenylacetylene (2a, 0.061 g, 0.6 mmol). Purification by flash column chromatography (ethyl acetate/pentane 1:1) afforded pure 3ea. Yield 0.113 g (0.27 mmol, 69%); white solid; mp 160-161 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 3.56 (t, $J = 9.2$ Hz, 1H), 5.40 (t, $J = 9.9$ Hz, 1H), 7.27-7.59 (m, 14H), 7.66-7.74 (m, 2H), 7.81-7.91 (m, 2H), 8.05-8.13 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 47.2, 85.5, 88.8, 122.6, 127.2, 127.9, 128.1, 128.3, 128.5, 128.6, 131.6, 131.7, 131.8, 131.9, 132.6, 132.7, 133.1, 140.2, 140.2. IR (KBr): 3162, 1693, 1605, 1528, 1343, 1310, 1162, 1040 cm$^{-1}$. MS (EI, 70

N-(2-methoxyphenyl)-3-amino 1,3-diphenylprop-1-yne (3ha).
Prepared starting from imine 1h (0.106 g, 0.5 mmol) and phenylacetylene (2a, 0.128 g, 1.25 mmol). Purification by flash column chromatography (diethyl ether / PE 1:20) afforded pure 3ha. Yield 0.119 g (0.38 mmol, 76%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 400 MHz) \( \delta \) 3.83 (s, 3H), 4.78 (s, 1H), 5.50 (s, 1H), 6.71-6.91 (m, 4H), 7.23-7.44 (m, 8H), 7.64-7.70 (m, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 100 MHz) \( \delta \) 50.4, 55.5, 84.9, 88.7, 109.6, 111.7, 117.7, 121.1, 122.9, 127.4, 128.0, 128.16, 128.20, 128.7, 131.8, 136.4, 139.9, 147.1. IR (neat): 3418, 3062, 2934, 2834, 1600, 1510, 1243, 1223 cm\(^{-1}\). MS (EI, 70 eV): \( m/z = 313 [M]^+ \), 282 [M-CH₃O]+, 236, 225, 191 [M-C₇H₈NO]+. Anal. Calcd. for C₂₂H₁₉NO: C, 84.31; H, 6.11; N, 4.47. Found: C, 84.43; H, 6.22; N, 4.20.

N-(\(p\)-toluensulfonyl)-1-amino-1-phenylnon-2-yne (3ab)
Prepared starting from imine 1a (0.130 g, 0.5 mmol) and 1-octyne (2b, 0.083 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:3) afforded pure 3ab. Yield 0.125 g (0.35 mmol, 69%); white solid; mp 82-83 °C. \(^1\)H-NMR (CDCl\(_3\), 400 MHz) \( \delta \) 0.81 (t, \( J = 7.0 \) Hz, 3H), 1.11-1.28 (m, 8H), 1.89 (dt, \( J = 6.9 \) Hz, \( J = 2.0 \) Hz, 2H), 2.35 (s, 3H), 4.73 (dd, \( J = 8.8 \) Hz, \( J = 2.0 \) Hz, 1H), 5.23 (d, \( J = 8.8 \) Hz, 1H), 7.17-7.27 (m, 5H); 7.37-7.43 (m, 2H), 7.67-7.73 (m, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 100 MHz) \( \delta \) 14.1, 18.6, 21.6, 22.6, 28.3, 28.6, 31.3, 49.5, 76.6, 87.6, 127.2, 127.4, 128.1, 128.4, 129.3, 137.5, 138.0, 143.1. IR (KBr): 3288, 2928, 2857, 2227, 1597, 1330, 1157, 1031 cm\(^{-1}\). MS (EI, 70 eV): \( m/z = 299, 214 [M-Ts]^+ \), 155, 143, 91, 77. Anal. Calcd. for C₂₂H₂₇NO₂S: C, 71.51; H, 7.36; N, 3.79. Found: C, 71.65; H, 7.70; N, 3.66.

N-(\(p\)-toluensulfonyl)-3-amino-3-phenyl-1-trimethylsilylprop-1-yne (3ac). Prepared starting from imine 1a (0.130 g, 0.5 mmol) and trimethylsilylethyne (2c, 0.075 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:5) afforded pure 3ac. Yield 0.091 g (0.26 mmol, 51%); white solid; mp 139-140 °C. \(^1\)H-NMR (CDCl\(_3\), 400 MHz) \( \delta \) 0.04 (s, 9H), 2.43 (s, 3H), 4.81 (d, \( J = 8.5 \) Hz, 1H), 5.34 (d, \( J = 9.2 \) Hz, 1H), 7.25-7.36 (m, 5H), 7.46-7.52 (m, 2H), 7.76-7.82 (m, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 100 MHz) \( \delta \) –0.3, 21.6, 49.7, 91.6, 101.4, 127.2, 127.4, 128.3, 128.5, 129.5, 137.2, 137.3, 143.3. IR (KBr): 3256, 2175, 1952, 1911, 1425, 1328, 1249, 1162, 1056 cm\(^{-1}\). MS (EI, 70 eV): \( m/z = 356 [M-1]^+ \), 260, 234, 218, 202 [M-Ts]^+, 159, 91. Anal. Calcd. for C₁₉H₂₃NO₂SSi: C, 63.83; H, 6.48; N, 3.92. Found: C, 63.75; H, 6.35; N, 3.78.
N-\((p\text{-toluensulfonyl})\)-3-amino-3-phenyl-1-(4-trifluoromethyl)phenylprop-1-yne (3ad). Prepared starting from imine 1a (0.130 g, 0.5 mmol) and 4-(trifluoromethyl)phenylacetylene (2d, 0.128 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:4) afforded pure 3ad. Yield 0.183 g (0.43 mmol, 86%); white solid; mp 140-141 °C. $^1$H-NMR (CDCl$_3$, 300 MHz) $\delta$ 2.24 (s, 3H), 4.96 (d, $J$ = 8.9 Hz, 1H), 5.50 (d, $J$ = 9.1 Hz, 1H), 7.12-7.34 (m, 7H), 7.40-7.49 (m, 4H), 7.70-7.77 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 75 MHz) $\delta$ 21.4, 49.7, 85.2, 88.1, 125.0, 125.1, 125.8, 127.3, 127.5, 127.6, 128.7, 128.8, 129.6, 131.8, 136.9, 137.4, 143.6. IR (KBr): 3278, 1924, 1807, 1736, 1606, 1328, 1163 cm$^{-1}$. MS (EI, 70 eV): $m/z = 410$ [M-F]$^+$, 274 [M-Ts]$^+$, 259, 173, 91, 77. Anal. Calcd. for C$_{23}$H$_{18}$NO$_2$SF$_3$: C, 64.33; H, 4.22; N, 3.26. Found: C, 63.99; H, 4.69; N, 3.25. HRMS (EI): $m/z$ calcd. For C$_{23}$H$_{18}$NO$_2$SF$_3$:SO$_2$H: 364.1313. Found: 364.1313.

N-\((p\text{-nitrobenzensulfonyl})\)-1-amino-1-phenylnon-2-yne (3db). Prepared starting from imine 1d (0.145 g, 0.5 mmol) and 1-octyne (2b, 0.083 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate/PE 1:4), followed by recrystallization from MTBE afforded pure 3db. Yield 0.159 g (0.39 mmol, 79%); yellow solid; mp 103-104 °C. $^1$H-NMR (CDCl$_3$, 300 MHz) $\delta$ 0.87 (t, $J$ = 6.9 Hz, 3H), 1.14-1.36 (m, 8H), 1.96 (dt, $J$ = 6.9 Hz, $J$ = 2.1 Hz, 2H), 5.04 (d, $J$ = 7.8 Hz, 1H), 5.39 (d, $J$ = 8.2 Hz, 1H), 7.27-7.36 (m, 3H), 7.39-7.48 (m, 2H), 7.97-8.07 (m, 2H), 8.25-8.34 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 75 MHz) $\delta$ 14.0, 18.5, 22.5, 28.2, 28.3, 28.5, 31.2, 49.9, 76.1, 88.3, 123.9, 127.3, 128.6; 128.7, 128.7, 137.3, 146.4, 149.9. IR (KBr): 3268, 2927, 2230, 1602, 1525, 1345, 1309, 1166, 1044 cm$^{-1}$. MS (EI, 70 eV): $m/z = 330$, 291 [M-C$_8$H$_{15}$]$^+$, 214 [M-Ns]$^+$, 143, 91, 77. Anal. Calcd. for C$_{21}$H$_{24}$N$_2$SO$_4$: C, 62.98; H, 6.04; N, 6.99. Found: C, 63.38; H, 6.06; N, 6.94.

N-\((p\text{-toluensulfonyl})\)-3-amino-3-(4-methylphenyl)-1-phenylprop-1-yne (3ia). Prepared starting from imine 1i (0.109 g, 0.4 mmol) and phenylacetylene (2a, 0.061 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate/PE 1:4) afforded pure 3ia. Yield 0.116 g (0.31 mmol, 77%); white solid; mp 190-191 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 2.32 (s, 3H), 2.34 (s, 3H), 4.89 (d, $J$ = 9.1 Hz, 1H), 5.52 (d, $J$ = 9.1 Hz, 1H), 7.07-7.17 (m, 4H), 7.19-7.33 (m, 5H), 7.38-7.46 (m, 2H), 7.77-7.85 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 21.2, 21.5, 49.6, 85.7, 86.5, 122.0, 127.1, 127.4, 128.0, 128.4, 129.3, 129.4, 131.4, 134.4, 137.3, 138.2, 143.4. IR (KBr): 3269, 2221, 1430, 1329, 1155, 1047 cm$^{-1}$. MS (EI, 70 eV): $m/z = 310$, 236, 220 [M-Ts]$^+$, 205, 128,105, 91, 77. HRMS (EI): $m/z$ calcd. For C$_{23}$H$_{21}$NO$_2$S-SO$_2$H: 310.1596. Found: 310.1595.
N-(p-toluensulfonyl)-1-amino-1-(4-methylphenyl)non-2-yne (3ib). Prepared starting from imine 1i (0.109 g, 0.4 mmol) and 1-octyne (2, 0.066 g, 0.6 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:3) afforded pure 3ib. Yield 0.092 g (0.24 mmol, 60%); white solid; mp 107-108 °C. 1H-NMR (CDCl3, 300 MHz) δ 0.88 (t, J = 6.9 Hz, 3H), 1.16-1.36 (m, 8H), 1.95 (dt, J = 6.9 Hz, J = 2.1 Hz, 2H), 2.32 (s, 3H), 2.43 (s, 3H), 4.72 (d, J = 8.7 Hz, 1H), 5.26 (d, J = 8.7 Hz, 1H), 7.06-7.16 (m, 2H), 7.24-7.37 (m, 4H), 7.73-7.81 (m, 2H). 13C-NMR (CDCl3, 75 MHz) δ 14.0, 18.5, 21.1, 21.5, 22.5, 28.3, 28.5; 31.3, 49.2, 76.8, 87.3, 127.2, 127.5, 129.2, 129.3, 135.2, 137.6, 138.0, 143.2. IR (KBr): 3271, 2930, 2224, 1916, 1334, 1160, 1028 cm⁻¹. MS (EI, 70 eV): m/z = 313, 274 [M-C8H15]+, 228 [M-Ts]+, 157, 105, 91, 77. Anal. Calcd. for C23H29NO2S: C, 72.03; H, 7.62; N, 3.65. Found: C, 71.64; H, 7.76; N, 3.73.

N-(p-toluensulfonyl)-3-amino-3-(4-methoxyphenyl)-1-phenylprop-1-yne (3ja). Prepared starting from imine 1j (0.145 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:3) afforded pure 3ja. Yield 0.171 g (0.44 mmol, 87%); white solid; mp 186-187 °C. 1H-NMR (CDCl3, 400 MHz) δ 2.32 (s, 3H), 3.80 (s, 3H), 4.90 (d, J = 8.9 Hz, 1H), 5.51 (d, J = 9.0 Hz, 1H), 6.84-6.90 (m, 2H), 7.08-7.15 (m, 2H), 7.20-7.33 (m, 5H), 7.43-7.50 (m, 2H), 7.78-7.84 (m, 2H). 13C-NMR (CDCl3, 100 MHz) δ 21.5, 49.3, 55.4, 85.7, 86.5, 114.0, 121.9, 127.4, 128.0, 128.4, 128.5, 129.4, 131.4, 137.3, 143.4, 159.5. IR (KBr): 3263, 2221, 1509, 1329, 1250, 1157, 1034 cm⁻¹. MS (EI, 70 eV): m/z = 391 [M]+, 326, 236 [M-Ts]+, 235, 221, 178, 91, 77. Anal. Calcd. for C23H21NO3S: C, 70.56; H, 5.41; N, 3.58. Found: C, 71.42; H, 5.36; N, 3.57.

N-(p-toluensulfonyl)-3-amino-3-(2-naphtyl)-1-phenylprop-1-yne (3ka). Prepared starting from imine 1k (0.143 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by recrystallization from ethyl acetate afforded pure 3ka. Yield 0.166 g (0.43 mmol, 85%); white solid; mp 206-207 °C. 1H-NMR (CD2Cl2, 400 MHz) δ 2.21 (s, 3H), 5.06 (d, J = 9.2 Hz, 1H), 5.60 (d, J = 9.2 Hz, 1H), 7.07-7.30 (m, 7H), 7.39-7.47 (m, 2H), 7.51-7.57 (m, 1H), 7.68-7.81 (m, 5H), 7.90 (s, 1H). 13C-NMR (CD2Cl2, 100 MHz) δ 21.2, 50.0, 85.4, 86.7, 125.0, 126.0, 126.1, 126.4, 126.5, 127.4, 127.5, 128.0, 128.1, 128.6, 129.5, 131.5, 133.0, 133.1, 134.8, 137.2, 143.8. IR (KBr): 3259, 2221, 1509, 1329, 1250, 1157, 1034 cm⁻¹. MS (EI, 70 eV): m/z = 411 [M]+, 346, 272, 256 [M-Ts]+, 235, 221, 178, 91, 77. Anal. Calcd. for C26H21NO3S: C, 75.89; H, 5.14; N, 3.40. Found: C, 75.95; H, 5.10; N, 3.36.

N-(p-toluensulfonyl)-3-amino-3-(2-bromophenyl)-1-phenylprop-1-yne (3la). Prepared starting from imine 1l (0.169 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:3) afforded pure 3la. Yield 0.159 g (0.44 mmol, 88%); white solid; mp 206-207 °C. 1H-NMR (CD2Cl2, 400 MHz) δ 2.21 (s, 3H), 5.06 (d, J = 9.2 Hz, 1H), 5.60 (d, J = 9.2 Hz, 1H), 7.07-7.30 (m, 7H), 7.39-7.47 (m, 2H), 7.51-7.57 (m, 1H), 7.68-7.81 (m, 5H), 7.90 (s, 1H). 13C-NMR (CD2Cl2, 100 MHz) δ 21.2, 50.0, 85.4, 86.7, 125.0, 126.0, 126.1, 126.4, 126.5, 127.4, 127.5, 128.0, 128.1, 128.6, 129.5, 131.5, 133.0, 133.1, 134.8, 137.2, 143.8. IR (KBr): 3259, 2220, 1427, 1329, 1156, 1039 cm⁻¹. MS (EI, 70 eV): m/z = 411 [M]+, 346, 272, 256 [M-Ts]+, 241, 228, 155, 128, 91, 77. Anal. Calcd. for C26H21NO3S: C, 75.89; H, 5.14; N, 3.40. Found: C, 75.95; H, 5.10; N, 3.36.
column chromatography (ethyl acetate / PE 1:4) afforded pure 3la. Yield 0.205 g (0.47 mmol, 93%); white solid; mp 169-170 °C. $^1$H-NMR (CDCl$_3$, 300 MHz) $\delta$ 2.24 (s, 3H), 5.10 (d, $J$ = 8.3 Hz, 1H), 5.75 (d, $J$ = 8.3 Hz, 1H), 7.04-7.26 (m, 9H), 7.43-7.52 (m, 2H), 7.67-7.74 (m, 2H). $^{13}$C-NMR (CD$_2$Cl$_2$, 75 MHz) $\delta$ 21.4, 50.1, 85.0, 86.5, 121.9, 123.0, 127.5, 127.8, 128.1, 128.6, 129.4, 129.6, 130.0, 131.6, 133.5, 136.7, 137.2, 143.5. IR (KBr): 3268, 1923, 1594, 1329, 1156, 1054 cm$^{-1}$. MS (EI, 70 eV): $m/z$ = 441 [M$^+$], 439, 378, 376, 302, 300, 286 [M-Ts$^+$], 284, 204, 105, 91, 77. Anal. Calcd. for C$_{22}$H$_{18}$NO$_2$BrS: C, 60.01; H, 4.12; N, 3.18. Found: C, 60.05; H, 4.48; N, 3.05.

N-($p$-toluensulfonyl)-3-amino-3-(2-furyl)-1-phenylprop-1-yne (3ma). Prepared starting from imine 1m (0.125 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 2:7) afforded pure 3ma. Yield 0.140 g (0.40 mmol, 80%); pale brown solid; mp 151-152 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 2.25 (s, 3H), 4.98 (d, $J$ = 9.0 Hz, 1H), 5.53 (d, $J$ = 9.0 Hz, 1H), 6.22 (dd, $J$ = 3.3 Hz, $J$ = 1.9 Hz, 1H), 6.31 (d, $J$ = 3.3 Hz, 1H), 7.05-7.29 (m, 8H), 7.69-7.76 (m, 2H). $^{13}$C-NMR (CD$_2$Cl$_2$, 100 MHz) $\delta$ 21.5, 44.2, 83.4, 85.3, 108.3, 110.4, 121.6, 127.3, 128.0, 128.6, 129.4, 131.5, 137.2, 143.1, 143.5, 149.4. IR (KBr): 3263, 2225, 1433, 1333, 1157, 1039 cm$^{-1}$. MS (EI, 70 eV): $m/z$ = 303, 250 [M-C$_8$H$_5$]+, 196 [M-Ts$^+$], 181 [M-C$_7$H$_8$NO$_2$S$^+$], 168, 152, 105, 91, 77. Anal. Calcd. for C$_{20}$H$_{17}$NO$_3$: C, 68.35; H, 4.88; N, 3.89. Found: C, 68.00; H, 5.20; N, 3.89.

N-($p$-toluensulfonyl)-3-amino-3-(2-furyl)-1-(4-trifluoromethylphenyl) prop-1-yne (3md). Prepared starting from imine 1m (0.125 g, 0.5 mmol) and 4-(trifluoromethyl)phenylacetylene (2d, 0.128 g, 0.75 mmol). Purification by recrystallization from MTBE afforded pure 3md. Yield 0.199 g (0.47 mmol, 95%); white solid; mp 117-118 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 2.25 (s, 3H), 5.06 (d, $J$ = 8.9 Hz, 1H), 5.55 (d, $J$ = 8.9 Hz, 1H), 6.22 (dd, $J$ = 3.3 Hz, $J$ = 1.9 Hz, 1H), 6.31 (d, $J$ = 3.3 Hz, 1H), 7.12-7.31 (m, 5H), 7.41-7.48 (m, 2H), 7.69-7.76 (m, 2H). $^{13}$C-NMR (CD$_2$Cl$_2$, 100 MHz) $\delta$ 21.5, 44.0, 83.9, 86.0, 108.5, 110.5, 125.0, 125.4, 127.4, 129.5, 131.8, 137.2, 143.2, 143.6, 148.8. IR (KBr): 3263, 2923, 1926, 1616, 1329, 1162, 1132 cm$^{-1}$. MS (EI, 70 eV): $m/z$ = 400, 354, 280, 264 [M-Ts$^+$], 249, 139, 91, 77. Anal. Calcd. for C$_{21}$H$_{16}$NO$_3$: C, 60.14; H, 3.85; N, 3.34. Found: C, 60.03; H, 4.15; N, 3.32.

N-($p$-toluensulfonyl)-3-amino-3-cyclohexyl-1-phenylprop-1-yne (3na). Prepared starting from imine 1n (0.133 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by recrystallization from EtOAc afforded pure 3na. Yield 0.155 g (0.42 mmol, 84%); white solid; mp 202-203 °C. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 0.95-1.23 (m, 5H), 1.66-1.87 (m, 6H), 2.25 (s, 3H), 4.04 (dd, $J$ = 9.9 Hz, $J$ = 6.0 Hz, 1H), 4.59 (d, $J$ = 9.9 Hz, 1H), 6.93-7.00 (m, 2H), 7.11-7.22 (m, 5H), 7.70-7.76 (m, 2H). $^{13}$C-NMR
N-(p-toluensulfonyl)-3-amino-5-methyl-1-phenylhex-1-yne (3oa). Prepared starting from imine 1o (0.120 g, 0.5 mmol) and phenylacetylene (2a, 0.077 g, 0.75 mmol). Purification by flash column chromatography (ethyl acetate / PE 1:7) afforded pure 3na. Yield 0.025 g (0.08 mmol, 15%); white solid.

3. Three-component synthesis of propargylic imines 3

3.1. Typical procedure for the three-component synthesis of propargylic imines 3

METHOD A. In an oven-dried Schlenk flask under an inert atmosphere of argon were placed the appropriate aldehyde 7 (0.2 mmol) and 2-methoxyaniline (6, 0.2 mmol, 1.0 equiv), followed by anhydrous toluene (2.0 mL). After 30 min stirring, a 2.0 M solution of dimethylzinc in toluene (0.35 mL, 0.7 mmol, 3.5 equiv) was added. The reaction mixture was then stirred for another 30 min, before adding phenylacetylene (2a, 0.5 mmol, 2.5 equiv). The resulting solution was stirred at room temperature for 48-60 h. The reaction mixture was diluted with diethyl ether (5 mL), and quenched with water (10 mL). The resulting heterogeneous mixture was filtered over Celite®. The aqueous phase was separated and washed with diethylether (2x5 mL). The combined organic layers were dried over Na2SO4 and evaporated under reduced pressure to give the crude product, which was then purified by flash column chromatography (see Supporting Information for details).

METHOD B (concentrated conditions). In an oven-dried Schlenk flask under an inert atmosphere of argon were placed the appropriate aldehyde 7 (0.4 mmol) and 2-methoxyaniline (6, 0.4 mmol, 1.0 equiv). A 2.0 M solution of dimethylzinc in toluene (0.7 mL, 1.4 mmol, 3.5 equiv) was immediately added. The reaction mixture was then stirred for 15 min, before the addition of phenylacetylene (1a, 1.0 mmol, 2.5 equiv). The resulting solution was stirred at room temperature for 48-96 h. Subsequently, the protocol followed the procedure reported above for Method A.
3.2. Optimization of the reaction conditions (Method A)

\[
\begin{align*}
7b & \quad \text{MeO} \quad 6 \quad \text{Ph} \equiv \text{H} \\
& \quad \text{ZnMe}_2 \\
& \quad \text{MeO} \quad \text{Cl} \quad \text{H} \quad \text{Ph} \\
& \quad \text{solvent} \\
& \quad \text{3pa}
\end{align*}
\]

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3.3. Analytical data of compounds 3pa-3Ba.

N-(2-methoxyphenyl)-3-amino-3-(4-chlorophenyl)-1-phenylprop-1-yne (3pa). Prepared starting from aldehyde 7b (0.030 g, 0.2 mmol) and phenylacetylene (2a, 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (CH$_2$Cl$_2$ / cyclohexane 2:3) afforded pure 3pa. Yield 0.053 g (0.15 mmol, 76%); yellow oil. $^1$H-NMR (CDCl$_3$, 400 MHz) $\delta$ 3.83 (s, 3H), 4.81 (brs, 1H), 5.43 (s, 1H), 6.78-6.85 (m, 4H), 7.26-7.33 (m, 3H), 7.36 (d, $J = 8.1$ Hz, 2H), 7.42-7.45 (m, 2H), 7.62 (d, $J = 8.1$ Hz, 2H). $^{13}$C-NMR (CDCl$_3$, 100 MHz) $\delta$ 49.8, 55.4, 85.1, 88.1, 109.5, 111.6, 117.9, 121.0, 122.6, 128.2, 128.4, 128.6, 128.8, 131.7, 133.7, 136.1, 138.5, 147.1. IR (neat): 3409, 3058, 2945, 2939, 1606, 1507, 1480, 1023 cm$^{-1}$. Anal. Calcd. for C$_{22}$H$_{18}$ClNO: C, 75.97; H, 5.22; N, 4.03. Found: C, 75.80; H, 5.29; N, 4.02.

N-(2-methoxyphenyl)-3-amino-3-(3-bromophenyl)-1-phenylprop-1-yne (3qa). Prepared starting from aldehyde 7c (0.037 g, 0.2 mmol) and phenylacetylene (2a, 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (diethyl ether / cyclohexane 1:9) afforded pure
N-(2-methoxyphenyl)-3-amino-3-(4-bromophenyl)-1-phenylprop-1-yne (3ra). Prepared starting from aldehyde 7d (0.037 g, 0.2 mmol) and phenylacetylene (2a, 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (CH2Cl2 / cyclohexane 2:3) afforded pure 3ra. Yield 0.057 g (0.15 mmol, 73%); yellow oil. 1H-NMR (CDCl3, 400 MHz) δ 3.84 (s, 3H); 4.92 (brs, 1H); 5.62 (s, 1H); 6.73-6.77 (m, 1H); 6.82 (d, J = 7.2 Hz, 1H); 6.90-6.92 (m, 2H); 7.28-7.31 (m, 3H), 7.59-7.62 (m, 2H); 7.45 (d, J = 8.7 Hz, 2H). 13C-NMR (CDCl3, 100 MHz) δ 50.6, 55.4, 85.1, 88.7, 109.6, 111.7, 117.8, 121.1, 122.9, 125.4, 126.1, 126.2, 126.3, 127.7, 128.1, 128.2, 128.2, 128.6, 131.8, 133.1, 133.4, 136.5, 137.3, 147.2. IR (neat): 3423, 3058, 2919, 2833, 1594, 1178, 1211, 1229, 1254, 1261, 1262, 1263, 1277, 1281, 1282, 1282, 1286, 1318, 1331, 1334, 1365, 1373, 1472. Anal. Calcd. for C26H21NO: C, 85.92; H, 5.82; N, 3.85. Found: C, 86.03; H, 5.85; N, 3.81.
δ 50.0, 55.4, 84.9, 88.6, 105.5, 109.5, 111.6, 121.1, 127.1, 127.5, 127.8, 128.1, 128.18, 128.24, 128.8, 131.8, 134.6, 138.9, 140.9, 147.2. IR (neat): 3423, 3051, 2925, 2826, 1593, 1500, 1235, 1020 cm\(^{-1}\). Anal. Calcd. for C\(_{28}\)H\(_{23}\)NO: C, 86.34; H, 5.95; N, 3.60. Found: C, 86.40; H, 5.98; N, 3.56.

**N-(2-methoxyphenyl)-3-amino-3-(3-nitrophenyl)-1-phenylprop-1-yne (3ua).** Prepared starting from aldehyde 7\(g\) (0.030 g, 0.2 mmol) and phenylacetylene (2\(a\), 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (CH\(_2\)Cl\(_2\) / cyclohexane 3:7) afforded pure 3\(ua\). Yield 0.047 g (0.13 mmol, 66%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 300 MHz) δ 3.85 (s, 3H); 5.10 (brs, 1H), 5.60 (s, 1H), 6.67-6.86 (m, 4H), 7.26-7.33 (m, 3H), 7.42-7.45 (m, 2H), 7.57 (t, \(J = 8.1\) Hz, 1H), 8.01 (d, \(J = 7.8\) Hz, 1H), 8.20 (dd, \(J = 8.1\) Hz, \(J = 0.9\) Hz, 1H), 8.48 (s, 1H). \(^{13}\)C-NMR (CDCl\(_3\), 75 MHz) δ 49.9, 55.4, 85.9, 87.2, 109.8, 111.7, 118.5, 121.0, 122.3, 123.0, 128.3, 128.6, 129.6, 131.8, 133.3, 135.7, 142.4, 147.3, 146.6. IR (neat): 3423, 3051, 2925, 2826, 1593, 1500, 1235, 1020 cm\(^{-1}\). Anal. Calcd. for C\(_{22}\)H\(_{18}\)N\(_2\)O\(_3\): C, 73.73; H, 5.06; N, 7.82. Found: C, 73.80; H, 5.13; N, 7.75.

**N-(2-methoxyphenyl)-3-amino-3-(4-trifluoromethylphenyl)-1-phenylprop-1-yne (3va).** Prepared starting from aldehyde 7\(h\) (0.035 g, 0.2 mmol) and phenylacetylene (2\(a\), 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (diethyl ether / cyclohexane 1:9) afforded pure 3\(va\). Yield 0.060 g (0.16 mmol, 79%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 300 MHz) δ 3.84 (s, 3H), 5.58 (s, 1H), 6.68-6.85 (m, 4H); 7.27-7.35 (m, 3H), 7.38-7.44 (m, 2H), 7.65 (d, \(J = 8.4\) Hz, 2H), 7.79 (d, \(J = 8.4\) Hz, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 75 MHz) δ 50.0, 55.4, 85.4, 87.7, 109.7, 111.7, 118.2, 120.1, 121.1, 122.5, 125.67, 125.72, 127.6, 128.3, 128.5, 131.8, 136.0, 144.0, 147.2. IR (neat): 3390, 3270, 2919, 2853, 1475, 1380, cm\(^{-1}\). Anal. Calcd. for C\(_{23}\)H\(_{18}\)F\(_3\)NO: C, 72.43; H, 4.76; N, 3.67. Found: C, 72.48; H, 4.79; N, 3.62.

**4-[1-(2-Methoxy-3-phenylamino)-3-phenylpropyn-2-yl]-benzoic acid methyl ester (3wa).** Prepared starting from aldehyde 7\(i\) (0.033 g, 0.2 mmol) and phenylacetylene (2\(a\), 0.050 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (diethyl ether / cyclohexane 1:4) afforded pure 3\(wa\). Yield 0.048 g (0.13 mmol, 65%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 300 MHz) δ 3.81 (s, 3H), 3.88 (s, 3H), 5.50 (s, 1H), 6.69-6.84 (m, 4H), 7.22-7.28 (m, 3H), 7.36-7.40 (m, 2H), 7.70 (d, \(J = 8.4\) Hz, 2H), 8.04 (d, \(J = 8.4\) Hz, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 75 MHz) δ 50.1, 52.1, 55.4, 85.3, 87.9, 109.6, 111.7, 118.0, 121.0, 122.5, 127.2, 128.2, 128.4, 129.8, 130.0, 131.7, 136.0, 145.0, 147.2, 166.7. IR (neat): 3390, 3270,
2919, 2853, 1475, 1380 cm\(^{-1}\). Anal. Calcd. for C\(_{24}\)H\(_{21}\)NO\(_3\): C, 77.71%; H, 5.70; N, 3.77. Found: C, 77.76; H, 5.78; N, 3.71.

**N-(2-methoxyphenyl)-3-amino-3-(pentafluorophenyl)-1-phenylprop-1-yn e (3xa).** Prepared starting from aldehyde 7\(j\) (0.055 g, 0.2 mmol) and phenylacetylene (2\(a\), 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (CH\(_2\)Cl\(_2\) / cyclohexane 35:65) afforded pure 3\(xa\). Yield 0.051 g (0.13 mmol, 63%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 400 MHz) \(\delta\) 3.84 (s, 3H), 5.95 (s, 1H), 6.72-6.82 (m, 3H), 6.87 (dt, \(J = 7.6\) Hz, \(J = 1.6\) Hz, 1H), 7.27-7.34 (m, 3H), 7.43-7.46 (m, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 100 MHz) \(\delta\) 40.4, 55.6, 84.4, 85.1, 110.2, 111.2, 114.5 (t, \(J = 56\) Hz), 119.0, 121.2, 122.0, 128.3, 128.8, 131.9, 134.8, 136.5 (dt, \(J = 73\) Hz, \(J = 24\) Hz), 139.9 (dt, \(J = 66\) Hz, \(J = 20\) Hz), 139.0 (m), 143.7 (m), 146.1 (m), 147.7. IR (neat): 3390, 3270, 2919, 2853, 1475, 1380 cm\(^{-1}\). Anal. Calcd. for C\(_{22}\)H\(_{14}\)F\(_5\)NO: C, 65.51; H, 3.50; N, 3.47. Found: C, 65.48; H, 3.41; N, 3.49.

**N-(2-methoxyphenyl)-3-amino-1-phenyl-3-(3-pyridyl)-prop-1-yn e (3ya).** Prepared starting from aldehyde 7\(k\) (0.021 g, 0.2 mmol) and phenylacetylene (2\(a\), 0.051 g, 0.5 mmol) according to Method A. Purification by flash column chromatography (ethyl acetate / cyclohexane 55:45) afforded pure 3\(ya\). Yield 0.041 g (0.13 mmol, 65%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 300 MHz) \(\delta\) 3.84 (s, 3H), 5.60 (s, 1H), 6.78-6.93 (m, 4H), 7.30-7.34 (m, 3H), 7.42-7.46 (m, 3H), 8.09 (d, \(J = 7.5\) Hz, 1H), 8.64 (d, \(J = 5.1\) Hz, 1H), 8.97 (s, 1H). \(^{13}\)C-NMR (CDCl\(_3\), 75 MHz) \(\delta\) 48.2, 55.4, 85.6, 87.3, 109.7, 111.8, 118.3, 121.0, 122.4, 123.6, 128.2, 128.5, 131.7, 135.0, 135.7, 135.9, 147.3, 148.9, 149.1. IR (neat): 3390, 3270, 2919, 2853, 1475, 1380 cm\(^{-1}\). Anal. Calcd. for C\(_{21}\)H\(_{18}\)N\(_2\)O: C, 80.23; H, 5.77; N, 8.91. Found: C, 80.20; H, 5.79; N, 8.93.

**N-(2-methoxyphenyl)-3-amino-3-cyclohexyl-1-phenylprop-1-yn e (3za).** Prepared starting from aldehyde 7\(l\) (0.044 g, 0.4 mmol) and phenylacetylene (2\(a\), 0.102 g, 1.0 mmol) according to Method B. Purification by flash column chromatography (CH\(_2\)Cl\(_2\) / cyclohexane 15:85) afforded pure 3\(za\). Yield 0.109 g (0.34 mmol, 85%); yellow oil. \(^1\)H-NMR (CDCl\(_3\), 300 MHz) \(\delta\) 1.35-1.47 (m, 6H), 1.74-2.08 (m,5H), 3.90 (s, 3H), 4.22 (d, \(J = 5.7\) Hz, 1H), 4.40 (brs, 1H), 6.62-6.97 (m, 4H), 7.29-7.32 (m, 3H), 7.39-7.44 (m, 2H). \(^{13}\)C-NMR (CDCl\(_3\), 75 MHz) \(\delta\) 26.0, 26.1, 26.4, 42.3, 51.3, 55.3, 83.6, 89.1, 109.4, 110.1, 116.9, 121.1, 123.2, 127.8, 128.1, 131.6, 136.8, 147.0. Anal. Calcd. for C\(_{22}\)H\(_{25}\)NO: C, 82.72; H, 7.89; N, 4.38. Found: C, 82.70; H, 7.84; N, 4.40.
N-(2-methoxyphenyl)-3-amino-4,4-dimethyl-1-phenylpent-1-yne (3Aa). Prepared starting from aldehyde 7m (0.034 g, 0.4 mmol) and phenylacetylene (2a, 0.102 g, 1.0 mmol) according to Method B. Purification by flash column chromatography (CH$_2$Cl$_2$ / cyclohexane 1:4) afforded pure 3Aa. Yield 0.079 g (0.27 mmol, 67%); yellow oil. $^1$H-NMR (CDCl$_3$, 300 MHz) δ 1.22 (s, 9H), 3.91 (s, 3H), 4.08 (s, 1H), 4.55 (brs, 1H), 6.72-6.78 (m, 1H), 6.83-6.90 (m, 2H), 6.89-6.95 (m, 1H), 7.29-7.38 (m, 3H), 7.38-7.43 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 75 MHz) δ 26.5, 35.7, 55.4, 55.9, 83.3, 89.4, 109.6, 111.0, 116.9, 121.1, 123.3, 127.8, 128.1, 131.6, 137.3, 137.1. Anal. Calcd. for C$_{20}$H$_{23}$NO: C, 81.87; H, 7.90; N, 4.77. Found: C, 81.84; H, 7.88; N, 4.80.

N-(2-methoxyphenyl)-3-amino-1-phenyldec-1-yne (3Ba). Prepared starting from aldehyde 7n (0.052 g, 0.4 mmol) and phenylacetylene (2a, 0.102 g, 1.0 mmol) according to Method B. Purification by flash column chromatography (CH$_2$Cl$_2$ / cyclohexane 1:4) afforded pure 3Ba. Yield 0.060 g (0.18 mmol, 45%); yellow oil. $^1$H-NMR (CDCl$_3$, 300 MHz) δ 0.82-1.00 (m, 3H), 1-20-1.42 (m, 9H), 1.60-1.80 (m, 2H), 1.89-2.02 (m, 1H), 3.90 (s, 3H), 4.34 (t, $J = 6.3$ Hz, 1H), 4.46 (brs, 1H), 6.73-6.98 (m, 4H), 7.29-7.31 (m, 3H), 7.39-7.43 (m, 2H). $^{13}$C-NMR (CDCl$_3$, 75 MHz) δ 14.1, 22.6, 26.1, 29.2, 29.2, 31.8, 35.9, 45.9, 55.3, 82.6, 90.3, 109.4, 111.3, 117.2, 121.1, 123.2, 127.9, 128.1, 131.7, 136.6, 147.0. Anal. Calcd. for C$_{23}$H$_{29}$NO: C, 82.34; H, 8.71; N, 4.18. Found: C, 82.31; H, 8.69; N, 4.20.

4. Copies of the NMR spectra of compounds 3aa-3na and 3pa-3Ba
3aa

ppm (t1)
S33

NHS

O

O

3ia

ppm (t1)
The image contains a spectroscopic analysis, likely an NMR spectrum, with chemical shifts marked along the x-axis (ppm) and relative intensities along the y-axis. The spectrum includes peaks at various chemical shifts, with specific values noted at 7.89, 7.76, 7.71, etc. The molecule labeled as 3ka is shown with its structural formula, including aromatic rings and a sulfonyl group. The spectrum indicates the presence of various proton signals, with their corresponding ppm values.
The diagram shows a chemical structure labeled as 3ka. The spectrum is labeled ppm (t1) with values ranging from 125 to 150. The chemical structure includes a benzene ring with a sulfonyl group and a phenyl ring connected by a nitrogen atom. The spectrum displays various peaks at different ppm values.
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![Chemical Structure](image)

The structure is labeled as **3md**.