Synthesis of Functionalized Oxazolones by a Sequence of Cu(II)- and Au(I)-Catalyzed Transformations

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General Informations

Commercially available reagents were used as received without further purification. Dry THF and diethylether were obtained by distillation from Na/benzophenone, dry tolueneand dichloromethane from CaH_2. $CDCl_3$ was distilled from P_2O_5, and stored on 4 Å Linde molecular sieves.

All products were purified by flash column chromatography using silica gel (granulometry 40-63 µm) or neutral alumina (granulometry 50-200 µm).

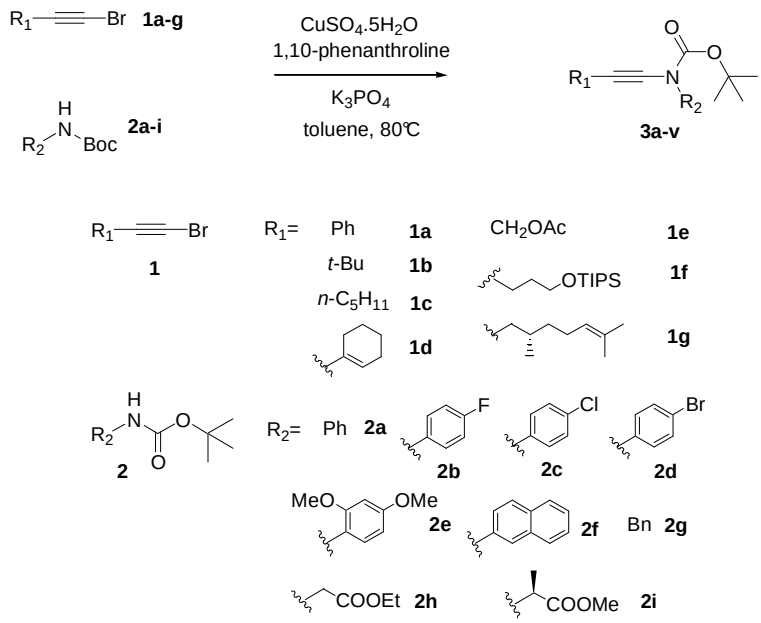
NMR spectra were recorded in $CDCl_3$ (or CD_2Cl_2) with TMS as an internal standard at ambient temperature on machines operating at 400 MHz for 1H, at 100 MHz for 13C and at 121.5 MHz for 31P. Infrared absorption spectra were recorded as a solution in CCl_4 with a Fourier transform spectrophotometer. Melting points were determined by Reichert microscope apparatus and were uncorrected.

R_3P-Au-NTf_2 catalysts were synthesized as previously described.[1]

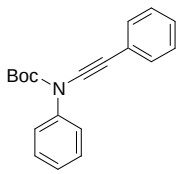
Synthesis of carbamates 3a-v

Substrates **3a-v** were synthesized following a procedure previously reported by Hsung and coworkers. This one was however slightly modified for the special coupling of bromoalkynes **1** with *tert*-butyloxycarbamates **2**.[2]

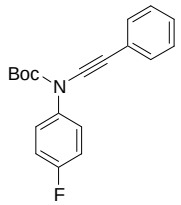
General procedure: to a solution of a bromoalkyne **1** (1 equiv) in dry toluene (0.33M), were sequentially added the carbamate **2** (1.2 equiv), K_3PO_4 (2.4 equiv), $CuSO_4.5H_2O$ (0.2 equiv) and 1,10-phenanthroline (0.4 equiv). The reaction mixture was capped and heated in an oil bath at 80°C for 16 to 72 h while beeing monitored by TLC analysis. Upon completion, the reaction mixture was cooled to room temperature, diluted with ether and filtered through celite, and the filtrate was concentrated in vacuo. The crude products were purified by silica gel flash column chromatography (gradient eluent, ether in petroleum ether) to afford the desired carbamate **3**.



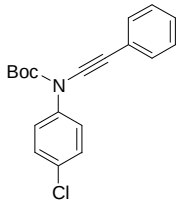
(1) Mezailles, N.; Ricard, L.; Gagosz, F. *Org. Lett.* **2005**, *7*, 4133-4136
(2) (a) Zhang, X.; Zhang, Y.; Huang, J.; Hsung, R. P.; Kurtz, K. C. M.; Oppenheimer, J.; Petersen, M. E.; Sagamanove, I. K.; Shen, L.; Tracey, M. R. *J. Org. Chem.* **2006**, *71*, 4170-4177. (b) Zhang, Y.; Hsung, R. P.; Tracey, M. R.; Kurtz, K. C. M.; Vera, E. L. *Org. Lett.* **2004**, *6*, 1151-1154



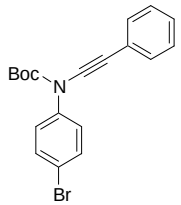
Phenyl-phenylethynyl-carbamic acid *tert*-butyl ester (3a): Yield: 80%. ^{1}H-NMR (400MHz, $CDCl_3$): 7.58 (dd, , J = 1.0Hz, 8.5Hz, 2H), 7.43 (dt, 1H, J = 2.1Hz, 8.5Hz, 4H), 7.36-7.27 (m, 4H), 1.61 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 130.9, 128.9, 128.3, 127.4, 126.7, 124.7, 123.5, 83.7, 83.5, 70.2, 28.1. IR (CCl_4): 3062, 2980, 2932, 2252, 1738, 1594, 1495, 1365, 1286, 1254, 1157, 1009. MS (EI+): m/z 293 (M^+), 234, 220, 193. HRMS (EI+): m/z calcd for $C_{19}H_{19}NO_2$: 293.1416, found: 293.1418.



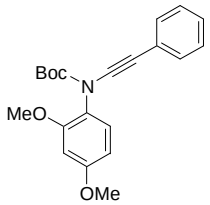
(4-Fluoro-phenyl)-phenylethynyl-carbamic acid *tert*-butyl ester (3b): Yield: 65%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.54 (dd, J = 9.0 Hz, 4.7 Hz, 2H), 7.45-7.42 (m, 2H), 7.37-7.29 (m, 3H), 7.16-7.10 (m, 2H), 1.61 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 161.0 (d, J = 246 Hz), 152, 9, 135.7 (d, J = 3 Hz), 130.9, 128.3, 127.5, 126.6 (d, J = 8 Hz), 123.2, 115.7 (d, J = 23 Hz), 83.7, 83.5, 70.2, 28.0. IR (CCl_4): 3058, 2980, 2932, 2252, 1875, 1736, 1599, 1507, 1453, 1364, 1290, 1238, 1157, 1009. MS (EI+): m/z 311 (M^+), 253, 238. HRMS (EI+): m/z calcd for $C_{19}H_{18}NO_2F$: 311.1322, found: 311.1312.



(4-Chloro-phenyl)-phenylethynyl-carbamic acid *tert*-butyl ester (3c): Yield: 68%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.51 (m, 2H), 7.41 (dd, J = 7.8 Hz, 1.8 Hz, 2H), 7.37 (m, 2H), 7.31 (m, 3H), 1.58 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.7, 138.3, 132.1, 131.0, 128.9, 128.3, 127.6, 125.8, 123.1, 83.9, 83.1, 70.6, 28.0. IR (CCl_4): 3058, 2980, 2933, 2360, 2336, 2252, 1885, 1738, 1594, 1491, 1363, 1258, 1254, 1156, 1095, 1006. MS (EI+): m/z 327 (M^+), 268, 229, 227. HRMS (EI+): m/z calcd for $C_{19}H_{18}ClNO_2$: 327.1026, found: 327.1021.



(4-Bromo-phenyl)-phenylethynyl-carbamic acid *tert*-butyl ester (3d): Yield: 48%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.43 (m, 6H), 7.27 (m, 3H), 1.56 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.6, 138.9, 131.9, 131.0, 128.4 127.7, 126.1, 123.2, 119.9, 84.0, 83.0, 77.5, 77.1, 76.8, 70.7, 28.1. IR (CCl_4): 3059, 2980, 2252, 1886, 1738, 1594, 1487, 1362, 1284, 1255, 1157, 1072, 1005, 905. MS (EI+): m/z 371 (M^+), 314, 312, 273, 271, 234, 194, 193, 192. HRMS (EI+): m/z calcd for $C_{19}H_{18}BrNO_2$: 371.0521, found: 371.0513.



(2,4-Dimethoxy-phenyl)-phenylethynyl-carbamic acid *tert*-butyl ester (3e): Yield: 22%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.42 (bd, J = 6.8 Hz, 2H), 4.35-7.23 (m, 4H), 6.57-6.53 (m, 2H), 3.90 (s, 3H), 3.85 (s, 3H), 1.57 (bs, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 160.6, 155.6, 153.6, 130.9, 128.7, 128.7, 128.1, 127.0, 123.8, 104.4, 99.6, 84.8, 82.7, 68.0, 55.8, 55.5, 28.0. IR (CCl_4): 2976, 2935, 2250, 1734, 1607, 1513, 1462, 1367, 1321, 1295, 1253, 1161, 1130, 1040, 1005. MS (EI+): m/z 353 (M^+), 319, 294, 253, 238. HRMS (EI+): m/z calcd for $C_{21}H_{23}NO_4$: 353.1627, found: 353.1626.

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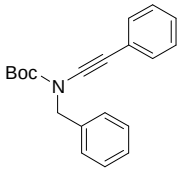
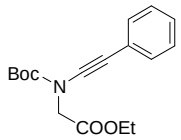
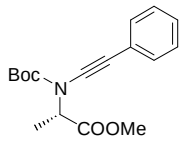


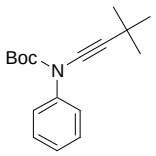
Benzyl-phenylethynyl-carbamic acid *tert*-butyl ester (3f): Yield: 62%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.47-7.24 (m, 10H), 4.72 (s, 2H), 1.58 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.7, 135.3, 129.5, 127.4, 127.2, 127.1, 126.8, 126.0, 122.6, 83.0, 81.5, 69.9, 52.0, 26.9. IR (CCl_4): 2979, 2934, 2242, 1722, 1392, 1365, 1301, 1244, 1159. MS (EI+): m/z 307 (M^+), 251. HRMS (EI+): m/z calcd for $C_{20}H_{21}NO_2$: 307.1572, found: 307.1579.



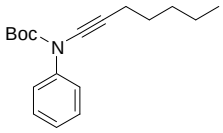
(*tert*-Butoxycarbonyl-phenylethynyl-amino)-acetic acid ethyl ester (3g): Yield: 70%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.-43-7.26 (m, 5H), 4.30 (q, J = 7.2 Hz, 2H), 4.27 (bs, 2H) 1.56 (s, 9H), 1.31 (t, J = 7.2 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 168.0, 153.9, 130.8, 128.2, 127.3, 123.5, 83.6, 83.3, 69.9, 61.6, 51.0, 28.0, 14.2. IR (CCl_4): 2981, 2935, 2247, 1758, 1728, 1449, 1393, 1372, 1321, 1251, 1201, 1159, 1027. MS (EI+): m/z 303 (M^+), 219. HRMS (EI+): m/z calcd for $C_{17}H_{21}NO_4$: 303.1471, found: 303.1473.



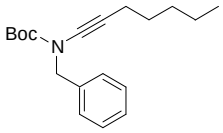
(S)-2-(*tert*-Butoxycarbonyl-phenylethynyl-amino)-propionic acid methyl ester (3h): Yield: 23%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.37 (m, 2H), 7.28 (m, 3H), 4.77 (m, 1H), 3.77 (s, 3H), 1.62 (d, J = 7.4 Hz, 3H), 1.55 (s, 9H). IR (CCl_4): 2982, 2952, 2245, 1724, 1452, 1393, 1370, 1307, 1255, 1216, 1165, 1017. MS (EI+): m/z 303 (M+), 259, 244, 230, 216. HRMS (EI+): m/z calcd for $C_{17}H_{21}NO_4$: 303.1471, found: 303.1468.



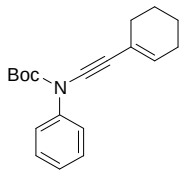
(3,3-Dimethyl-but-1-ynyl)-phenyl-carbamic acid *tert*-butyl ester (3i): Yield: 24%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.48 (m, 2H) 7.35 (t, J=7.9Hz, 2H) 7.20 (t, J=7.9H, 1H,) 1.54 (s, 9H) 1.27 (s, 9H). IR (CCl_4): 2972, 2262, 1733, 1594, 1492, 1457, 1291, 1252, 1160, 1010. MS (EI+): m/z 273, 229, 217, 214. HRMS (EI+): m/z calcd for $C_{17}H_{23}NO_2$: 273.1729, found: 273.1732.



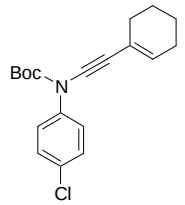
Hept-1-ynyl-phenyl-carbamic acid *tert*-butyl ester (3j): Flash column chromatography (silica gel, PE/Et_2O 98/2). Yield: 78%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.47 (d, J = 7.5 Hz, 2H), 7.36 (t, J = 7.5 Hz, 2H), 7.21 (t, J = 7.4 Hz, 1H), 2.33 (t, J = 7.0 Hz, 2H), 1.55 (m, 2H), 1.53 (s, 9H), 1.45-1.28 (m, 4H), 0.91 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.5, 140.2, 128.5, 126.1, 124.5, 82.8, 74.3, 69.3, 31.0, 28.6, 28.0, 22.2, 18.4, 13.9. IR (CCl_4): 3067, 3038, 2958, 2931, 2862, 2266, 1731, 1594, 1494, 1459, 1366, 1295, 1256, 1161, 1048, 1015. MS (EI+): m/z 287 (M^+), 228, 214, 186, 172, 159, 144, 130, 117, 105. HRMS (EI+): m/z calcd for $C_{18}H_{25}NO_2$: 287.1885, found: 287.1889.



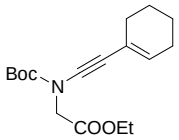
Benzyl-hept-1-ynyl-carbamic acid *tert*-butyl ester (3k): Yield: 69%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.40-7.30 (m, 5H), 4.59 (s, 2H), 2.29 (t, J = 6.4 Hz, 2H), 1.57-1.46 (m, 11H), 1.41-1.28 (m, 4H), 2.98 (t, J = 7.1 Hz, 3H),. ^{13}C-NMR (100MHz, $CDCl_3$): . IR (CCl_4): 2957, 2931, 2861, 2260, 1717, 1455, 1388, 1366, 1295, 1164. MS (EI+): m/z 301 (M^+), 266, 245. HRMS (EI+): m/z calcd for $C_{19}H_{27}NO_2$: 301.2042, found: 301.2033.



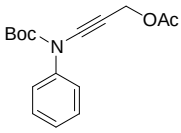
Cyclohex-1-enylethynyl-phenyl-carbamic acid *tert*-butyl ester (3l): Flash column chromatography (silica gel, PE/Et_2O 98/2). Yield: 72%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.48 (d, J = 7.5 Hz, 2H), 7.37 (t, J = 7.5 Hz, 2H), 7.23 (t, J = 7.4 Hz, 1H), 6.02 (m, 1H), 2.16 (m, 2H), 2.10 (m, 2H), 1.70-1.55 (m, 4H), 1.54 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.0, 139.9, 132.5, 128.6, 126.3, 124.4, 120.1, 83.1, 81.1, 71.5, 29.3, 27.9, 25.5, 22.3, 21.5. IR (CCl_4): 3066, 3032, 2978, 2933, 2862, 2243, 1733, 1594, 1495, 1453, 1369, 1287, 1159, 1102, 1008. MS (EI+): m/z 297 (M^+), 266, 253, 241, 238, 224, 212. HRMS (EI+): m/z calcd for $C_{19}H_{23}NO_2$: 297.1729, found: 297.1732.



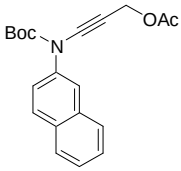
(4-Chloro-phenyl)-cyclohex-1-enylethynyl-carbamic acid *tert*-butyl ester (3m): Flash column chromatography (silica gel, PE/Et_2O 98/2). Yield: 80%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.44 (d, J = 8.9 Hz, 2H), 7.32 (d, J = 8.9 Hz, 2H), 6.03 (m, 1H), 2.15 (m, 2H), 2.10 (m, 2H), 1.69-1.56 (m, 4H), 1.54 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.7, 138.5, 132.9, 131.6, 128.7, 125.5, 120.0, 83.5, 80.5, 72.0, 29.3, 27.9, 25.5, 22.3, 21.5. IR (CCl_4): 2979, 2933, 2862, 2838, 2243, 1734, 1491, 1369, 1286, 1258, 1157, 1095, 1006. MS (EI+): m/z 331 (M^+), 318, 272, 231. HRMS (EI+): m/z calcd for $C_{19}H_{22}NO_2Cl$: 331.1339, found: 331.1343.



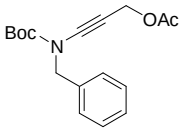
(*tert*-Butoxycarbonyl-cyclohex-1-enylethynyl-amino)-acetic acid ethyl ester (3n): Flash column chromatography (silica gel, PE/Et_2O 97/3-96/4). Yield: 50%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 5.96 (m, 1H), 4.24 (q, J = 7.1 Hz, 2H), 4.14 (s, 2H), 2.09 (m, 4H), 1.67-1.54 (m, 4H), 1.52 (s, 9H), 1.29 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 168.0, 154.0, 132.0, 120.1, 82.8, 81.0, 71.2, 61.3, 51.0, 29.3, 27.9, 25.5, 22.3, 21.5, 14.1. IR (CCl_4): 2980, 2933, 2862, 2240, 1755, 1726, 1397, 1369, 1319, 1243, 1199, 1160, 1101, 1027. MS (EI+): m/z 307 (M^+), 266, 248, 235, 217, 212. HRMS (EI+): m/z calcd for $C_{17}H_{25}NO_4$: 307.1784, found: 307.1784.



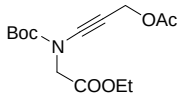
(Acetic acid 3-(*tert*-butoxycarbonyl-phenyl-amino)-prop-2-ynyl ester (3o): Flash column chromatography (silica gel, PE/Et_2O 92/8). Yield: 55%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.43 (d, J = 7.4 Hz, 2H), 7.38 (t, J = 7.4 Hz, 2H), 7.26 (t, J = 7.2 Hz, 1H), 4.86 (s, 2H), 2.10 (s, 3H), 1.53 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.3, 152.9, 139.3, 128.8, 126.8, 124.7, 83.7, 81.0, 64.4, 52.8, 27.9, 20.8. IR (CCl_4): 3067, 3039, 2980, 2935, 2261, 1742, 1594, 1495, 1369, 1287, 1224, 1158, 1048, 1019. MS (EI+): m/z 289 (M^+), 189, 146, 129, 105. HRMS (EI+): m/z calcd for $C_{16}H_{19}NO_4$: 289.1314, found: 289.1322.



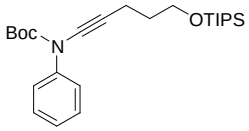
Acetic acid 3-(*tert*-butoxycarbonyl-naphthalen-2-yl-amino)-prop-2-ynyl ester (3p): Flash column chromatography (silica gel, PE/Et_2O 70/30). Yield: 49%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.92 (s, 1H), 7.83-7.79 (m, 3H), 7.57 (dd, J = 1.6, 8.8 Hz, 1H), 7.45 (m, 2H), 4.91 (s, 2H), 2.07 (s, 3H), 1.55 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.0, 152.8, 136.6, 133.0, 131.7, 128.4, 127.7, 127.4, 126.3, 126.0, 123.1, 122.6, 83.6, 80.9, 64.7, 52.6, 27.7, 20.6. IR (CCl_4): 3464, 2061, 2980, 2936, 2260, 1741, 1597, 1512, 1468, 1368, 1289, 1223, 1156, 1020. MS (EI+): m/z 339 (M^+), 319, 316, 305. HRMS (EI+): m/z calcd for $C_{20}H_{21}NO_4$: 339.1471, found: 339.1471.



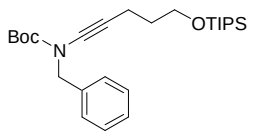
Acetic acid 3-(benzyl-*tert*-butoxycarbonyl-amino)-prop-2-ynyl ester (3q): Yield: 49%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.40-7.30 (m, 5H), 4.82 (s, 2H), 4.60 (s, 2H), 2.10 (s, 3H), 1.53 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.4, 153.9, 136.3, 128.5, 128.1, 127.9, 83.0, 81.6, 65.2, 53.1, 52.9, 28.0, 20.9. IR (CCl_4): 3066, 2979, 2938, 2258, 1726, 1436, 1400, 1364, 1294, 1224, 1161, 1020. MS (EI+): m/z 303 (M^+), 285, 266, 247, 244, 212. HRMS (EI+): m/z calcd for $C_{17}H_{21}NO_4$: 303.1471, found: 303.1469.



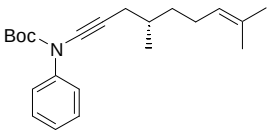
[(3-Acetoxy-prop-1-ynyl)-*tert*-butoxycarbonyl-amino]-acetic acid ethyl ester (3r): Yield: 48%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 4.77 (s, 2H), 4.20 (q, J = 7.1 Hz, 2H), 4.09 (s, 2H), 2.05 (s, 3H), 1.47 (s, 9H), 1.26 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.2, 167.7, 153.6, 83.4, 80.9, 64.4, 61.4, 52.7, 50.7, 27.8, 20.8, 14.1. IR (CCl_4): 2982, 2933, 2263, 1738, 1404, 1370, 1317, 1219, 1158, 1026. MS (EI+): m/z 299 (M^+), 285. HRMS (EI+): m/z calcd for $C_{14}H_{21}NO_6$: 299.1369, found: 299.1374.



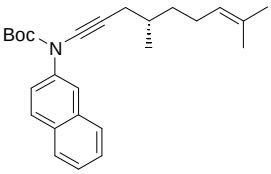
Phenyl-(5-triisopropylsilanyloxy-pent-1-ynyl)-carbamic acid *tert*-butyl ester (3s): Flash column chromatography (silica gel, PE/Et_2O 96/4). Yield: 88%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.45 (d, J = 7.6 Hz, 2H), 7.35 (t, J = 7.5 Hz, 2H), 7.22 (t, J = 7.8 Hz, 1H), 3.78 (t, J = 6.1 Hz, 2H), 2.45 (t, J = 6.9 Hz, 2H), 1.77 (pent, J = 6.8 Hz, 2H), 1.53 (s, 9H), 1.05 (m, 3H), 1.04 (d, J = 4.5 Hz, 18H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.5, 140.2, 128.5, 126.2, 124.5, 82.8, 74.3, 68.8, 65.8, 61.9, 32.2, 27.9, 17.9, 14.9, 11.9. IR (CCl_4): 3067, 3038, 2943, 2865, 2264, 1731, 1594, 1494, 1462, 1366, 1296, 1254, 1160, 1109, 1068. MS (EI+): m/z 431 (M^+), 375, 358, 344, 332. HRMS (EI+): m/z calcd for $C_{25}H_{41}NO_3Si$: 431.2856, found: 431.2841.



Benzyl-(5-triisopropylsilanyloxy-pent-1-ynyl)-carbamic acid *tert*-butyl ester (3t): Yield: 72%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.38-7.30 (m, 5H), 4.59 (s, 2H), 3.77 (t, J = 6.1 Hz, 2H), 2.42 (bm, 2H), 1.74 (bm, 2H), 1.63 (s, 9H), 1.17-1.05 (m, 23H). ^{13}C-NMR (100MHz, $CDCl_3$): 154.6, 136.9, 128.4, 128.0, 127.6, 82.0, 74.6, 69.4, 61.9, 53.1, 32.4, 28.0, 18.0, 14.9, 12.0,. IR (CCl_4): 2943, 2895, 2865, 2261, 1718, 1461, 1388, 1294, 1250, 1163, 1108, 1069. MS (EI+): m/z 345 (M^+), 431. HRMS (EI+): m/z calcd for $C_{26}H_{43}NO_3Si$: 445.3012 , found: 445.3023.



((S)-4,8-Dimethyl-non-7-en-1-ynyl)-phenyl-carbamic acid *tert*-butyl ester (3u): Flash column chromatography (silica gel, PE/Et_2O 98/2). Yield: 74%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.48 (d, J = 7.5 Hz, 2H), 7.36 (t, J = 7.5 Hz, 2H), 7.21 (t, J = 7.5 Hz, 1H), 5.10 (t, J = 7.0 Hz, 1H), 2.32 (dd, J = 5.5, 16.4 Hz, 1H), 2.23 (dd, J = 6.8, 16.4 Hz, 1H), 2.00 (m, 2H), 1.71 (m, 1H), 1.69 (s, 3H), 1.61 (s, 3H), 1.54 (s, 9H), 1.47 (m, 2H), 1.01 (d, J = 6.7 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.5, 140.2, 131.2, 128.5, 126.1, 124.5, 124.4, 82.8, 75.1, 68.0, 36.0, 32.4, 28.0, 25.7, 25.6, 25.5, 19.5, 17.6. IR (CCl_4): 3066, 3037, 2969, 2921, 2263, 1731, 1594, 1494, 1454, 1368, 1269, 1160, 1016. MS (EI+): m/z 341 (M^+), 286, 270, 242, 226, 209, 199. HRMS (EI+): m/z calcd for $C_{23}H_{31}NO_2$: 341.2355, found: 341.2356.

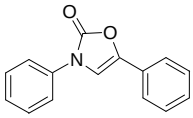


((S)-4,8-Dimethyl-non-7-en-1-ynyl)-naphthalen-2-yl-carbamic acid *tert*-butyl ester (3v): Flash column chromatography (silica gel, PE/Et_2O 90/10). Yield: 65%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.96 (d, J = 2.0 Hz, 1H), 7.83 (m, 3H), 7.64 (dd, J = 2.1, 8.8 Hz, 1H), 7.49 (m, 2H), 5.13 (tm, J = 7.1 Hz, 1H), 2.38 (dd, J = 5.6, 16.4 Hz, 2H), 2.29 (dd, J = 6.8, 16.4 Hz, 2H), 2.03 (m, 2H), 1.74 (m, 1H), 1.70 (s, 3H), 1.61 (s, 3H), 1.58 (s, 9H), 1.52 (m, 1H), 1.30 (m, 1H), 1.06 (d, J= 6.7 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.7, 137.9, 133.3, 131.7, 131.3, 128.3, 127.9, 127.6, 126.4, 125.9, 124.6, 123.4, 122.3, 83.1, 75.3, 68.3, 36.2, 32.5, 28.1, 25.9, 25.8, 25.7, 19.6, 17.7. IR (CCl_4): 3439, 3060, 2971, 2919, 2727, 2262, 1943, 1899, 1731, 1512, 1460, 1369, 1294, 1159, 1047. MS (CI+, NH_3): m/z 409 (MNH_4^+), 392 (MH^+), 353, 348, 336, 309, 292. HRMS (EI+): m/z calcd for $C_{26}H_{33}NO_2$: 391.2511, found: 391.2512.

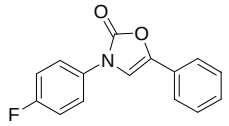
Gold - catalyzed formation of oxazolones 4a-v

General procedure: to a solution of the substrate **3** (1 equiv) in dry dichloromethane (0.5M) was added [Ph_3P-Au-($NCCH_3$)]$^+SbF_6$ (0.01 equiv). The mixture was heated at 40°C and monitored periodically by TLC. Upon completion, the mixture was evaporated, loaded onto a silicagel column and chromatographed (gradient eluent, ether in petroleum ether) to afford the desired oxazolone **4**.

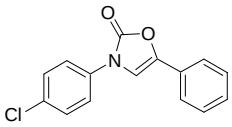
Due to the instability of of ozalones **4k**, **4q** and **4t**, the yiled was determined by 1H NMR of the crude reaction mixture using 1,3,5-trimethoxybenzene as an internal standard.



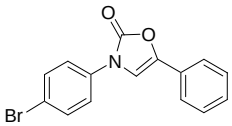
3,5-Diphenyl-3*H*-oxazol-2-one (4a): Recrystallization in PE. Yield: 83%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.63 (d, J = 7.6 Hz, 2H), 7.56 (d, J = 7.3 Hz, 2H), 7.48 (t, J = 7.6 Hz, 2H), 7.42 (t, J = 7.3 Hz, 2H), 7.34 (t, J = 7.4 Hz, 1H), 7.31 (t, J = 7.5 Hz, 1H), 7.18 (s, 1H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.5, 139.8, 135.4, 129.4, 128.8, 128.5, 126.8, 126.5, 123.1, 120.9, 108.4. IR (CCl_4): 3153, 3055, 2958, 2927, 2860, 1773, 1595, 1503, 1450, 1393, 1212, 1114. MS (EI+): m/z 237 (M^+), 218. HRMS (EI+): m/z calcd for $C_{15}H_{11}NO_2$: 237.0790, found: 237.0793.



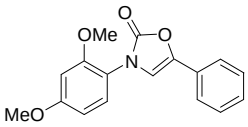
3-(4-Fluoro-phenyl)-5-phenyl-3*H*-oxazol-2-one (4b): Recrystallization in PE. Yield: 88%. Pale brown crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.63-7.55 (m, 4H), 7.43 (t, J = 7.3 Hz, 2H), 7.35 (t, J = 7.4 Hz, 1H), 7.17 (dd, J = 8.2, 8.9 Hz, 2H), 7.13 (s, 1H). ^{13}C-NMR (100MHz, $CDCl_3$): 160.9 (d, J = 247.2 Hz), 152.6, 140.0, 131.5 (d, J = 3.0 Hz), 128.9, 128.7, 126.8, 123.2, 123.0 (d, J = 8.4 Hz), 116.4 (d, J = 23.0 Hz), 108.5. IR (CCl_4): 3060, 2926, 2855, 2359, 1770, 1515, 1451, 1397, 1234, 1112. MS (EI+): m/z 255 (M^+), 211. HRMS (EI+): m/z calcd for $C_{15}H_{10}NO_2F$: 255.0696, found: 255.0699.



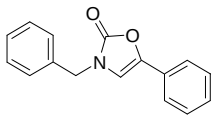
3-(4-Chloro-phenyl)-5-phenyl-3*H*-oxazol-2-one (4c): Recrystallization in PE. Yield: 88%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.62-7.55 (m, 4H), 7.47-7.41 (m, 4H), 7.36 (t, J = 7.4 Hz, 1H), 7.16 (s, 1H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.3, 140.1, 134.0, 132.0, 129.6, 128.9, 128.7, 126.6, 123.2, 122.0, 107.9. IR (CCl_4): 3117, 3062, 2975, 2928, 1731, 1654, 1498, 1449, 1393, 1279, 1203, 1095, 1052, 1016. MS (EI+): m/z 271 (M^+), 227, 192. HRMS (EI+): m/z calcd for $C_{15}H_{10}NO_2Cl$: 271.0400, found: 271.0403.



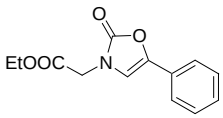
3-(4-Bromo-phenyl)-5-phenyl-3*H*-oxazol-2-one (4d): Recrystallization in PE. Yield: 83%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.63-7.52 (m, 6H), 7.43 (t, J = 7.2 Hz, 2H), 7.36 (t, J = 7.3 Hz, 1H), 7.15 (s, 1H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.2, 140.2, 134.5, 132.5, 128.9, 128.8, 126.6, 123.2, 122.2, 119.8, 107.8. IR (CCl_4): 3128, 3060, 2926, 2856, 1768, 1732, 1653, 1589, 1495, 1449, 1392, 1277, 1203, 1051. MS (EI+): m/z 315 (M^+), 288, 267, 212. HRMS (EI+): m/z calcd for $C_{15}H_{10}NO_2Br$: 314.9895, found: 314.9890.



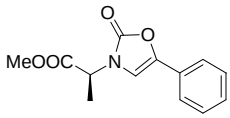
3-(2,4-Dimethoxy-phenyl)-5-phenyl-3*H*-oxazol-2-one (4e): Recrystallization in PE. Yield: 85%. Orange crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.53 (d, J = 7.2 Hz, 2H), 7.41-7.36 (m, 3H), 7.30 (t, J = 7.4 Hz, 1H), 6.96 (s, 1H), 6.57 (s, 1H), 6.56 (dd, J = 2.6, 10.8 Hz, 1H), 3.84 (s, 3H), 3.83 (s, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 160.7, 154.9, 153.9, 138.5, 128.7, 128.0, 127.9, 127.4, 122.8, 116.6, 112.0, 104.5, 99.6, 55.7, 55.5. IR (CCl_4): 3061, 2927, 2854, 2360, 1768, 1611, 1518, 1460, 1287, 1212, 1162, 1109, 1039. MS (EI+): m/z 297 (M^+), 253, 238, 223, 195. HRMS (EI+): m/z calcd for $C_{17}H_{15}NO_4$: 297.1001, found: 297.0998.



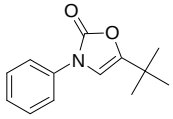
3-Benzyl-5-phenyl-3*H*-oxazol-2-one (4f): Recrystallization in PE. Yield: 78%. Pale yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.49-7.31 (m, 9H), 7.27 (t, J = 7.4 Hz, 1H), 6.65 (s, 1H), 4.80 (s, 2H). ^{13}C-NMR (100MHz, $CDCl_3$): 154.9, 139.2, 135.2, 129.0, 128.7, 128.4, 128.1, 127.9, 127.2, 122.8, 108.8, 47.8. IR (CCl_4): 3134, 3064, 3032, 2927, 2856, 1767, 1449, 1396, 1362, 1262, 1179, 1082, 1019. MS (EI+): m/z 251 (M^+), 193. HRMS (EI+): m/z calcd for $C_{16}H_{13}NO_2$: 251.0946, found: 251.0937.



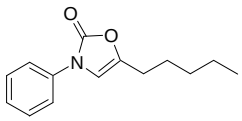
(2-Oxo-5-phenyl-2,3-dihydro-oxazol-4-yl)-acetic acid ethyl ester (4g): Recrystallization in PE. Yield: 93%. Yellow solid. ^{1}H-NMR (400MHz, $CDCl_3$): 7.48 (d, J = 7.3 Hz, 2H), 7.37 (t, J = 7.3 Hz, 2H), 7.29 (t, J = 7.3 Hz, 1H), 6.85 (s, 1H), 4.40 (s, 2H), 4.25 (q, J = 7.1 Hz, 2H), 1.3 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 167.4, 154.9, 139.4, 128.8, 128.3, 127.2, 123.0, 109.8, 62.1, 45.0, 14.1. IR (CCl_4): 3063, 2981, 2937, 2360, 2336, 1775, 1759, 1419, 1260, 1199, 1096, 1021. MS (CI+, NH_3): m/z 265 (MNH_4^+), 248 (MH^+), 236, 225, 208, 149, 139, 132. HRMS (EI+): m/z calcd for $C_{13}H_{13}NO_4$: 247.0845, found: 247.0843.



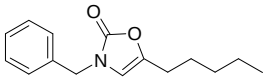
(S)-2-(2-Oxo-5-phenyl-2,3-dihydro-oxazol-4-yl)-propionic acid methyl ester (4h): Recristallization in PE. Yield: 94%. Orange solid. ^{1}H-NMR (400MHz, $CDCl_3$): 7.49 (d, J = 7.5 Hz, 2H), 7.37 (t, J = 7.4 Hz, 2H), 7.29 (t, J = 7.3 Hz, 1H), 6.95 (s, 1H), 4.89 (q, J = 7.4 Hz, 1H), 3.77 (s, 3H), 1.63 (d, J = 7.4 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.8, 154.4, 139.5, 128.8, 128.2, 127.2, 123.0, 107.1, 52.9, 51.4, 17.1. IR (CCl_4): 3156, 3063, 2991, 2953, 2850, 1766, 1599, 1451, 1395, 1201, 1182, 1055. MS (CI+, NH_3): m/z 265 (MNH_4^+), 248 (MH^+), 240, 220, 208, 149. HRMS (EI+): m/z calcd for $C_{13}H_{13}NO_4$: 247.0845, found: 247.0845.



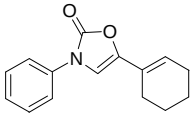
5-*tert*-Butyl-3-phenyl-3*H*-oxazol-2-one (4i): Flash column chromatography (silica gel, PE/Et_2O 80/20). Yield: 58%. Yellow solid. ^{1}H-NMR (400MHz, $CDCl_3$): 7.57 (d, J = 7.7 Hz, 2H), 7.43 (t, J = 7.6 Hz, 2H), 7.26 (t, J = 7.4 Hz, 1H), 6.50 (s, 1H), 1.27 (s, 9H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.4, 149.7, 135.9, 129.4, 126.2, 120.8, 106.6, 31.3, 27.7. IR (CCl_4): 3651, 3160, 2968, 2872, 1768, 1597, 1505, 1390, 1301, 1250, 1223, 1111. MS (CI+, NH_3): m/z 235 (MNH_4^+), 218 (MH^+), 202. HRMS (EI+): m/z calcd for $C_{13}H_{15}NO_2$: 217.1103, found: 217.1103.



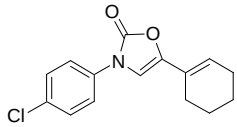
5-Pentyl-3-phenyl-3*H*-oxazol-2-one (4j): Flash column chromatography (silica gel, PE/Et_2O 92/8). Yield: 74%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.56 (d, J = 7.6 Hz, 2H), 7.43 (t, J = 7.5 Hz, 2H), 7.25 (t, J = 7.5 Hz, 1H), 6.59 (t, J = 1.1 Hz, 1H), 2.47 (td, J = 1.1, 7.8 Hz, 1H), 1.63 (m, 2H), 1.39-1.34 (m, 4H), 0.92 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.2, 141.9, 135.7, 129.3, 126.0, 120.5, 108.8, 31.0, 26.1, 25.8, 22.2, 13.8. IR (CCl_4): 3154, 3069, 3048, 2955, 2930, 2863, 1764, 1677, 1596, 1503, 1461, 1393, 1296, 1212, 1113. MS (EI+): m/z 231 (M^+), 186, 174, 158, 144, 130, 105. HRMS (EI+): m/z calcd for $C_{11}H_{17}NO_2$: 231.1259, found: 231.1257.



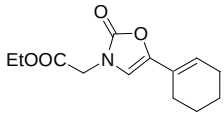
3-Benzyl-5-pentyl-3*H*-oxazol-2-one (4k): Not isolated (difficult to isolate). Yield (determined by ^{1}H-NMR of the crude mixture using 1,3,5-trimethoxybenzene as internal standard): 50%. ^{1}H-NMR (400MHz, $CDCl_3$): 7.40-7.21 (m, 5H), 6.02 (t, J = 1.2 Hz, 1H), 4.68 (s, 2H), 2.34 (td, J = 1.1, 7.8 Hz, 2H), 1.53 (m, 2H), 1.29 (m, 4H), 0.88 (m, 3H).



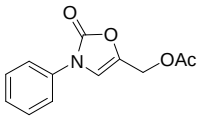
5-Cyclohex-1-enyl-3-phenyl-3*H*-oxazol-2-one (4l): Recrystallization in PE. Yield: 78%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.58 (d, J = 7.6 Hz, 2H), 7.44 (t, J = 7.5 Hz, 2H), 7.27 (t, J = 7.4 Hz, 1H), 6.65 (s, 1H), 6.27 (m, 1H), 2.21 (m, 2H), 2.15 (m, 2H), 1.79-1.63 (m, 4H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.6, 141.2, 135.6, 129.3, 126.2, 125.0, 123.2, 120.7, 106.8, 25.0, 23.3, 21.9, 21.8. IR (CCl_4): 3153, 3117, 3053, 2932, 2861, 1770, 1596, 1504, 1390, 1290, 1214, 1114, 1016. MS (EI+): m/z 241 (M^+), 217, 213. HRMS (EI+): m/z calcd for $C_{15}H_{15}NO_2$: 241.1103, found: 241.1107.



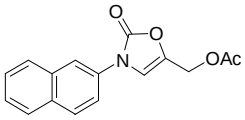
3-(4-Chloro-phenyl)-5-cyclohex-1-enyl-3*H*-oxazol-2-one (4m): Recrystallization in PE. Yield: 94%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.54 (d, J = 9.0 Hz, 2H), 7.40 (d, J = 9.0 Hz, 2H), 6.62 (s, 1H), 6.27 (m, 1H), 2.21 (m, 2H), 2.14 (m, 2H), 1.78-1.63 (m, 4H). ^{13}C-NMR (100MHz, $CDCl_3$): 152.3, 141.4, 134.2, 131.6, 129.4, 125.4, 123.0, 121.7, 106.3, 25.0, 23.2, 21.9, 21.8. IR (CCl_4): 3140, 3051, 2930, 2865, 1755, 1596, 1499, 1393, 1203, 1142, 1095, 1016. MS (EI+): m/z 275 (M^+), 266, 235, 231, 217. HRMS (EI+): m/z calcd for $C_{15}H_{14}NO_2Cl$: 275.0713, found: 275.0709.



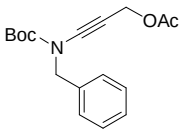
(5-Cyclohex-1-enyl-2-oxo-oxazol-3-yl)-acetic acid ethyl ester (4n): Recrystallization in PE. Yield: 70%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 6.30 (s, 1H), 6.17 (m, 1H), 4.30 (s, 2H), 4.23 (q, J = 7.2 Hz, 2H), 2.16 (m, 2H), 2.07 (m, 2H), 1.73-1.58 (m, 4H), 1.29 (t, J = 7.2 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 167.4, 154.8, 140.7, 124.2, 123.3, 108.0, 61.9, 44.7, 24.9, 23.2, 21.9, 21.8, 14.0. IR (CCl_4): 3147, 2981, 2935, 2862, 1763, 1425, 1377, 1260, 1206, 1098, 1022. MS (EI+): m/z 251 (M^+), 223, 211. HRMS (EI+): m/z calcd for $C_{13}H_{17}NO_4$: 251.1158, found: 251.1151.



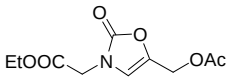
Acetic acid 2-oxo-3-phenyl-2,3-dihydro-oxazol-5-ylmethyl ester (4o): Flash column chromatography (silica gel, PE/Et_2O 50/50). Yield: 71%. Yellow crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.53 (d, J = 7.6 Hz, 2H), 7.44 (t, J = 7.5 Hz, 2H), 7.29 (t, J = 7.5 Hz, 1H), 6.99 (s, 1H), 4.91 (s, 2H), 2.11 (s, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.4, 152.5, 135.4, 135.1, 129.4, 126.7, 120.9, 114.6, 55.9, 20.7. IR (CCl_4): 3049, 2959, 2927, 2862, 1777, 1748, 1597, 1505, 1398, 1218, 1108, 1024. MS (EI+): m/z 233(M^+), 174, 163, 130, 118, 105. HRMS (EI+): m/z calcd for $C_{12}H_{11}NO_4$: 233.0688, found: 233.0692.



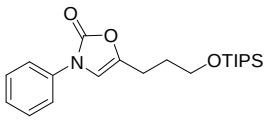
Acetic acid 3-naphthalen-2-yl-2-oxo-2,3-dihydro-oxazol-5-ylmethyl ester (4p): Recristallization in PE. Yield: 88%. Orange solid. ^{1}H-NMR (400MHz, $CDCl_3$): 7.99 (d, J = 1.6 Hz, 1H), 7.90 (d, J = 8.8 Hz, 1H), 7.84 (d, J = 8.4 Hz, 2H), 7.66 (dd, J = 2.1, 8.8 Hz, 2H), 7.51 (m, 2H), 7.10 (s, 1H), 4.93 (s, 2H), 2.13 (s, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.5, 152.8, 135.6, 133.3, 132.6, 131.6, 129.6, 127.9, 127.7, 127.1, 126.4, 119.4, 118.9, 114.9, 56.1, 20.8. IR (CCl_4): 3671, 3154, 3060, 2962, 2081, 1776, 1748, 1633, 1599, 1513, 1401, 1218, 1098, 1021. MS (EI+): m/z 283 (M^+), 267, 232. HRMS (EI+): m/z calcd for $C_{16}H_{13}NO_4$: 283.0845, found: 283.0843.



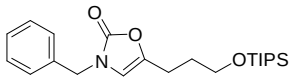
Acetic acid 3-benzyl-2-oxo-2,3-dihydro-oxazol-5-ylmethyl ester (4q): Not isolated (difficult to isolate). Yield (determined by ^{1}H-NMR of the crude mixture using 1,3,5-trimethoxybenzene as internal standard): 50%. ^{1}H-NMR (400MHz, $CDCl_3$): 7.43-7.22 (m, 5H), 6.47 (s, 1H), 4.79 (s, 2H), 4.71 (s, 2H), 2.07 (s, 3H).



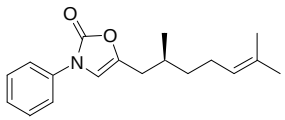
(5-Acetoxymethyl-2-oxo-oxazol-3-yl)-acetic acid ethyl ester (4r): Washing with PE. Yield: 49%. Yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 6.66 (s, 1H), 4.85 (s, 2H), 4.33 (s, 2H), 4.25 (q, J = 7.1 Hz, 2H), 2.09 (s, 3H), 1.30 (t, J = 7.1 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 170.4, 167.2, 154.8, 134.8, 115.8, 62.1, 56.0, 44.7, 20.7, 14.0. IR (CCl_4): 3152, 2982, 2934, 2869, 1773, 1753, 1708, 1424, 1376, 1215, 1165, 1088, 1022. MS (EI+): m/z 243 (M^+), 216, 211, 201, 192. HRMS (EI+): m/z calcd for $C_{10}H_{13}NO_6$: 243.0743, found: 243.0739.



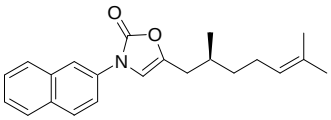
3-Phenyl-5-(3-triisopropylsilanyloxy-propyl)-3*H*-oxazol-2-one (4s): Flash column chromatography (silica gel, PE/Et_2O 94/6). Yield: 69%. White crystals. ^{1}H-NMR (400MHz, $CDCl_3$): 7.56 (d, J = 7.6 Hz, 2H), 7.43 (t, J = 7.5 Hz, 2H), 7.26 (t, J = 7.4 Hz, 1H), 6.61 (t, J = 1.1 Hz, 1H), 3.78 (t, J = 5.9 Hz, 2H), 2.62 (td, J = 1.1, 7.9 Hz, 2H), 1.87 (tt, J = 6.0, 7.7 Hz, 2H), 1.09 (m, 3H), 1.07 (d, J = 4.7 Hz, 18H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.2, 141.6, 135.7, 129.3, 126.0, 120.5, 109.0, 61.8, 29.7, 22.4, 17.9, 11.9. IR (CCl_4): 3069, 3047, 2944, 2894, 2865, 1769, 1597, 1505, 1462, 1391, 1108, 1068. MS (EI+): m/z 375 (M^+), 350, 335, 332. HRMS (EI+): m/z calcd for $C_{21}H_{33}NO_3Si$: 375.2230, found: 375.2245.



3-Benzyl-5-(3-triisopropylsilanyloxy-propyl)-3*H*-oxazol-2-one (4t): Not isolated (difficult to isolate). Yield (determined by ^{1}H-NMR of the crude mixture using 1,3,5-trimethoxybenzene as internal standard): 38%. ^{1}H-NMR (400MHz, $CDCl_3$): 7.40-7.20 (m, 5H), 6.05 (s, 1H), 4.68 (s, 2H), 3.69 (t, J = 6.0 Hz, 2H), 2.50 (t, J = 7.8 Hz, 2H), 1.77 (m, 2H), 1.04 (m, 21H).



5-((S)-2,6-Dimethyl-hept-5-enyl)-3-phenyl-3*H*-oxazol-2-one (4u): Flash column chromatography (silica gel, PE/Et_2O 94/6). Yield: 71%. Pale yellow oil. ^{1}H-NMR (400MHz, $CDCl_3$): 7.57 (d, J = 7.6 Hz, 2H), 7.44 (t, J = 7.5 Hz, 2H), 7.26 (t, J = 7.5 Hz, 1H), 6.61 (s, 1H), 5.10 (tm, J = 7.0 Hz, 1H), 2.47 (ddd, J = 1.0, 5.9, 15.2 Hz, 1H), 2.28 (ddd, J = 0.7, 7.8, 15.1 Hz, 1H), 2.02 (m, 2H), 1.85 (m, 1H), 1.70 (s, 3H), 1.62 (s, 3H), 1.43 (m, 2H), 0.97 (d, J = 6.7 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.2, 140.8, 135.7, 131.6, 129.3, 126.0, 124.1, 120.5, 109.8, 36.4, 33.3, 30.7, 25.7, 25.4, 19.3, 17.6. IR (CCl_4): 3155, 3047, 2962, 2923, 2856, 1767, 1597, 1504, 1456, 1392, 1213, 1196, 1111. MS (EI+): m/z 285 (M^+), 226, 214, 201, 174, 148, 130, 105. HRMS (EI+): m/z calcd for $C_{18}H_{23}NO_2$: 285.1729, found: 285.1729.



5-((S)-2,6-Dimethyl-hept-5-enyl)-3-naphthalen-2-yl-3*H*-oxazol-2-one (4v): Flash column chromatography (silica gel, PE/Et_2O 70/30). Yield: 80%. White solid. ^{1}H-NMR (400MHz, $CDCl_3$): 8.01 (d, J = 1.8 Hz, 1H), 7.90 (d, J = 8.9 Hz, 1H), 7.84 (d, J = 8.0 Hz, 2H), 7.73 (dd, J = 2.1, 8.9 Hz, 1H), 7.50 (m, 2H), 6.73 (s, 1H), 5.13 (t, J = 7.0 Hz, 1H), 2.50 (dd, J = 5.8, 15.1 Hz, 1H), 2.30 (dd, J = 7.8, 15.2 Hz, 1H), 2.06 (m, 2H), 1.88 (m, 1H), 1.71 (s, 3H), 1.64 (s, 3H), 1.47 (m, 2H), 1.00 (d, J = 6.7 Hz, 3H). ^{13}C-NMR (100MHz, $CDCl_3$): 153.4, 141.0, 133.4, 133.2, 131.7, 131.3, 129.4, 127.8, 127.7, 127.0, 126.0, 124.2, 119.4, 118.2, 110.0, 36.6, 33.5, 30.8, 25.8, 25.5, 19.4, 17.7. IR (CCl_4): 3650, 3154, 3059, 2964, 2922, 2856, 1768, 1634, 1599, 1513, 1474, 1397, 1298, 1102. MS (CI+, NH_3): m/z 353 (MNH_4^+), 336 (MH^+), 322, 310, 292, 224. HRMS (EI+): m/z calcd for $C_{22}H_{25}NO_2$: 335.1885, found: 335.1888.

Silver - catalyzed formation of oxazolones 4a-d

General procedure: to a solution of the substrate **3a-d** (1 equiv) in dry dichloromethane (0.5M) was added $AgNTf_2$ (0.05 equiv). The mixture was stirred at room temperature and monitored periodically by TLC. Upon completion, the mixture was evaporated, and the yiled of the desired oxazolone **4a-d** determined by 1H NMR of the crude reaction mixture using 1,3,5-trimethoxybenzene as an internal standard.