Supporting information

Silyl Chloride as Effective Activation Agent for Swern Oxidation

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General methods and Materials

General methods: NMR data were obtained for ¹H 400 MHz. Chemical shifts were reported in ppm from tetramethylsilane with the solvent resonance as the internal standard in CDCl₃ solution. Column chromatography was performed on silica gel (200-300 mesh) eluting with diethyl ether and petroleum ether (30 °C – 60 °C). TLC was performed on glass-backed silica plates. All chemicals were used without purification as commercially available unless otherwise noted. Materials: Commercially available reagents were used throughout without further purification other than those detailed below.

General procedure for the oxidation

DMSO (2 mmol) in DCM was added to a solution of MeSiCl₃ (0.5 mmol) in DCM at – 20 °C, after 3 h, low the temperature to – 78 °C, the color of the solution turned milky white, 1 equivalent of alcohol in DCM was slowly added, after being stirred for 3 h, 8 equivalents of Et₃N was slowly added, then the reaction mixture was warmed to the room temperature and diluted by DCM, and then the organic solvents was evaporated. The residue was purified by flash chromatography (elution with petroleum ether 30 °C – 60 °C/diethyl ether), with dibromomethane or benzyl methyl ether as internal standard for ¹H NMR yield.

Synthesis of 1-Phenylpent-1-yn-3-ol¹

n-BuLi (2.5 M in hexane, 7.3 mL, 18.2 mmol) was added to a stirred solution of phenylacetylene (1.9 g, 18.2 mmol) in THF (20 mL) at 0 °C, and the mixture was stirred at 0 °C for 30 min. To the resulting solution was added propionaldehyde (1.3 mL, 18.2 mmol) at 0 °C, and the mixture was gradually warmed to rt. The reaction was quenched by the addition of water and extracted with Et₂O. The organic layer was washed with brine, dried over Na₂SO₄, and concentrated. The residue was purified by silica gel column chromatography (hexane : EtOAc = 8:1), which furnished 1-phenylpent-1-yn-3-ol 1a (2.7 g, 16.6 mmol, 90% yield) as a pale yellow oil. ¹H NMR (400 MHz, CDCl₃) δ 7.46 (m, 2H), 7.33 (m, 3H), 4.58 (dd, *J* = 12.2, 6.2 Hz, 1H), 2.30 (d, *J* = 5.5 Hz, 1H), 1.92 – 1.79 (m, 2H), 1.10 (t, *J* = 7.4 Hz, 3H).

Characterization of carbonyl compounds

White solid, ¹H NMR (400 MHz, CDCl₃) δ 10.01 (s, 1H), 7.85 (d, *J* = 8.4 Hz, 1H), 7.54 (d, *J* = 8.5 Hz, 1H).

White solid, ¹H NMR (400 MHz, CDCl₃) δ 10.19 (s, 1H), 8.42 (d, *J* = 8.7 Hz, 2H), 8.10 (d, *J* = 8.8 Hz, 2H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 9.89 (s, 1H), 7.85 (d, J = 8.8 Hz, 2H), 7.01 (d, J = 8.7 Hz, 2H), 3.90 (s, 3H).

Yellow oil. ^1H NMR (400 MHz, CDCl_3) δ 9.97 (d, J = 1.2 Hz, 1H), 7.86 – 7.74 (m, 2H), 7.24 (dd, J = 4.8, 3.8 Hz, 1H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 10.43 (s, 1H), 9.29 (d, J = 8.6 Hz, 1H), 8.13 (d, J = 8.2 Hz, 1H), 8.02 (dd, J = 7.0, 1.0 Hz, 1H), 7.95 (d, J = 8.2 Hz, 1H), 7.77 – 7.70 (m, 1H), 7.64 (ddd, J = 13.9, 8.0, 4.1 Hz, 2H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 9.77 (t, J = 1.8 Hz, 1H), 2.43 (td, J = 7.4, 1.8 Hz, 2H), 1.72 – 1.56 (m, 2H), 1.34 – 1.27 (m, 8H), 0.89 (t, J = 6.8 Hz, 3H).

Yellow oil. ^1H NMR (400 MHz, CDCl_3) δ 9.73 (d, J = 7.7 Hz, 1H), 7.64 – 7.41 (m, 6H), 6.75 (dd, J = 16.0, 7.7 Hz, 1H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.99 (d, J = 7.2 Hz, 2H), 7.59 (t, J = 7.4 Hz, 1H), 7.49 (t, J = 7.6 Hz, 2H), 2.64 (s, 3H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.99 (d, J = 7.2 Hz, 2H), 7.57 (t, J = 7.4 Hz, 1H), 7.48 (t, J = 7.6 Hz, 2H), 3.03 (q, J = 7.2 Hz, 2H), 1.25 (t, J = 7.2 Hz, 3H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 7.26 (m, 5H), 2.93 (t, J = 7.6 Hz, 2H), 2.79 (t, J = 7.6 Hz, 2H), 2.17 (s, 3H).

White solid. ^1H NMR (400 MHz, CDCl_3) δ 7.88 – 7.79 (m, 4H), 7.62 (t, J = 7.4 Hz, 2H), 7.51 (t, J = 7.6 Hz, 4H).

Yellow oil. ^1H NMR (400 MHz, CDCl_3) δ 7.58 (d, J = 7.1 Hz, 2H), 7.46 (t, J = 7.4 Hz, 1H), 7.38 (t, J = 7.4 Hz, 2H), 2.71 (q, J = 7.4 Hz, 2H), 1.22 (t, J = 7.4 Hz, 3H).

Yellow oil. ^1H NMR (400 MHz, CDCl_3) δ 2.44 – 2.30 (m, 1H), 2.23 – 1.79 (m, 6H), 1.47 – 1.26 (m, 2H), 1.02 (d, J = 6.3 Hz, 3H), 0.92 (d, J = 6.8 Hz, 3H), 0.86 (d, J = 6.8 Hz, 3H).

Colorless oil. ^1H NMR (400 MHz, CDCl_3) δ 8.79 (d, J = 5.9 Hz, 2H), 7.71 (d, J = 6.0 Hz, 2H), 2.62 (s, 3H).

1. Tanaka, K.; Shoji, T., *Organic Letters* 2005, 3561-3563.