Supporting Information

Acceptorless dehydrogenative lactonization of diols by Pt-loaded SnO_2 catalysts

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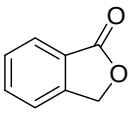
Experimental Section

General: Commercially available organic and inorganic compounds (from Tokyo Chemical Industry, Wako Pure Chemical Industries, Kishida Chemical, or Mitsuwa Chemicals) were used without further purifications. The GC (Shimadzu GC-14B) and GCMS (Shimadzu GCMS-QP2010) analyses were carried out with Ultra ALLOY capillary column UA^+-5 (Frontier Laboratories Ltd.) using nitrogen as the carrier gas.

NMR and GC/MS analysis

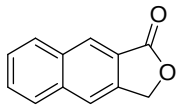
^1H and ^{13}C NMR spectra for lactones of Table-3 were assigned and reproduced to the corresponding literature. ^1H and ^{13}C NMR spectra were recorded using at ambient temperature on JEOL-ECX 600 operating at 600.17 and 150.92 MHz, respectively with tetramethylsilane as an internal standard. All chemical shifts (δ) are reported in ppm and coupling constants (*J*) in Hz. All chemical shifts are reported relative to tetramethylsilane and *d*-solvent peaks 77.00 ppm chloroform. Abbreviations used in the NMR experiments: s, singlet; d, doublet; t, triplet; q, quartet; m, multiplet. GC-MS spectra was taken by SHIMADZU QP2010.

Isobenzofuran-1(3*H*)-one:[1]



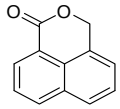
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.93 (d, *J* = 7.8 Hz, 1H), 7.71-7.68 (m, 1H), 7.55-7.50 (m, 2H), 5.33 (s, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 171.06, 146.46, 133.96, 128.95, 125.62, 125.58, 121.93, 69.60; GC-MS m/e 134.08.

3*H*- Naptho[2,3-c]furan-1-one:[2]



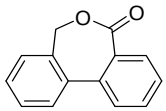
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 8.50 (s, 1H), 8.04 (d, *J* = 8.28 Hz, 1H), 7.94 (d, *J* = 8.22 Hz, 1H), 7.89 (s, 1H), 7.68-7.65 (m, 1H), 7.61-7.58 (m, 1H), 5.48 (s, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 170.96, 139.93, 136.23, 133.11, 129.93, 128.98, 128.11, 127.06, 126.93, 123.31, 120.85, 69.61; GC-MS m/e 184.05.

3*H*-Benzo[d,e]isochromen-1-one:[2]



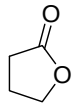
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 8.41 (d, *J* = 7.50 Hz, 1H), 8.12 (d, *J* = 8.22 Hz, 1H), 7.87 (d, *J* = 8.18 Hz, 1H), 7.67 (t, *J* = 7.56 Hz, 1H), 7.57 (t, *J* = 8.28 Hz, 1H), 7.38 (d, *J* = 6.18 Hz, 1H), 5.85 (s, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 164.32, 135.33, 133.44, 131.72, 130.40, 127.47, 126.55, 125.79, 125.25, 121.54, 118.60, 70.14; GC-MS m/e 184.01.

Dibenzo[c,e]oxepin-5(7*H*)-one:[1]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 7.98 (d, *J* = 8.28 Hz, 1H), 7.72-7.62 (m, 2H), 7.60-7.58 (m, 1H), 7.54-7.48 (m, 2H), 7.44-7.41 (m, 2H), 5.03 (s, 1H), 4.97 (s, 1H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 170.21, 138.90, 137.20, 134.26, 132.52, 131.86, 130.58, 130.07, 128.63, 128.60, 128.49, 128.36, 127.52, 69.12; GC-MS m/e 210.10.

Dihydrofuran-2(3*H*)-one:[3]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS: δ 4.27 (t, *J* = 7.02 Hz, 2H), 2.41 (t, *J* = 7.79 Hz, 2H), 2.22-2.17 (m, 2H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 177.65, 68.36, 27.54, 21.92; GC-MS m/e 86.07.

Tetrahydro-2*H*-pyran-2-one:[1]

^{1}H NMR (600.17 MHz, $CDCl_3$, TMS: δ 4.35 (t, *J* = 5.58 Hz, 2H), 2.56 (t, *J* = 7.20 Hz, 2H), 1.92-1.86 (m, 4H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 171.27, 69.31, 29.66, 22.12, 18.91; GC-MS m/e 100.055.

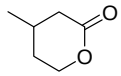
Oxepan-2-one:[4]

^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 4.16 (t, *J* = 4.53 Hz, 2H), 2.56 (t, *J* = 6.08 Hz, 2H), 1.79-1.77 (m, 2H), 1.71-1.67 (m, 4H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 176.07, 69.10, 34.32, 29.05, 28.68, 22.71; GC-MS m/e 114.05.

4-Methyl-oxetan-2-one:[5]

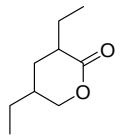
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 4.56-4.52 (m, 1H), 3.52-3.50 (m, 1H), 3.12-3.10 (m, 1H), 1.51 (d, *J* = 6.28 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 171.05, 64.39, 35.82, 20.96; GC-MS m/e 86.11

4-Methyl-tetrahydro-pyran-2-one:[6]



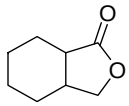
^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 4.43-4.39 (m, 1H), 4.18-4.17 (m, 1H), 2.60-2.58 (m, 1H), 2.22-2.26 (m, 2H), 1.85-1.79 (m, 1H), 1.60-1.55 (m, 1H), 1.09 (d, *J* = 6.18 Hz, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 171.27, 68.43, 37.96, 30.35, 26.29, 21.18; GC-MS m/e 114.06.

3,5-Diethyl-tetrahydro-pyran-2-one:



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 4.21-4.19 (m, 1H), 4.12-4.11 (m, 1H), 2.30-2.28 (m, 2H), 2.14-2.1.99 (m, 2H), 1.62-1.58 (m, 2H), 1.38-1.35 (m, 2H), 0.83-0.85 (m, 6H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 175.01, 72.53, 40.90, 38.32, 34.67, 24.54, 22.35, 11.09, 10.87; GC-MS m/e 156.15.

Hexahydro-isobenzo-furan-1-one:[7]



^{1}H NMR (600.17 MHz, $CDCl_3$, TMS): δ 4.21-4.19 (m, 1H), 3.95-3.91 (m, 1H), 2.64-2.70 (m, 1H), 2.54-2.49 (m, 1H), 1.94-1.92 (m, 1H), 1.68-1.57 (m, 4H), 1.28-1.20 (m, 3H); ^{13}C NMR (150.92 MHz, $CDCl_3$) δ 178.26, 71.84, 39.23, 35.77, 26.57, 23.41, 22.84, 22.43; GC-MS m/e 140.10.

References

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