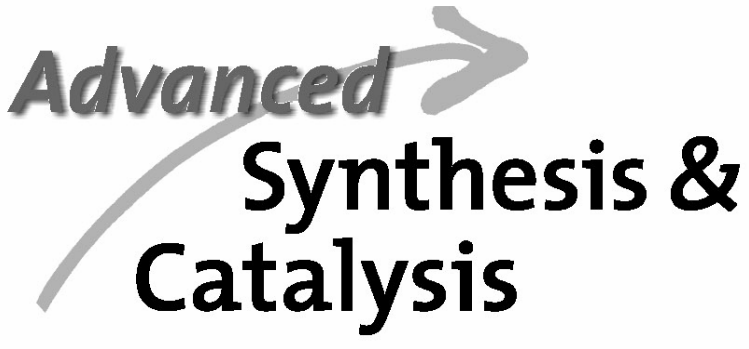

Supporting Information

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Vanadium Catalyzed Selective Oxidation of Alcohols to Aldehydes and Ketones with *tert*-Butyl Hydroperoxide

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4-Methoxybenzaldehyde. Colorless liquid; yield 99.9% (136.0 mg); ^{1}H NMR ($CDCl_3$) δ 9.84 (s, 1H), 7.80 (d, *J* = 8.0 Hz, 2H), 6.98 (d, *J* = 8.0 Hz, 2H), 3.90 (s, 3H); ^{13}C NMR ($CDCl_3$) δ 190.6, 164.6, 131.9, 130.0, 114.3, 55.5; IR (neat) 1682 cm^{-1}.

Benzaldehyde. Colorless liquid; yield 99.1% (105.2 mg); ^{1}H NMR ($CDCl_3$) δ 9.99 (s, 1H), 7.87-7.43 (m, 5H); ^{13}C NMR ($CDCl_3$) δ192.2, 136.5, 134.4, 129.7, 128.9; IR (neat) 1695 cm^{-1}.

3-Nitrobenzaldehyde. Yellow solid; yield 99.8% (150.8 mg); m.p. 58 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 10.10 (s, 1H), 8.70 (s, 1H), 8.47 (d, *J* = 8.8 Hz, 1H), 8.24 (d, *J* = 8.8 Hz, 1H), 7.77 (t, *J* = 8.0 Hz, 1H); ^{13}C NMR ($CDCl_3$) δ 190.0, 149.1, 137.5, 134.7, 130.5, 128.5, 124.4; IR (KBr) 1678 cm^{-1}.

4-Bromobenzaldehyde. Colorless solid; yield 99.4% (183.9 mg); m.p. 56-57 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 9.94 (s, 1H), 7.73 (d, *J* = 6.8 Hz, 2H), 7.67 (d, *J* = 6.8 Hz, 2H); ^{13}C NMR ($CDCl_3$) δ 129.7, 130.9, 132.3, 135.0, 191.0; IR (KBr) 1683 cm^{-1}.

4-Chlorobenzaldehyde. Colorless solid; yield 99.9% (140.4 mg); m.p. 50 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 9.95 (s, 1H), 7.81 (d, *J* = 8.4 Hz, 2H), 7.43 (d, *J* = 8.4 Hz, 2H); ^{13}C NMR ($CDCl_3$) δ 190.7, 140.9, 137.8, 130.9, 129.4; IR (KBr) 1705 cm^{-1}.

4-Nitrobenzaldehyde. Pale yellow solid; yield 99.1% (149.8 mg); m.p. 105 ^{o}C; ^{1}H NMR ($CDCl_3$) δ10.10 (s, 1H), 8.70 (s, 1H), 8.46 (d, *J* = 7.6 Hz, 1H), 8.22 (d, *J* = 7.6 Hz, 1H), 7.75 (t, *J* = 8.0 Hz, 1H); ^{13}C NMR ($CDCl_3$) δ 190.2, 151.1, 140.1, 130.4, 124.3; IR (KBr) 1678 cm^{-1}.

4-Hydroxybenzaldehyde. Colorless solid; yield 99.1% (121.2 mg); m.p. 112 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 9.83 (s, 1H), 7.80 (d, *J* = 8.4 Hz, 1H), 6.95 (d, *J* = 8.4 Hz, 1H); ^{13}C NMR ($CDCl_3$) δ 191.07, 161.1, 132.56, 128.71, 116.11; IR (KBr) 1680 cm^{-1}.

3,4,5-Trimethoxybenzaldehyde. Pale yellow solid; yield 99.6% (195.17 mg); m.p. 74 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 9.9 (s, 1H), 7.1 (s, 2H), 3.9 (s, 9H); ^{13}C NMR ($CDCl_3$) δ 190.9, 153.6, 143.7, 131.7, 106.8, 60.9, 56.3; IR (KBr) 1682 cm^{-1}.

9-Anthranaldehyde. Green solid; yield 99.6% (205.4 mg); m.p. 103-105 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 11.49 (s, 1H), 8.96 (d, *J* = 8.8 Hz, 2H), 8.66 (s, 1H), 8.04 (d, *J* = 8.4 Hz, 2H), 7.67-7.63 (m, 2H), 7.54-7.50 (m, 2H); ^{13}C NMR ($CDCl_3$) δ 192.98, 135.33, 132.22, 131.17, 129.38, 129.23, 125.80,123.65; IR (KBr) 1697 cm^{-1}.

2-Furfural. Colorless liquid; yield 99.5% (95.6 mg); ^{1}H NMR ($CDCl_3$) δ 9.63 (s, 1H), 7.68-7.67 (m, 1H), 7.55-7.46 (d, *J* = 3.6 Hz, 1H), 6.60-6.59 (m, 1H); ^{13}C NMR ($CDCl_3$) δ 77.8, 152.9, 148.1, 121.1, 112.6; IR (neat) 1681 cm^{-1}.

2-Pyridinecarboxaldehyde. Yellow liquid; yield 99.1% (106.1 mg); ^{1}H NMR ($CDCl_3$) δ 10.1 (s, 1H), 8.8 (d, *J* = 4.4 Hz, 1H), 8.0-7.8 (m, 2H), 7.6-7.5 (m, 1H); ^{13}C NMR ($CDCl_3$)δ 193.3, 152.7, 150.2, 137.0, 127.8, 121.6; IR (neat) 1680 cm^{-1}.

Acetophenone. Colorless liquid; yield 99.6% (119.7 mg); ^{1}H NMR ($CDCl_3$) δ 7.94-7.92 (m, 2H), 7.55-7.51 (m, 1H), 7.45-7.41 (m, 2H), 2.59 (s, 3H); ^{13}C NMR ($CDCl_3$) δ197.9, 137.2, 133.0, 128.5, 128.2, 26.5; IR (neat) 1683 cm^{-1}.

Benzil. Yellow solid; yield 99.3% (208.8 mg); m.p. 95 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 8.10 (d, *J* = 7.6 Hz, 2H), 7.94 (d, *J* = 8.0 Hz, 2H), 7.65-7.57 (m, 2H), 7.51-7.43 (m, 4H); ^{13}C NMR ($CDCl_3$) δ 195.1, 135.4, 133.6, 130.4, 129.6; IR (KBr) 1671 cm^{-1}.

Cyclohexanone. Colorless liquid; yield 95% (93.3 mg); ^{1}H NMR ($CDCl_3$) δ 2.33 (t, *J* = 6.8 Hz, 4H), 1.89-1.83 (m, 4H), 1.75-1.66 (m, 2H); ^{13}C NMR ($CDCl_3$) δ 211.7, 41.9, 27.1, 25.0; IR (neat) 1717 cm^{-1}.

Cyclododecanone. The residue was purified on silica gel column chromatography using ethyl acetate and hexane (1:19) to provide cyclododecanone as a colorless solid in 87% (158.6 mg) yield. Mp 58 ^{o}C; ^{1}H NMR ($CDCl_3$) δ 2.4-2.2 (m, 4H), 1.7-1.6 (m, 4H), 1.4-1.3 (m, 14H); IR (KBr) 1710 cm^{-1}; ^{13}C NMR ($CDCl_3$) δ 212.5, 44.1, 43.1, 42.7, 24.9, 24.6, 24.2, 22.9, 22.8, 22.7; IR (neat) 1714 cm^{-1}.