

Reagent/Reaction	Use	Ref	Note
DMSO/DCC (Pfitzner-Moffatt or Moffatt)	Alcohol → ketone/aldehyde	Jacs 1963, 3027; Mech: JACS, 1965, 5561, JOC, 1967, 1926	First DMSO-based; DCC pain to remove; EDCI better
DMSO/Ac <sub>2</sub> O	“	Jacs 1967, 2416	
DMSO/TFAA	“	Jacs, 1975, 2758	
DMSO/SO <sub>3</sub> -Pyridine (Parikh-Doering)	“	JACS, 1967, 5505	Often under ambient conditions; best for α-chiral aldehydes/ketones
(COCl) <sub>2</sub> /DMSO (swern)	“	JOC, 1978, 2480; mech: Tet. 1978, 1651	Most commonly used;
DMSO/Ac <sub>2</sub> O or other activating reagents (Pummerer rearrangement)	RCH <sub>2</sub> S(O)R → RCH(OR)S(O)R	Org. Reactions, 1991, 157	Sometimes competes with swern-type [O]; makes dimysl anion equiv. to acyl anion
Dess-Martin periodinane	Alcohol → ketone/aldehyde Dithiane → ketone (deprotection)	JACS, 1983, 4155; Org Synt, 1999, 141; Mech: JACS, 1991, 7277; with 1 equiv water: JOC, 1994, 7549	Very mild, easy workup, good yields. Very popular for complex molecules, potential shock and heat sensitivity
IBX	Alcohol → ketone/aldehyde Diol → hydroxyl ketone (no cleavage); ketone → enone; Amine → imine	Prep: JOC, 1999, 4537 TL, 1994, 8019, Jacs, 2000, 7596; ACIEE, 2003, 3981	Precursor to DMP
TPAP	Alcohol → ketone/aldehyde Lactol → lactone	Reviews: synthesis, 1994, 639; W.P. Griffith, S. V. Ley, Aldrichimica Acta, 1990, 23, 13-19 (great review)	Cat Ru(VII) with stoichiometric NMO; 4AMS a must.
TEMPO (and related)	“	Ref 5-13 in JOC, 1997, 6974; 3 proposed mechs: JOC 1975, 1998; TL 1986, 1119; JOC, 1991, 6110	Usually cat. Tempo and stoichiometric cheap [O]; often very selective, good for larger scale.
TEMPO/NaOCl + NaClO <sub>2</sub>	Primary alcohol → acid	JOC, 1999, 2564	Great method from Merck process group
MnO <sub>2</sub>	Allylic alcohol → enone Benzylic alcohol → ketone/ald; whole bunch of crazy stuff	Review: Paquette, Encyclopedia...1995, Vol 5, p 3229	Reactivity varies with preparation. Commercial stuff sometimes bad. Note: diols can be cleaved
BaMnO <sub>4</sub>	Allylic/benzylic alcohol → ketone/aldehyde	Review: Synthesis, 1987, 85	
Lewis acid/aldehyde (Oppenauer oxidation)	Alcohol → aldehyde/ketone	Review: Synthesis 1994, 1007	Reverse of Meerwein-Ponndorf-Verley; reversible, B, Ti and Zr popular Lewis acids
H <sub>2</sub> CrO <sub>4</sub> /H <sub>2</sub> SO <sub>4</sub> (Jones)	Alcohol/aldehyde → acid	General Cr review: Comp. Org. Syn. Vol 7, 251	Pretty brutal; some olefin oxidation or migration; diol cleavage
CrO <sub>3</sub> -Py <sub>2</sub> (Collins)	Alcohol → ketone/aldehyde	TL, 1968, 3363; Org. Syn. 1972, 5	Add Cr to Py; addn of Py to CrO <sub>3</sub> pretty violent; usually use ~6 equiv
PCC (Corey's reagent)	“	TL, 1975, 2647	Air stable, not hygroscopic (good for → aldehyde b/c no acetal formation); usually use ~1.5 equiv, often add celite to avoid clumping, MS 4A to accelerate
PCC (Corey's reagent)	3o allylic alcohol → enone (with transposition)	JOC, 1977, 682	Very nice route to enones, especially cyclic

PDC (PyH <sup>+</sup> ) <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub>	Alcohol/aldehyde → acid Aldehyde → Methyl ester	Eg: TL 1987, 3235	Good for acid-sensitive substrates
NBS or Br <sub>2</sub>	Alcohol → ketone	Eg's: TL 1979, 2745 (2° in presence of 1°); JACS, 2000 (lactol in presence of 2°); JACS, 1979, 5839 (stannylene acetal in presence of 2°)	Br <sub>2</sub> can be pretty difficult to handle.
NaClO <sub>2</sub>	Aldehyde → acid	Acta. Chem. Scand. 1973, 888	Usually done with added 2-methyl-2-butene (proposed to scavenge Cl <sub>2</sub> ); see above for one step route from 1° alcohol
KMnO <sub>4</sub>	1° alcohol → acid 2° alcohol → ketone Olefin → diol, diketone, α-hydroxy ketone, cleaved diacid,	Use: Paquette, Encyclopedia...vol 6, p 4274 Mech: JOC, 1982, 56	General and inexpensive oxidant. Products with olefins depends on solvent, acid. Also pretty good TLC stain
Ag <sub>2</sub> O	Aldehyde → acid	Old school.	
KCN/MnO <sub>2</sub> /MeOH (Corey-Gilman-Ganem oxidation)	Aldehyde → methyl ester	JACS, 1968, 5616	Via cyanohydrin intermediate
Br <sub>2</sub>	Aldehyde → ester	Review: Chem Soc. Rev. 1994, 357; egs. TL 1988, 5087; Tet 1996, 6409	Aq. Conditions; likely hemiacetal intermediate
Davis Oxaziridine	Ketone → α-hydroxy ketone	Review: Chem Rev. 1992, 919.	Usually oxidation of potassium enolate; enantioselective variants exist. Oxaziridine from ox of imine
MoO <sub>5</sub> -Py-HMPA (MoOPH)	“	Prep of MoOPH: Org Syn. 1986, 64, 127; examples: JOC 1978, 188, JACS, 1974, 5944	
Silylether+[O] (Rubottom oxidation)	“	Eg's: TL, 1974, 4319; JOC 1995, 3385	
PhNO	Aldehyde/ketone → α-hydroxy aldehyde/ketone	JACS 2003, 6038; jacs 2003, 10808; ACIEE, 2004, 1109, 1112.	All reports are asymmetric; different catalysts
Ag <sub>2</sub> CO <sub>3</sub> /celite (fetizon's reagent)	Diol → lactone	Chem Comm. 1969, 1102; TL 1972, 4445; JOC, 1974, 523	Cannot store reagent for long periods of time. Other oxidation methods that take alcohol to acid will often work also.
Pd(OAc) <sub>2</sub> (Segusa oxidation)	Enol ether → enone	Comp. Org. Syn.; 1991, vol 7, p 119-146	Also S and Se-based methods
Nef oxidation	Nitro alkane → ketone		Pretty brutal; more mild conditions involve Ti(III): Acct. Chem. Res. 1974, 281; Related: ACIEE, 2005, 612
(NH <sub>4</sub> ) <sub>6</sub> Mo <sub>7</sub> O <sub>24</sub> /H <sub>2</sub> O <sub>2</sub>	Alcohol → ketone	Trost, TL, 1984, 173	Selectivity for 2° over 1°; for more hindered over less hindered; \$.15/g for Mo compd

Topics not covered here but very important: epoxidations, dihydroxylations, allylic oxidations, oxidations at atoms other than C, Baeyer-Villiger, ox. Based on Pb, Hg, oxidative couplings involving Cu or V.