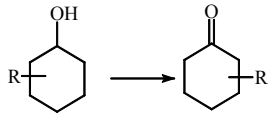
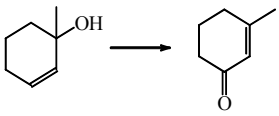
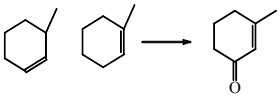
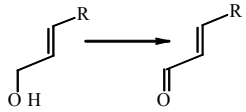
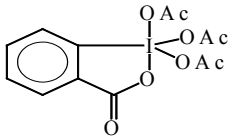
Chem 535 Synthetic Organic Chemistry –
Common Oxidizing Agents for the Conversion of ROH Functionality

Name	Composition	Typical Use	Scope & Limitations
Jones Reagent (most reactive of the common Chromium-based oxidizing reagents[1]	$H_2Cr_2O_7$ or $Na_2Cr_2O_7 + H_2SO_4$	  $RCH_2OH \rightarrow RCO_2H$	The chromium reagent oxidizes amines, sulfides; Cleaves 1,2-diaols and related functionaliy
Collins Reagent[2,3]	$CrO_3 \bullet NC_5H_5/CH_2Cl_2$ $CrO_3 \bullet Py_2$		Large excess often needed, messy workup
PCC=pyridinium chlorochromate[4]	$PyH \bullet ClCrO_3$	same as collins	Method of choice. Reagent is a solid, 1.5 equivs excess usually suffices can buffer acidic reagent with NaOAc
PDC[5]	$2Py \bullet Cr_2O_7$	$RCH_2OH \rightarrow RCO_2H$	probably better than jones
Active MnO_2[6]			Benzyl, allyl, cyclopropylcarbinyl alcohols are selectively oxidized
Swern[7]	DMSO, Oxalyl chloride, NEt_3	1° or 2° alcohol to aldehyde or ketone	won't oxidize R_2S or NR_3, or cleave diols or ∀-subheteroatom carbonyls
Moffatt[8]	DMSO, R-N=C=N-R H^+ or DMSO, Ac_2O	as in Swern	

$NaClO_2$ [9]	aqueous systems	RCHO □ RCO_2H	Method of Choice in complex systems
Dess-Martin reagent[10]		RCH_2OH□ RCHO RR'CHOH□RCOR'	very mild conditions

References:

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5. E. J. Corey et. al. *Tetrahedron. Lett.* **1979**, 399.

6. Carpino et. al. *J. Org. Chem.* **1970**, *35*, 3971.

7. D. Swern, *J. Org. Chem.* **1979**, *44*, 4148.

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