

A summary of six of the major oxygen-containing functional groups (Ch 8, 9, 10, 12)

type	general formula	example	IUPAC name (common name)
<u>Ch 8, 9</u> (one single-bonded oxygen)			
a. alcohol	R-O-H	CH ₃ CH ₂ OH	ethanol (ethyl alcohol)
b. ether	R-O-R'	CH ₃ CH ₂ OCH ₃	methoxyethane (ethyl methyl ether)
<u>Ch 10</u> (one double-bonded oxygen)			
a. aldehyde	$\begin{array}{c} \text{O} \\ \\ \text{RC-H} \end{array}$	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3\text{CH} \end{array}$	ethanal (acetaldehyde)
b. ketone	$\begin{array}{c} \text{O} \\ \\ \text{RC-R}' \end{array}$	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3\text{CH}_2\text{CCH}_3 \end{array}$	2-butanone ethyl methyl ketone (or MEK)
<u>Ch 12</u> (two oxygens)			
a. (carboxylic) acid	$\begin{array}{c} \text{O} \\ \\ \text{RC-O-H} \end{array}$	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3\text{COH} \end{array}$	ethanoic acid (acetic acid)
b. ester	$\begin{array}{c} \text{O} \\ \\ \text{RC-O-R}' \end{array}$	$\begin{array}{c} \text{O} \\ \\ \text{CH}_3\text{COCH}_3 \end{array}$	methyl ethanoate (methyl acetate)

Notes

R and R' refer to groups. (They need not specifically be alkyl groups.) The ' ("prime") indicates that the two groups need not be the same.

The a and b entries of each set are related structurally. In each case, the a compound has an -H, which is replaced by an -R' in the b compound.

The only case where one can easily interconvert the a and b compounds is with acids and esters, Ch 12.

Some of these compounds can be interconverted by oxidation and reduction reactions. See separate handout.