19.1: CARBONYL COMPOUND STRUCTURE AND PROPERTIES

THE CARBONYLS: THE ALDEHYES AND KETONES

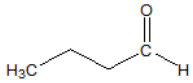
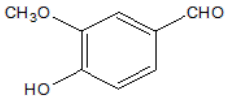
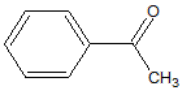
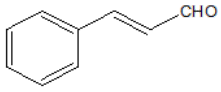
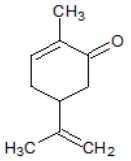
While there are several functional groups that include a carbonyl structural feature, the term "carbonyls" is used to describe aldehydes and ketones.

the carbonyl structural feature

aldehyde

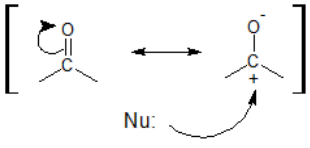
ketone

Aldehydes and ketones share a great deal of chemical reactivity so it makes sense to talk about these two functional groups within the same chapter. Aldehydes and ketones are both polar molecules that are H-bond acceptors. Following the "4 to 6 Rule", aldehydes and ketones with short carbon chains are soluble in water. Aldehydes and ketones are typically liquids with densities of approximately 0.8 g/mL. Aldehydes and ketones are prevalent in common household substances as shown in the table below.

Compound	Structure	Odor	Uses
Butyraldehyde		buttery	foods
Vanillin		vanilla	foods & perfumes
Acetophenone		pistachio	ice cream
Trans-Cinnamaldehyde		cinnamon & drugs	candy, food,
(-) carvone		spearmint	candy & food
(+) carvone		caraway	food
seed			

ALDEHYDES AND KETONES ARE ELECTROPHILES

The carbon of the carbonyl group is electrophilic because of resonance as shown below.



The δ+ and trigonal planar molecular shape make carbonyl carbons good electrophiles.