Aldehydes/Ketones I

General

Naming

Prep.

Ref 16: 1 - 5

Prob 16: 1; in-class HMWK

Adv Rdg 16: 6

General

(R_1 and/or R_2 = H: aldehyde; else ketone)

- C and (O) sp^2 hybridized
- R_1, R2, C, O all in same plane
- ~ 120° bonding angle
- strongly **polar** bond present

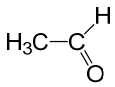
MO Description

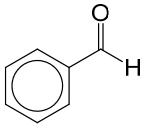
π orbital;
larger on O; polarized MO
bonding, same phase overlap
contains 2 e^-'s

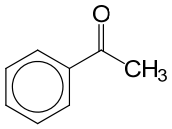
π^* orbital (antibonding);
larger on C; polarized MO
empty in ground state
"LUMO"
nucleophiles attack here

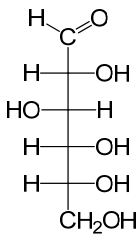
"sp^2"orbitals on O,
contain non-bonding e^-'s,
attract electrophiles

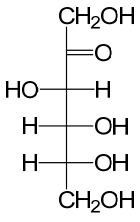
Common Names/ Occurrence











open structures

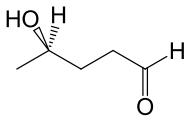
table sugar = dimer of glucose and fructose

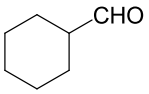
Systematic Naming

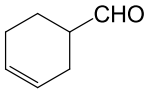
1.) Aldehydes

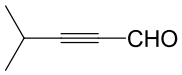
- ending: ...al
- highest priority (so far)
- always terminal; therefore C1
- carbaldehyde (carboxaldehyde) if attached to ring

Practice



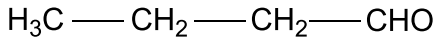






Use of Greek letters in carbonyl cmpds

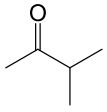
Ex.

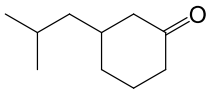


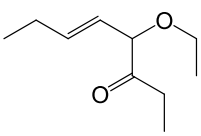
2.) Ketones

- ending: ...one
- "highest priority" , higher than –OH, = , otherwise similar to alcohols

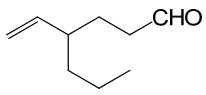
Practice

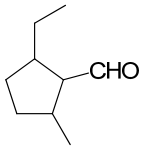


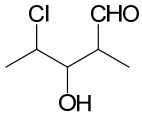


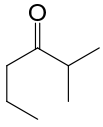


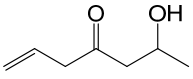
HMWK: Naming of Aldehydes & Ketones

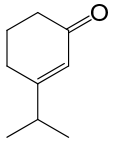








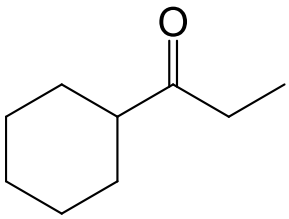




Semi-systematic Naming

"alkyl alkyl ketone" method

e.g.,



Preparation

A.) Aldehydes

1.) Oxidation of 1° alcohols

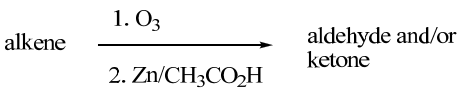
in non-aqueous media

esp. w/ PCC in CH_2Cl_2
"pyridinium chlorochromate"

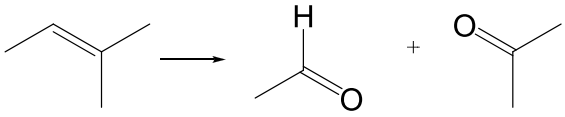
Ex.

(mech. later)

2.) **Ozonolysis** (see CHEM261)



Ex.



3.) **Hydroboration of terminal alkynes**

4.) **Reduction of acid derivatives**
(later)

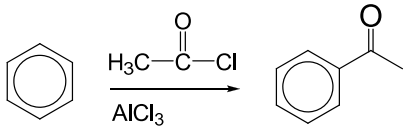
B.) Ketones

1.)

2.) Ozonolysis (seen before)
(*e.g.....cyclopentane-1,3-dicarbaldehyde*)

3.) Oxymercuration of alkynes (terminal or internal);
seen before; e.g.

4.) Friedel - Crafts Acylation; see before; e.g.



Mech. of PCC Oxidation