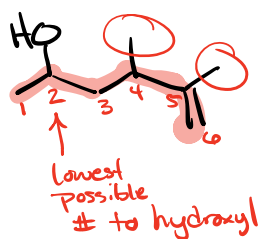


Alcohols & Phenols

Nomenclature

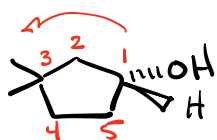


alkene < alkyne < alcohols

- Main Chain must contain alcohol

parts {
4,5-dimethyl
5-ene
2-ol
hex 6-Carbon

4,5-dimethylhex-5-en-2-ol

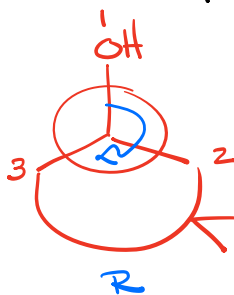
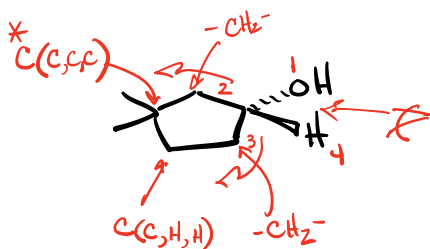


(1R)

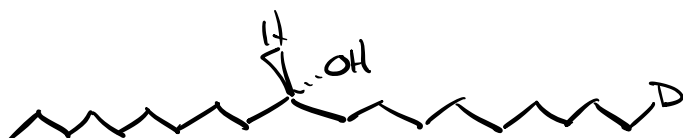
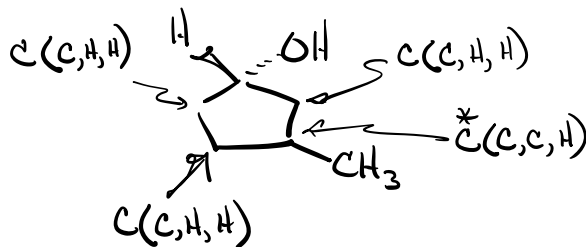
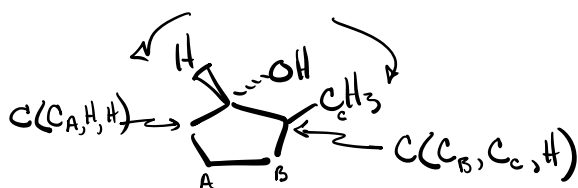
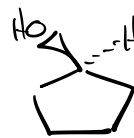
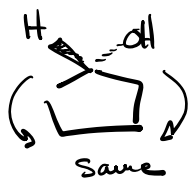
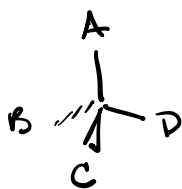
1-ol

3,3-dimethyl

Cyclopent



(R)-3,3-dimethylcyclopent-1-ol



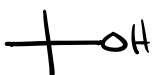
Many Common names for alcohols



isopropanol

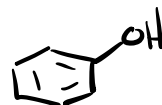
2-propanol

propan-2-ol



tert-butanol

2-methylpropan-2-ol

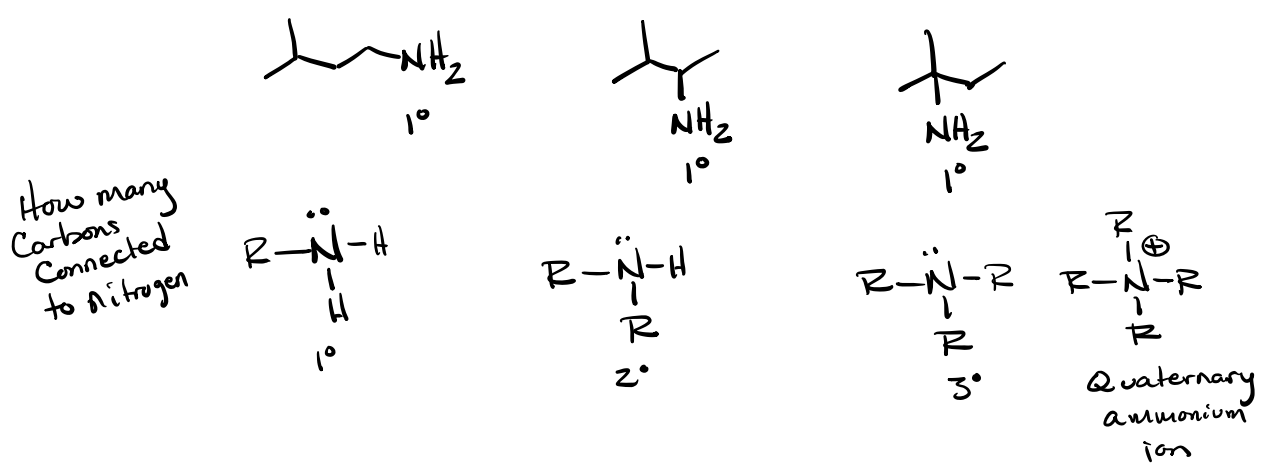
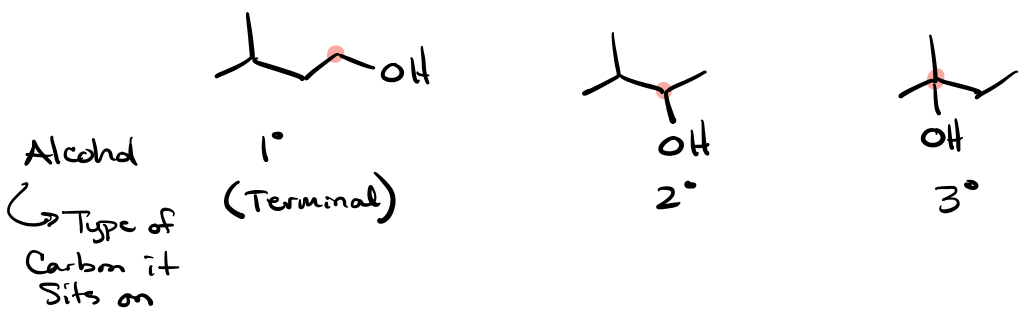


Phenol

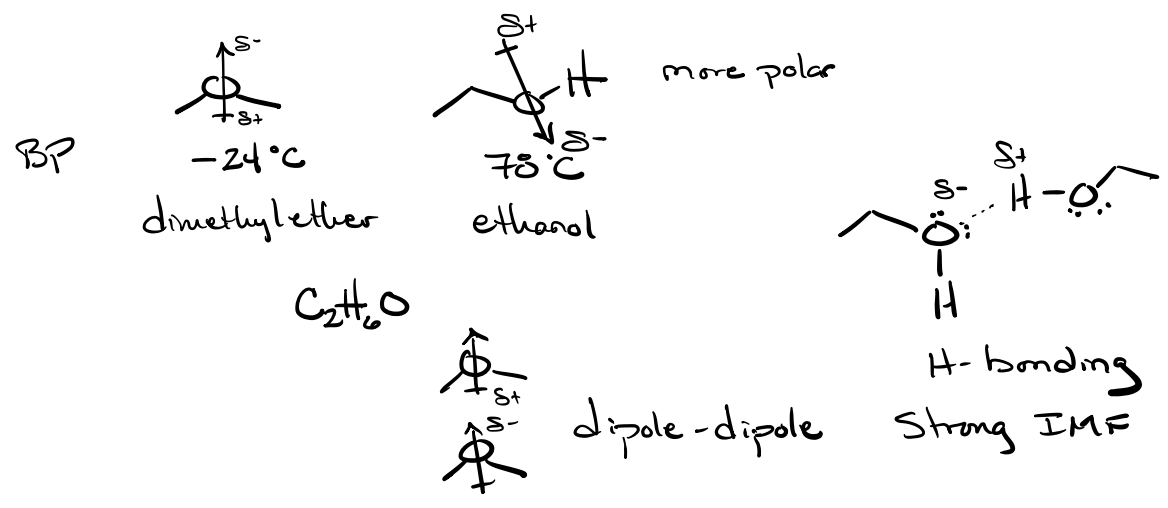


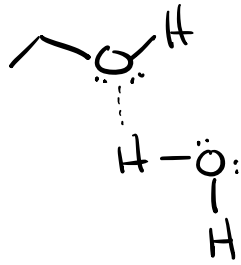
benzyl alcohol

Classification



Physical Properties

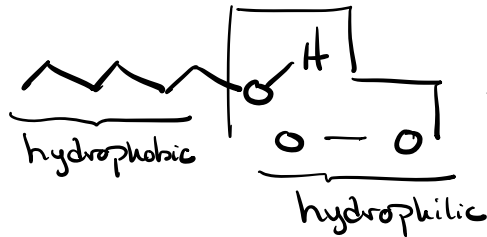




H-bonding with water

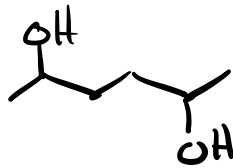
Like - dissolves - Like

Increased H₂O Solubility



pulls carbons into water solubility

HO can pull 3-4 carbons into solubility



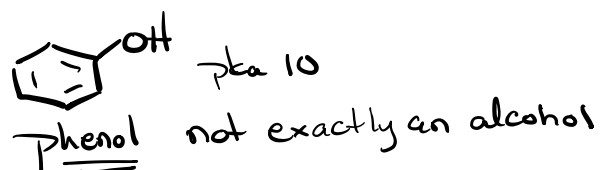
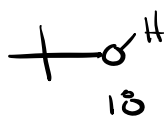
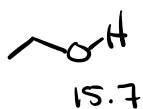
water soluble

$$2 \text{ OH} \times 3 = 6 \text{ carbons}$$

$$\frac{\text{OH}}{\text{C}} \text{ ratio}$$

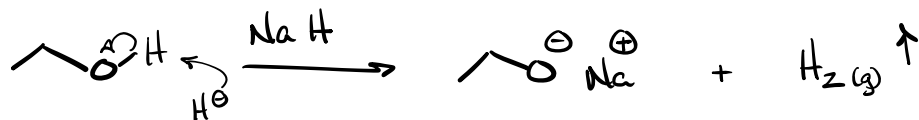
Acidity

	C-H	N-H	O-H	X-H
pKa	60	35-45	15-18	-10--3

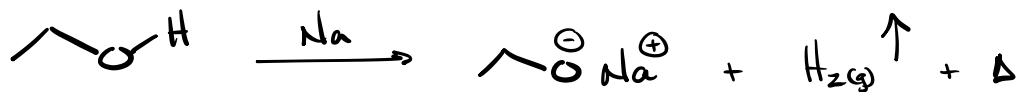


Reagents for Deprotonation - to make nucleophiles

* hydrides (NaH, KH, CaH₂)

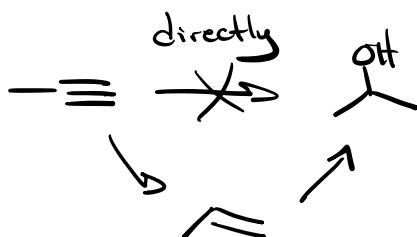
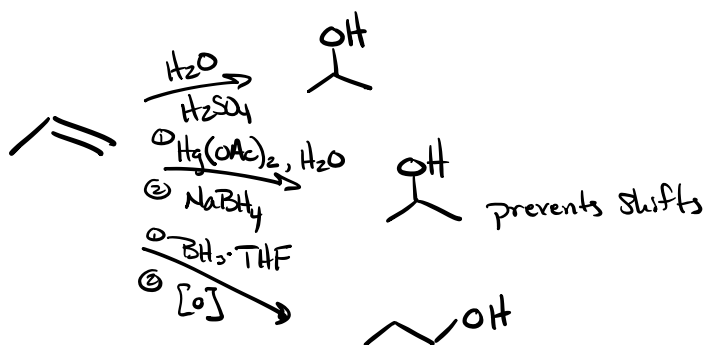
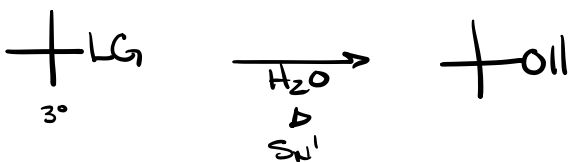
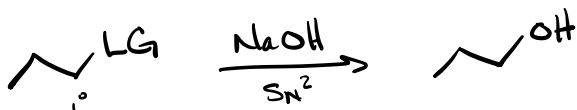


Alkali Metals (Na, K, Li)

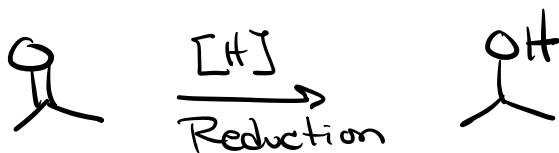


Synthesis

Review



New



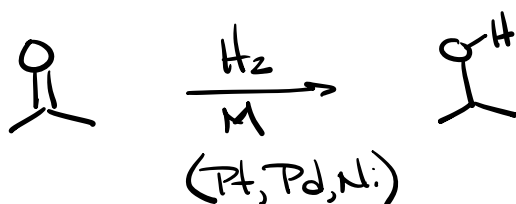
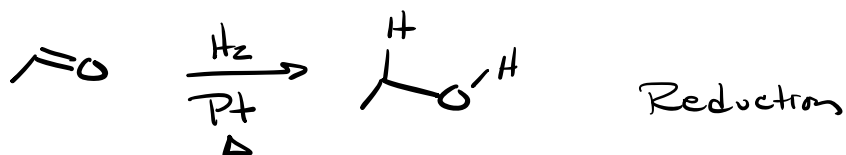
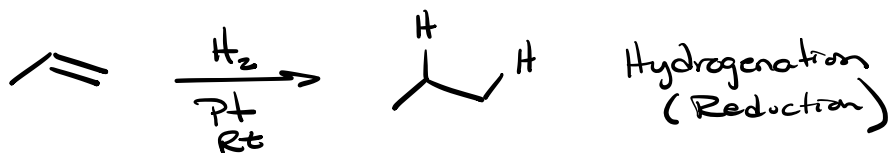
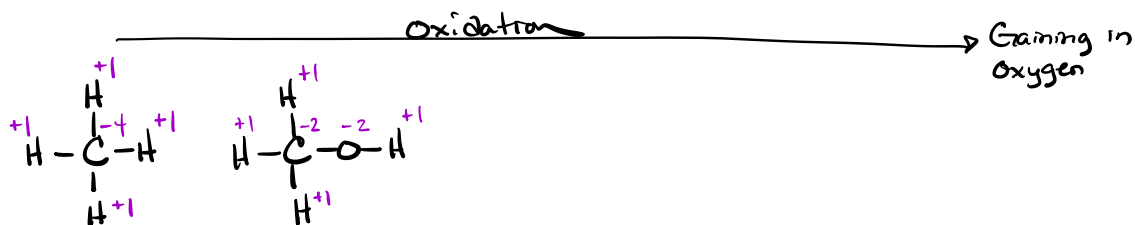
Oxidation States

oxidation is Loss of e^-
 Reduction is Gain of e^-

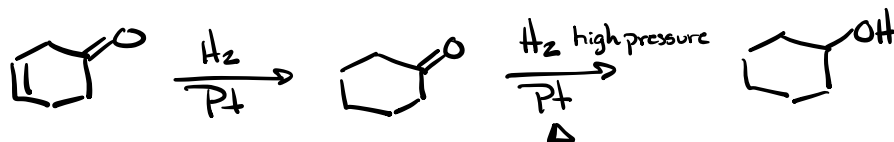
oxidation = gain of oxygen, or loss of hydrogen

Reduction = gain of hydrogen, or loss of oxygen

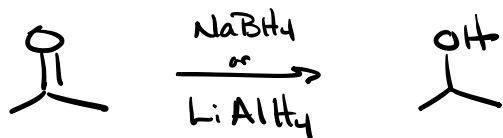
← Reduction



Requires higher temp & pressure than alkenes
 ⇒ Can be selective

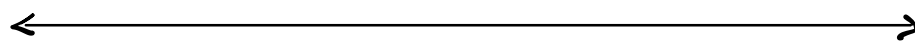


Additional Hydride Reducing Agents



mild

strong



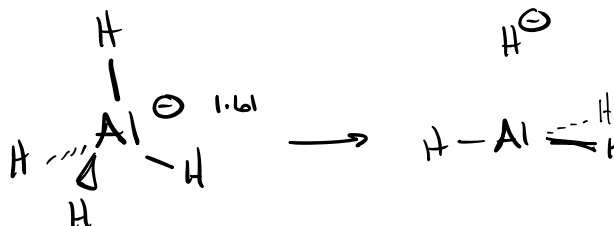
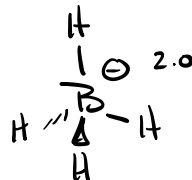
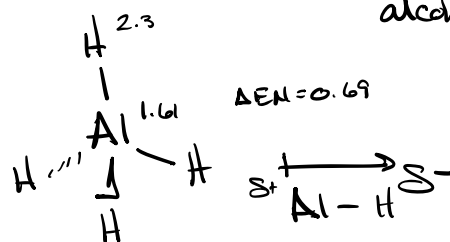
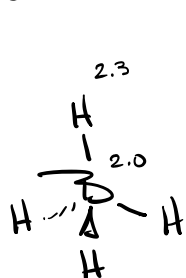
NaBH₄

many intermediates

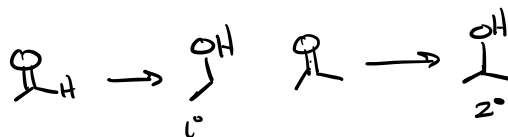
LiAlH₄

- Handled in air
- used in alcohols

- Handled in inert atmosphere (N₂ or Ar)
- Explodes w/ alcohols & H₂O

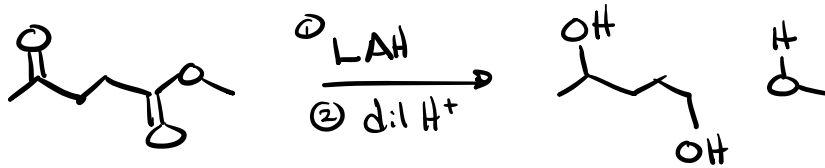
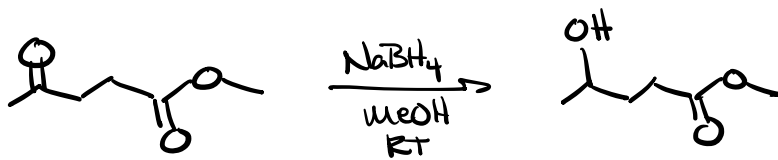


NaBH₄ weak
 good for Aldehydes & ketones
 Can be used in protic Solvents



LiAlH₄ Strong

No protic Solvent
 Reduces Aldehydes, ketones, esters, Carboxylic acids, amides, ...
 Requires 2nd protonation Step.



Ester Reduction w/ LAH

