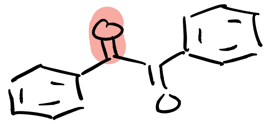
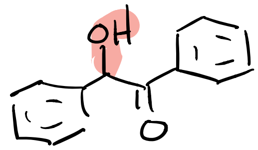
Part B - Choosing the right Solvent

A)



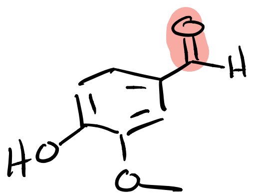
Benzoin



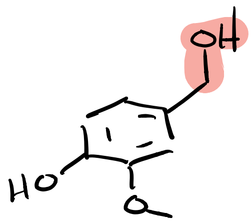
Benzil

acetone CH_2Cl_2 hexane

B)



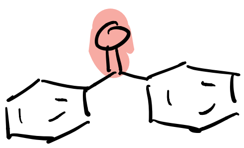
Vanillin



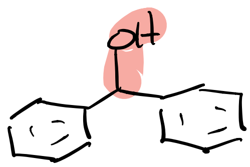
Vanillyl Alcohol

acetone 50/50 v/v toluene EtOAc hexane

C)

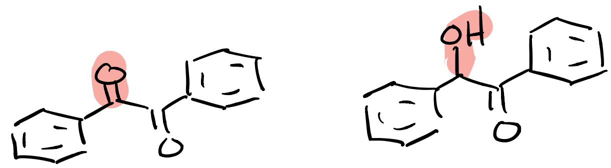


Benzophenone



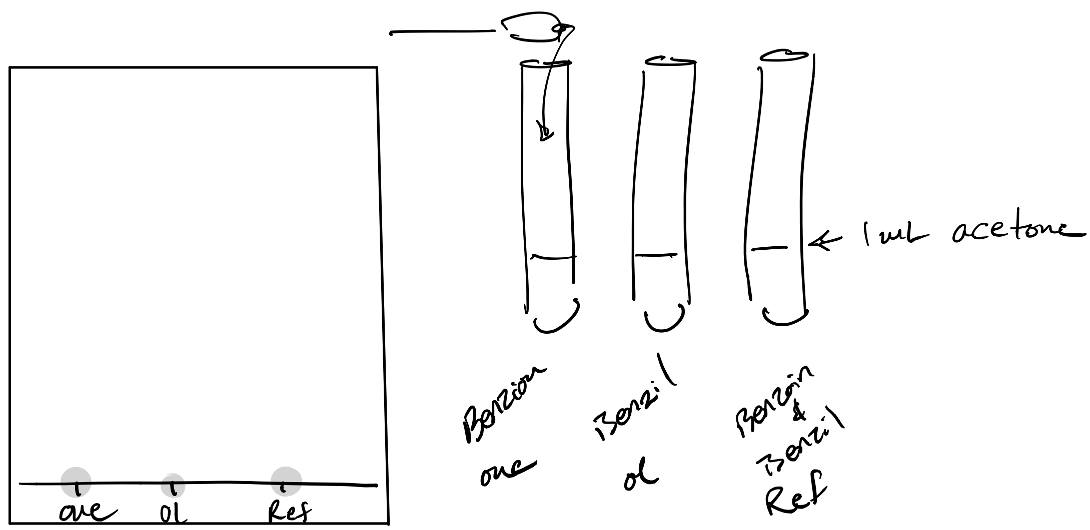
Diphenyl methanol

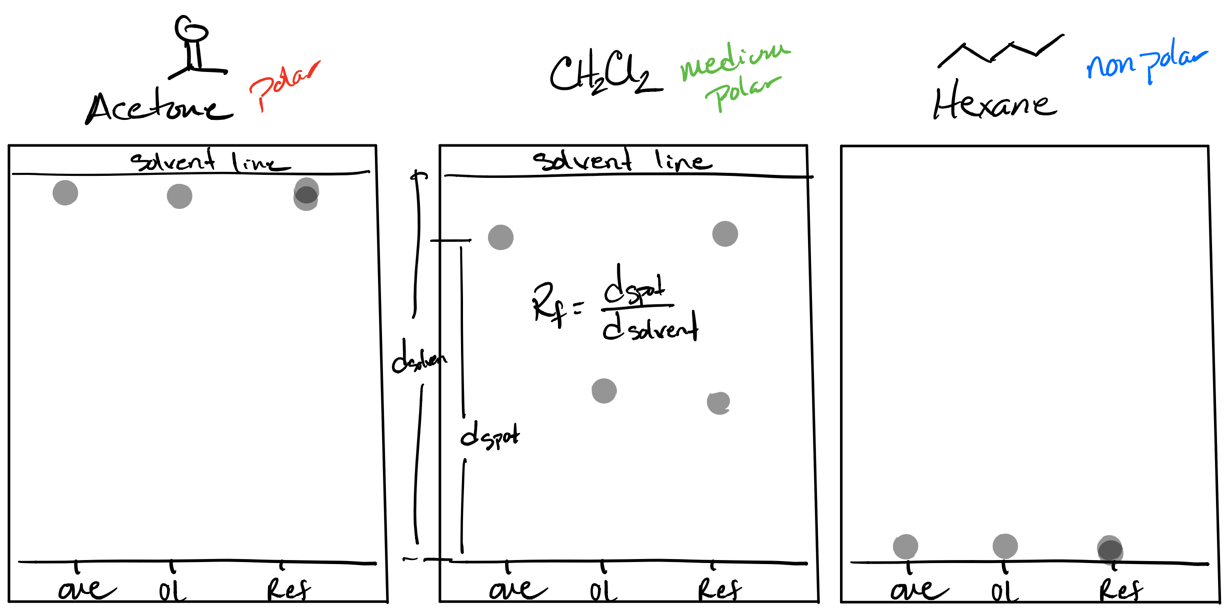
acetone 70/30 v/v acetone/hexane hexane

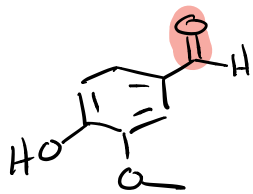


Benzoin

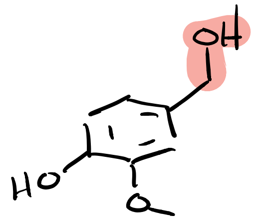
Benzil



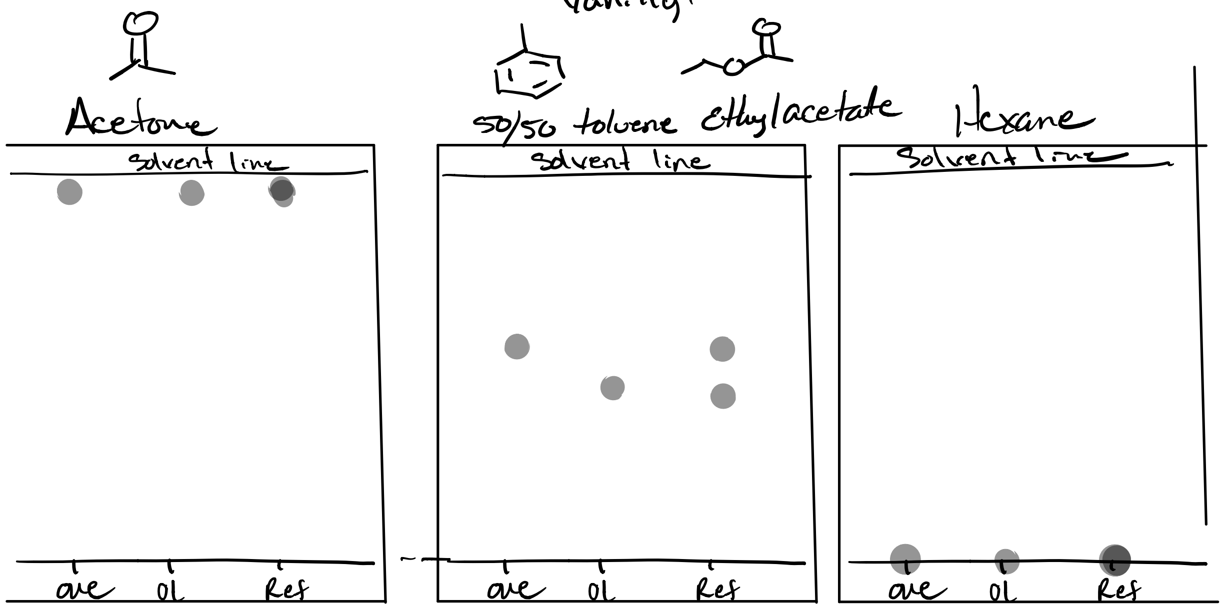




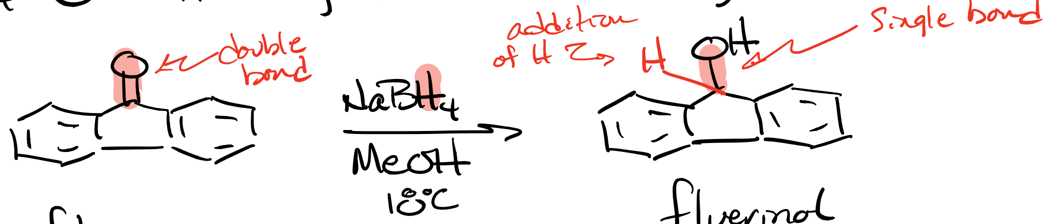
Vanillin



Vanillyl Alcohol



Part C - Tracking Chemical Rxn by TLC



fluerinone → fluerinol

Reduction

Oxidation = The gain of oxygen or loss of hydrogen

Reduction = The gain of hydrogen or loss of oxygen

Hydride Reagents

H_2 molecular hydrogen

H^+ hydrogen ion → proton

$H:^-$ hydride

O^{2-} oxide

N^{3-} Nitride

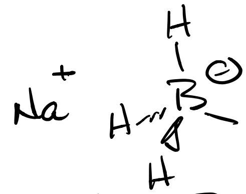
F^- fluoride

Cl^- Choride

NaH Sodium hydride

KH Potassium hydride

CaH_2 Calcium hydrede



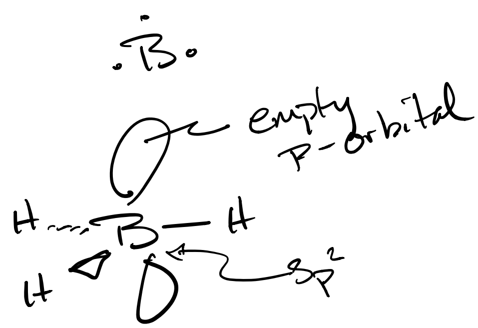
Sodium Borohydride

mild — use in air & protic solvents

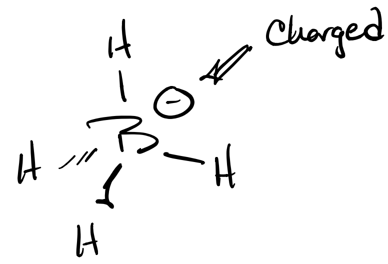
strong — Explode in air

$NaBH_4$ ← → CaH_2 — NaH, KH — $LiAlH_4$

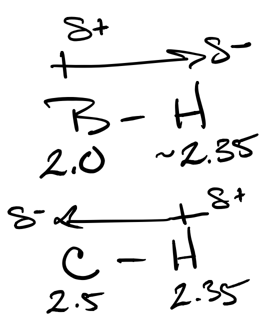
Boron 3A element

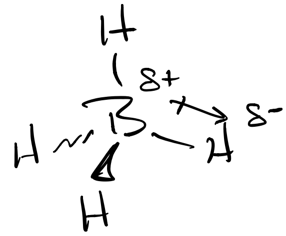


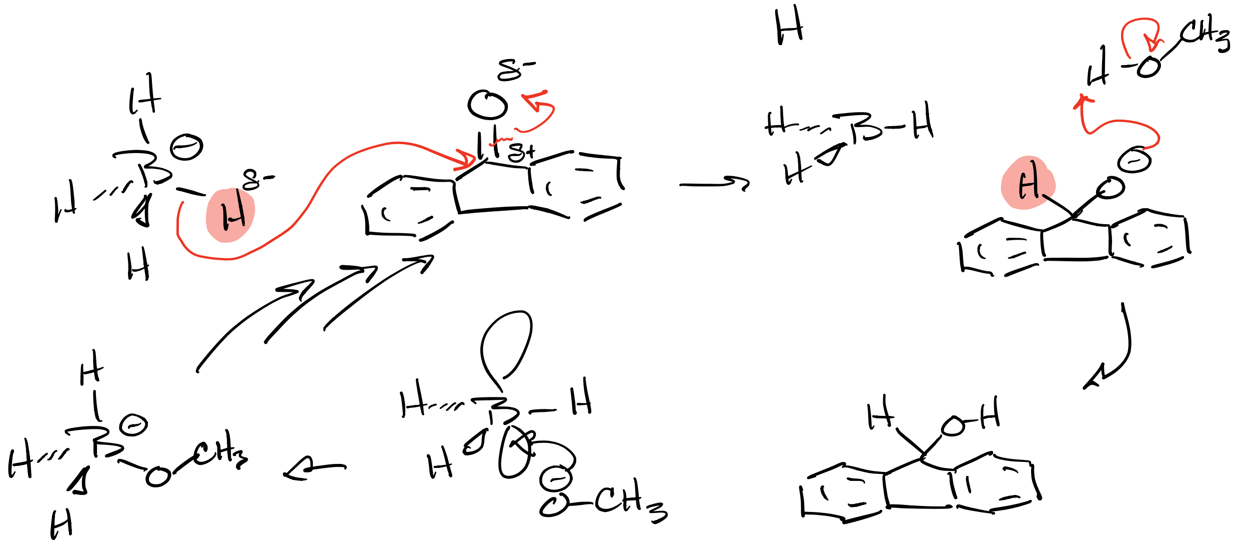
Borane
6 valence e⁻

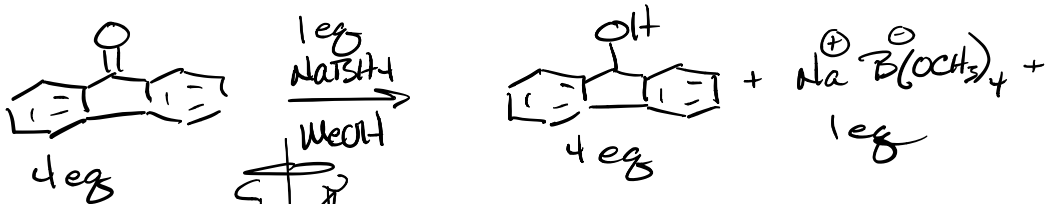


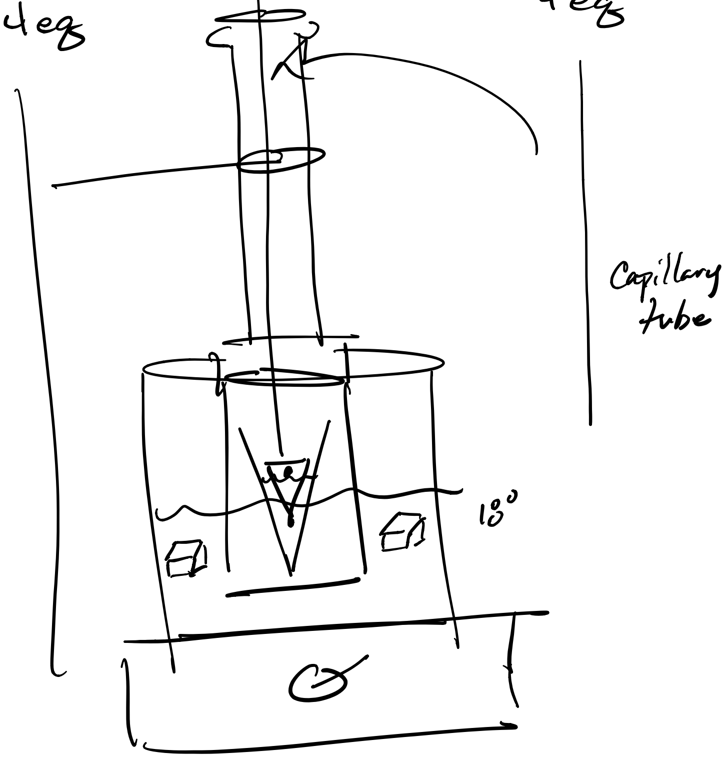
Borohydride
8 valene e⁻

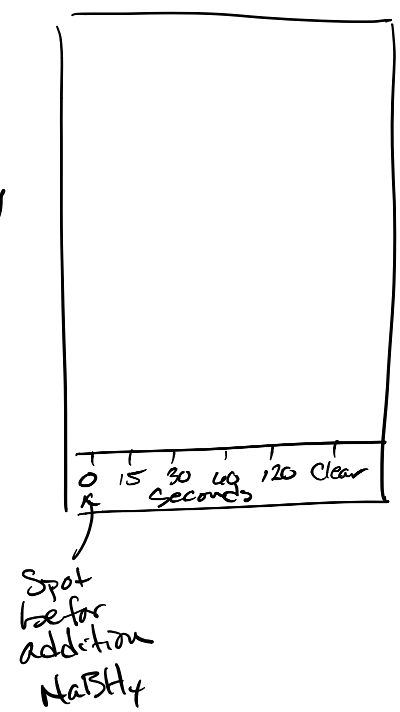


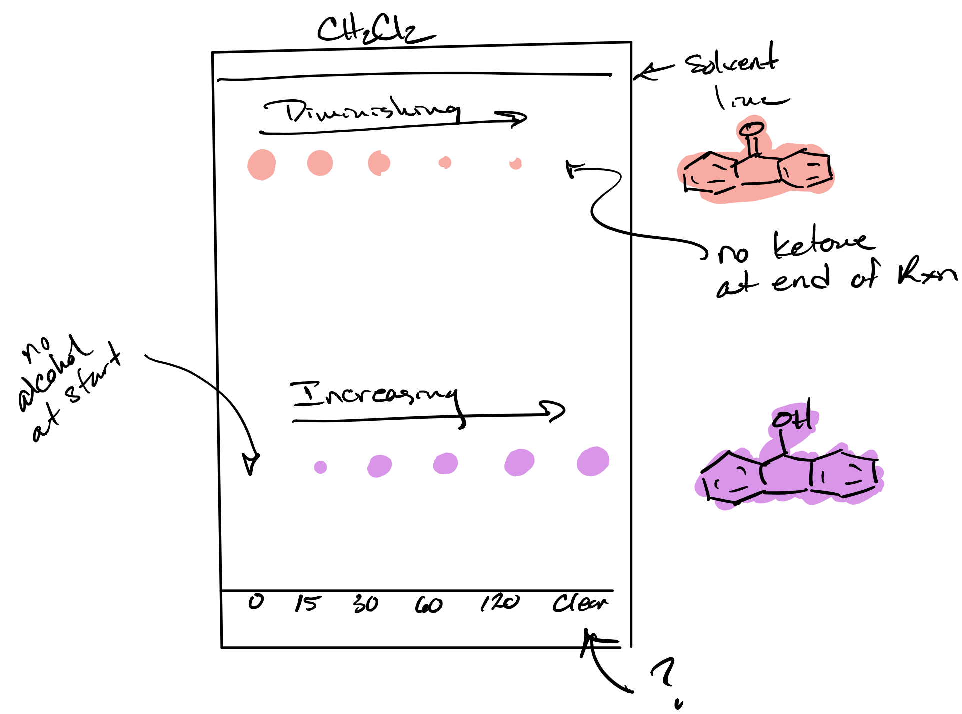


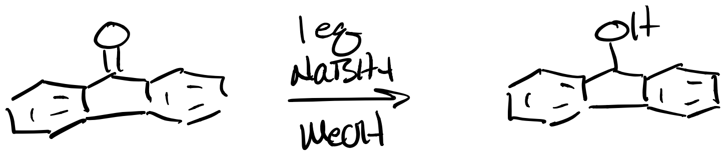



4 eq
1 eq NaBH4
MeOH
OH
4 eq
+ Na⊕ B⊖(OCH3)4 +
1 eq


Capillary tube

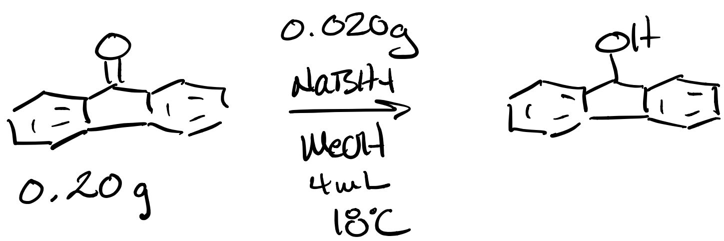

0 15 30 60 120 Clear
seconds
Spot befor addition NaBH4


CH2Cl2
solvent line
Diminishing
no ketone at end of Rxn
no alcohol at start
Increasing
OH
0 15 30 60 120 Clear
?



fluorenone
yellow

fluorenol
Colorless



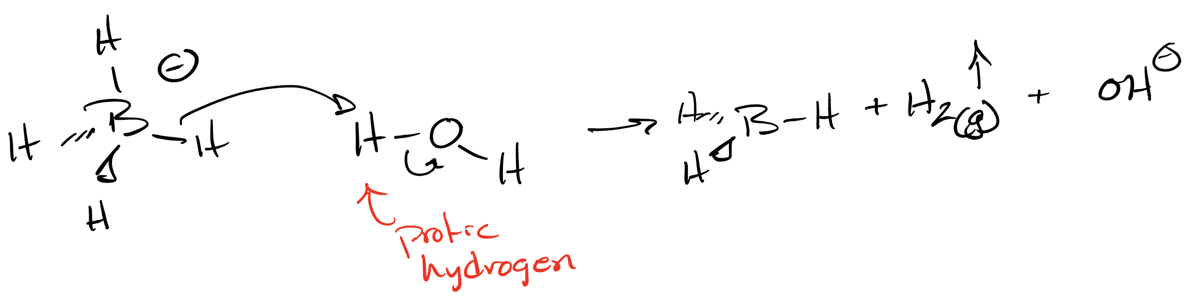
$C_{13}H_8O$
180.21 g/mol

$NaBH_4$
37.8325 g/mol

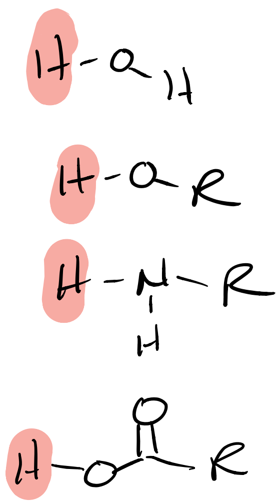
$$0.20\,g\ C_{13}H_8O \times \frac{1\ mole}{180.21\,g} \times \frac{1000\ mmol}{1\ mole} = 1.11\ mmole$$

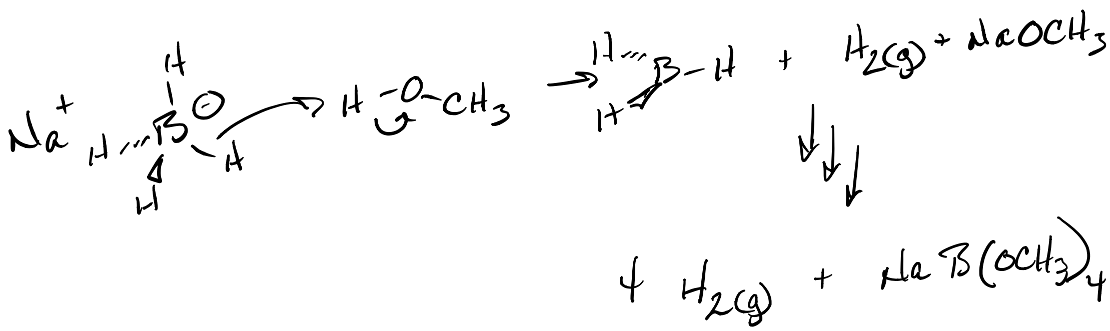
$$0.020\,g\ NaBH_4 \times \frac{1\ mole}{37.8325\,g} \times \frac{4\ mole\ H}{1\ mole\ BH_4} \times \frac{1000\ mmol\ H}{1\ mole\ H} = 2.11\ mmol$$

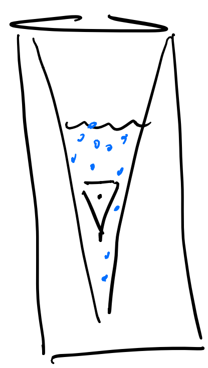
2x needed

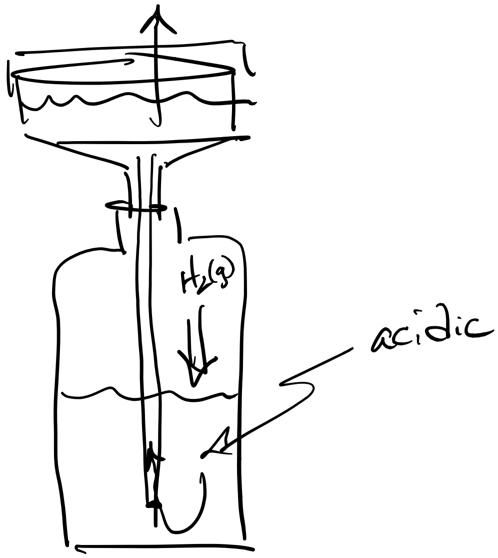


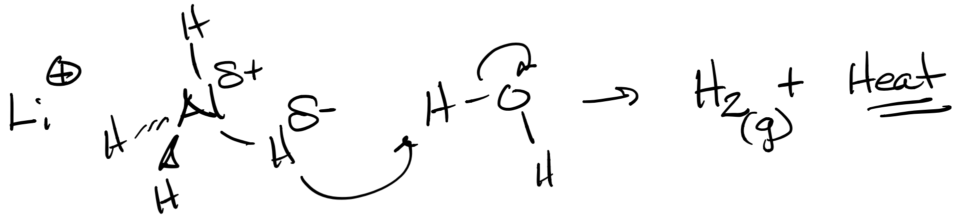
Protic hydrogen = hydrogen bonding hydrogen











NaH
KH } Never use metal
Always use plasic

static electricity can detonate hydrides