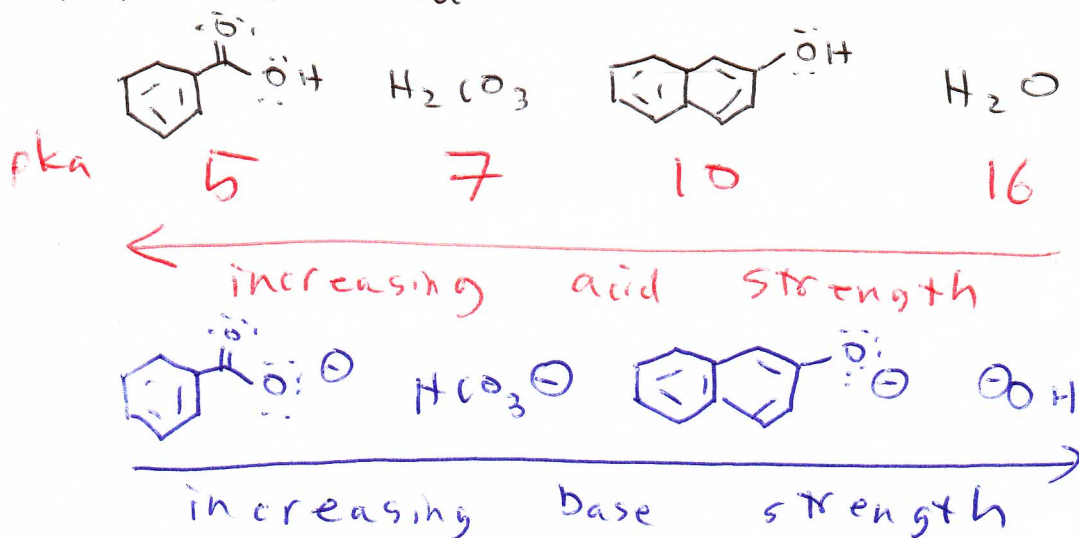


## Lab #1 - Extraction

Technique of extraction

Polarity, immiscible, density

Acid-base neutralization

Drying agent  $\rightarrow$  recrystallization + MP

## Lab #2 - TLC

Polarity as the basis of separation

Stationary + mobile phases

Preparing + developing a TLC plate + visualization

Interpreting  $R_f$  values

## Lab #4 - Spectroscopy

Mechanism

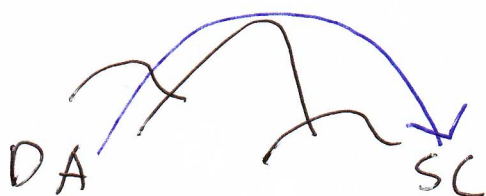
Washes

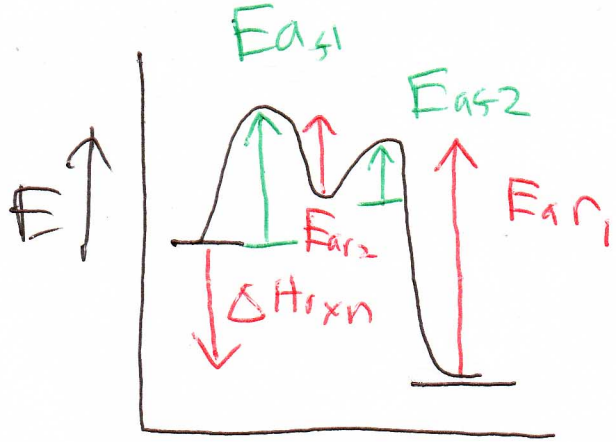
Outline of IR spectroscopy

Verification of successful reaction

Principle of microscopic reversibility

- For a reversible rxn, the energetically most favorable pathway of the forward rxn will be the same as the reverse rxn



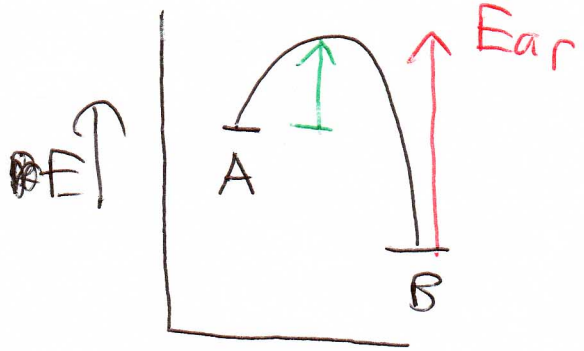


forward:  $E_{a1} > E_{a2}$   
 1st step is RLS  
 reverse:  $E_{ar1} > E_{ar2}$   
 1st step (in reverse) is RLS

RC

$$R_f = k_f [A]$$

$$R_r = k_r [B]$$



RC

Equilibrium:

- 1) The lowest-energy point in a reversible process:  $\Delta E = 0$
- 2) Rate of forward + reverse processes are equal to each other
- 3) No observable change in the concentration of reactants and products

@ Equilibrium  $R_f = R_r = k_f [A] = k_r [B]$

If all other factors are equal (same T, ignore A), since  $E_{ar} > E_{af}$ ,  $k_r < k_f$ .

$$\frac{[B]}{[A]} = \frac{k_f}{k_r} \Rightarrow K$$

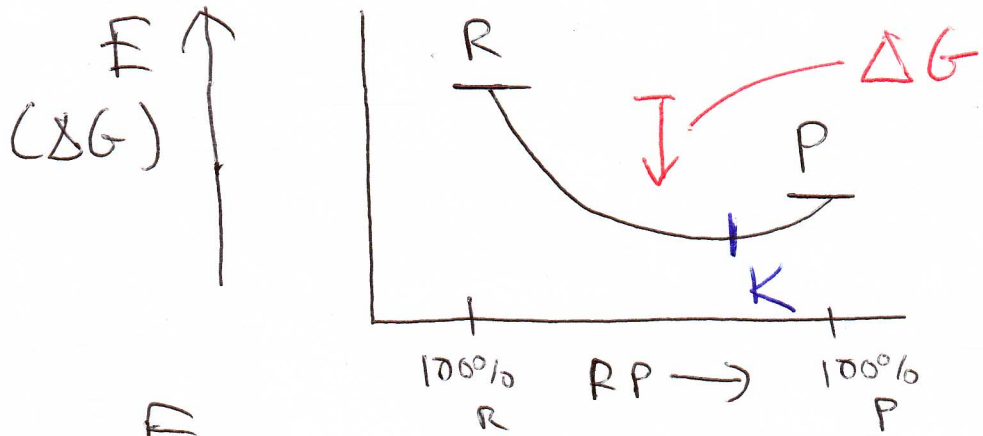
← equilibrium constant  
 → balance of products + reactants @ equilibrium



$$K = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

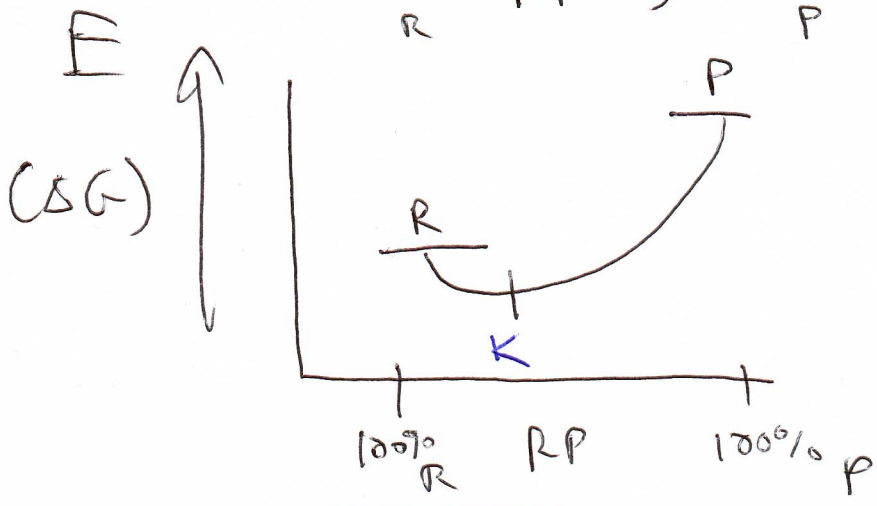
# Reaction progress dia gram-

Measure of the cumulative energy of all instances of a reaction as the solution moves from 100% reactants to 100% products.



$\Delta G < 0 \rightarrow$   
exergonic

$\Delta G > 0 \rightarrow$   
endergonic



$$\Delta G = -RT \ln K$$