

9/28/11

#1

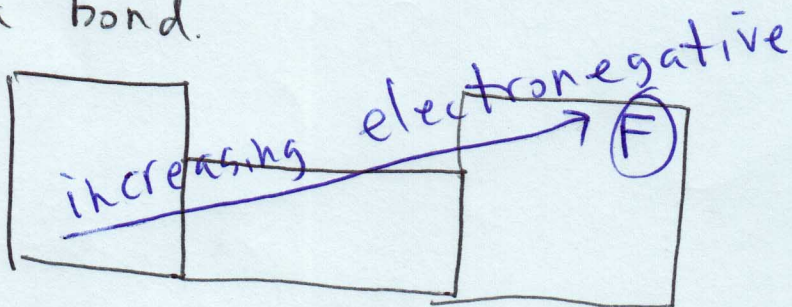
polarity
 solubility
 acid-base neutralization
 extraction
 chemical pet peeves

$\text{H}_3\text{C}-\text{CH}_3$ (ethane)
 MM ≈ 30 g/mol
 gas @ RT

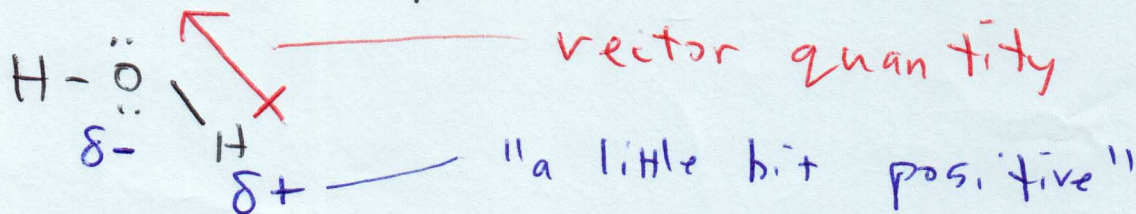
H_2O
 MM ≈ 18 g/mol
 liquid @ RT

why??

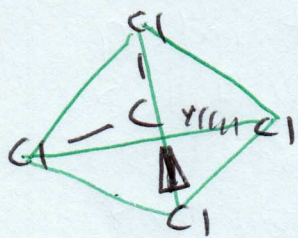
IMF - intermolecular forces - attractive electrostatic interactions between molecules
 electronegativity - the tendency for an atom to pull electrons towards itself when part of a bond.



dipole - a separation of charge in space
Bonds will have dipoles if the atoms in the bond have different electronegativities
 polar - has a dipole

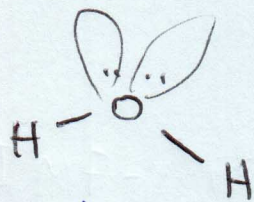


CCl_4



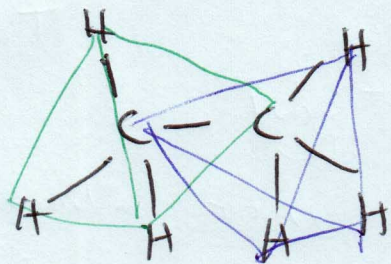
Although the bonds in this molecule ^{#2} are polar, the molecule as a whole is non-polar. because the dipoles all cancel each other,

Molecules will have dipoles if there is structural asymmetry,



polar

(asymmetric)

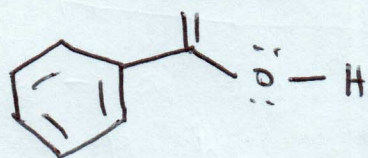


non-polar

(symmetric)

Water is a liquid @ room temperature because its IMF are able to overcome thermal energy (internal kinetic energy)

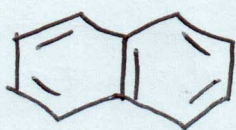
Solubility:



benzoic acid

non-polar

(very slightly polar)



naphthalene

very non-polar

Benzoic acid is non-polar because, although the carboxylic acid functional group is polar, the larger, very non-polar benzene ring outweighs the effect of the carboxylic acid.

solution - a homogeneous mixture

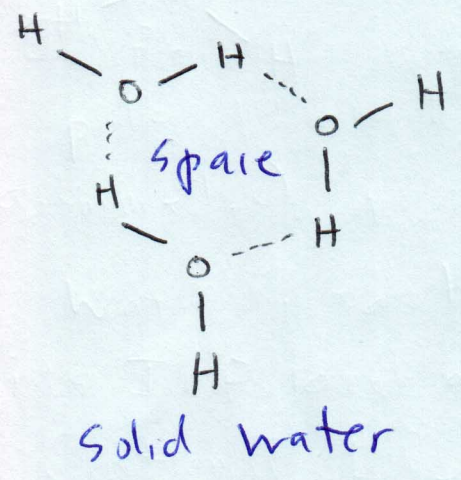
solvent - the major component of a solution

solute - the minor component of a solution

soluble - able to form a solution with a particular solvent

miscible - two solvents that form a solution regardless of the proportions used

immiscible - unable to mix regardless of the quantities used.

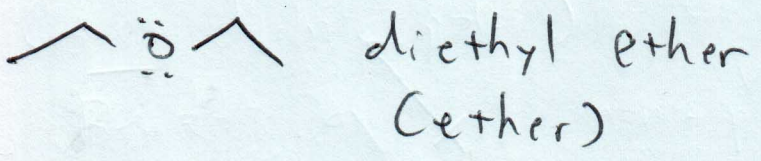
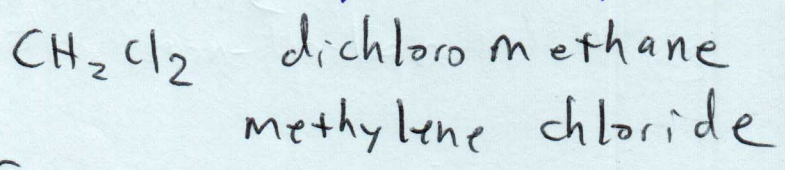
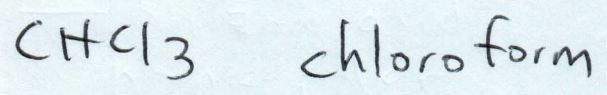
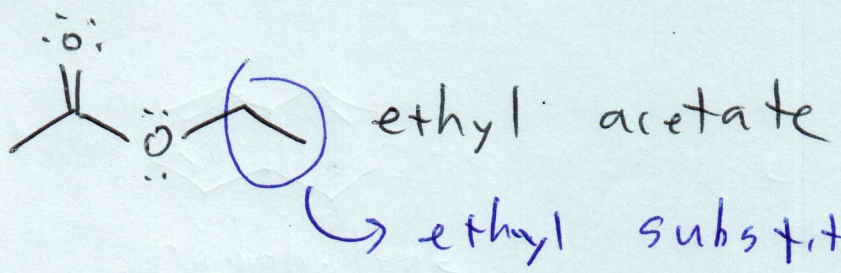
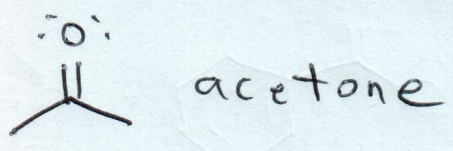


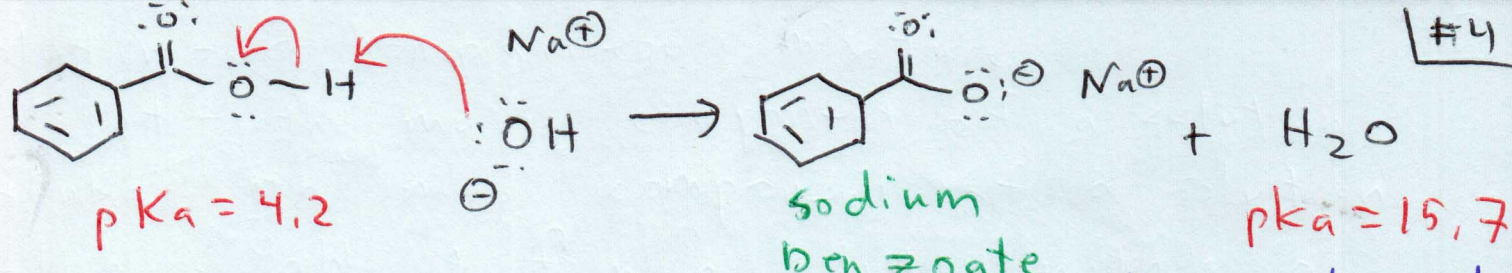
Common organic solvents

hexane

hexanes (with an "s")
- a mixture of isomers

molecules with the same formula, but different structure





$pK_a \equiv -\log_{10} K_a$

$K_a = \frac{[H^+][A^-]}{[HA]}$

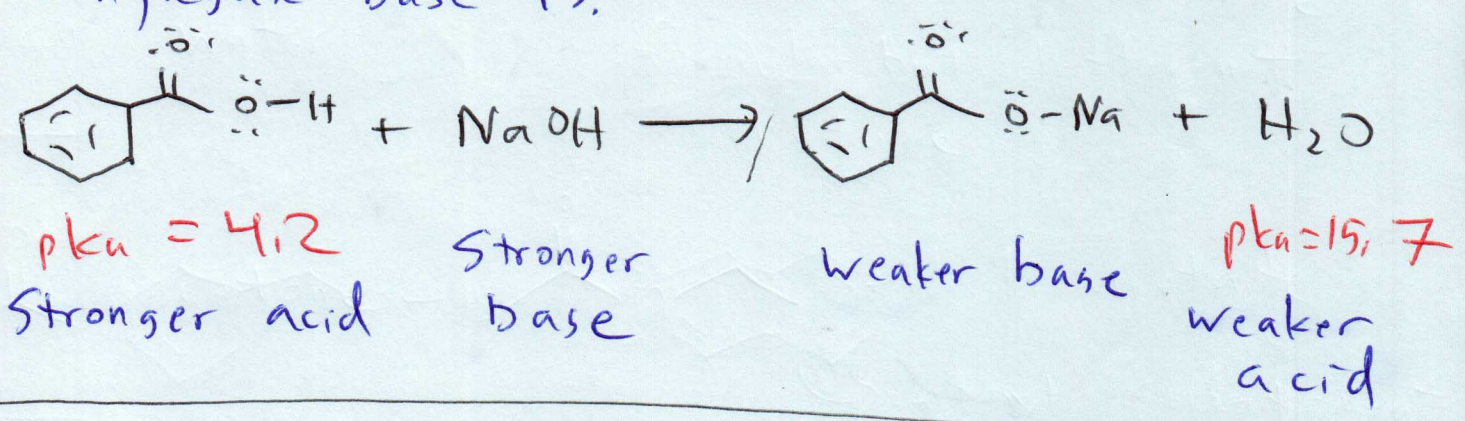
How much acid dissociates

 How much stays together

$K_a \gg 1$ $pK_a < 0$ extensive dissociation
 Strong acid

$K_a \ll 1$ $pK_a > 0$ minimal dissociation
 Weak acid

The stronger an acid is, the weaker its conjugate base is.



By neutralizing benzoic acid and forming an ion, the molecule becomes polar because the ionic portion outweighs the non-polar benzene portion.

hydrophobic - "fears water" - not soluble in water

hydrophilic - "loves water" - water-soluble

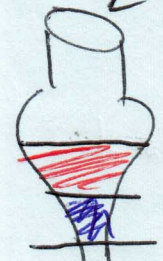
1) B.A + Napth

2) ether

3)

4) NaOH

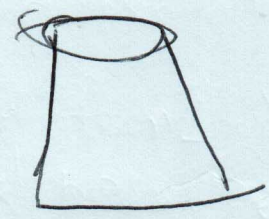
5) shake + vent



ether + naphthalene
water + sodium benzoate

6) drain aqueous

8) evaporate



7) add HCl + filter

