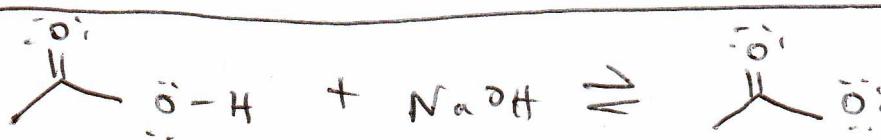
11/4/11 Lab report # 4 due 11/10/11

volume $\xrightarrow{\text{density}}$ mass $\longrightarrow$ moles of reagent = theoretical # of moles of product

calculation: % yield

discussion: justify your conclusion by discussing the appearance or disappearance of key absorbances in your IR spectrum.

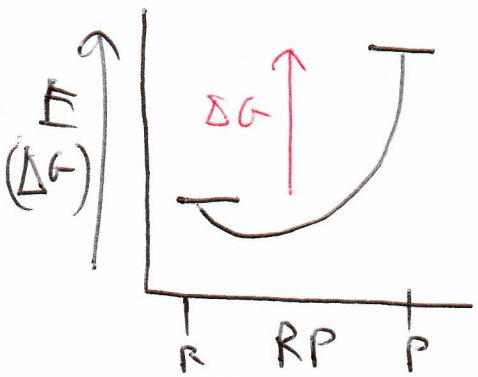
- If -OH peak is present in the product, discuss the significance of its presence.



$\Delta G > 0$

$pka \equiv -\log_{10} Ka$

weak acid → low dissociation → $K < 1 < pka >>$



Acetic acid, being a weak acid, (pka = 4.76) would only want to dissociate to small degree (~1%). Since NaOH is a strong base, it can force acetic acid to become neutralized (to dissociate).

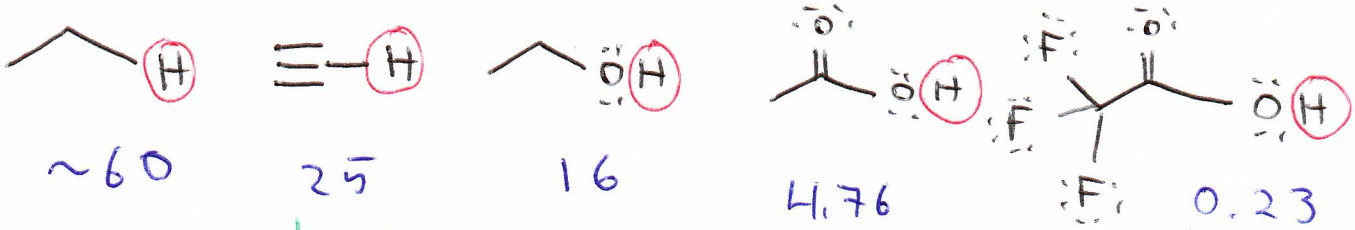
If acetic acid is forced to fully dissociate:

1) There are only products, no reactants, so $Q >> K$
2) Only the reverse rxn for the dissociation of acetic acid is possible (no reactants).
3) The rxn is driven to a higher potential energy.

Since the equilibrium for acetic acid has been forced too far towards products, acetate will react with water to reform acetic acid and reestablish equilibrium.

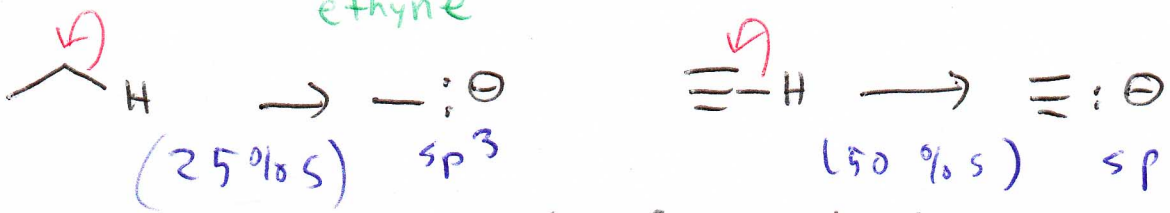
∴ neutralized ≠ neutral

end of exam 2



pka ~60 25 16 4.76 0.23

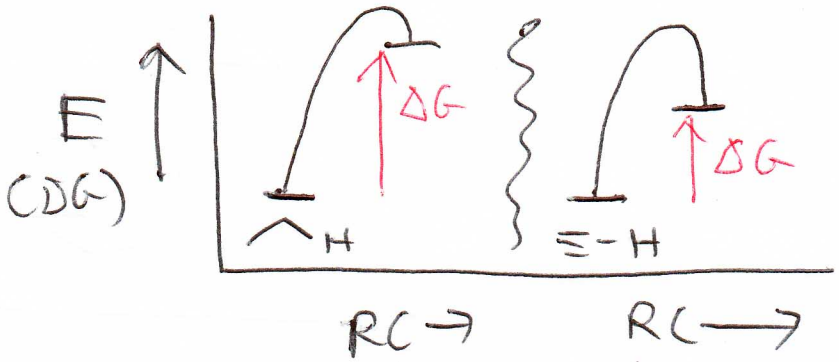
ethyne



(25% s) sp^3 (50% s) sp

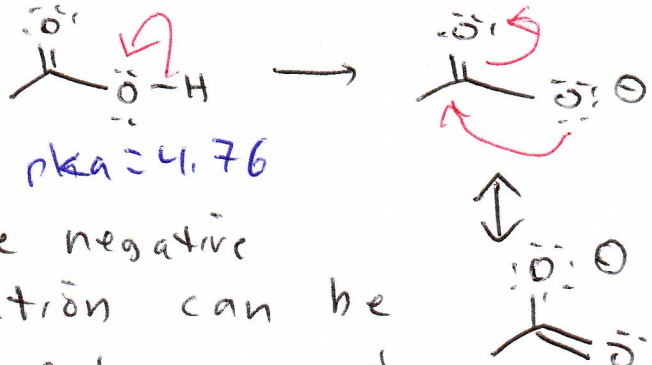
S- character → % of s orbital in a hybrid

In polyelectronic systems, s orbitals are lower in energy than p orbitals, Hybrids composed of a greater % of s orbital (greater s- character) are therefore lower in energy, so electrons in an sp orbital are lower in energy than sp^3.

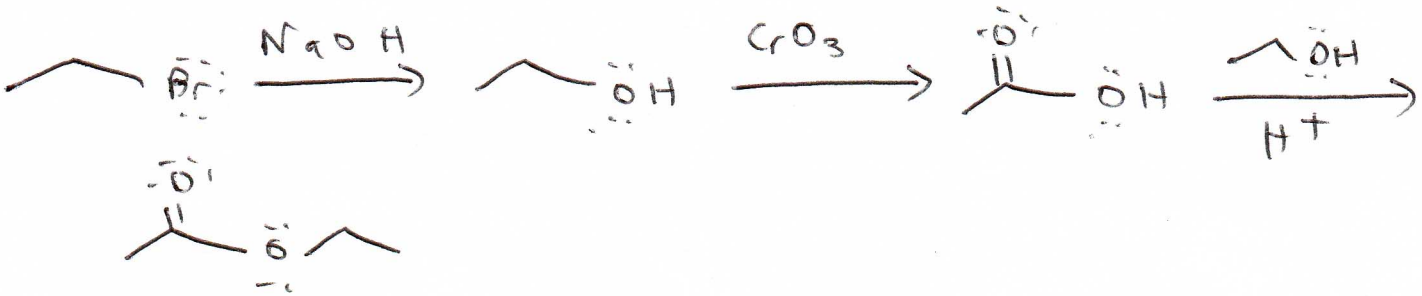


Structural effects that stabilize a product make it easier to form, which in this case means the original acid dissociates more easily → lower pKa.

Inductive effect- Since oxygen is electron egative, it can pull electron density away from the hydrogen, making the hydrogen dissociate more easily, making ethanol more acidic,



resonance effect - If the negative charge formed by dissociation can be delocalized, it is effectively easier to form the anion, meaning the parent acid is more acidic.



1) synthetic utility (transformation)
2) reagents
3) conditions
4) mechanism
5) stereochemistry
6) regiochemistry