Lab report #4 due 11/09/11

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

calculations; % yield

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

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

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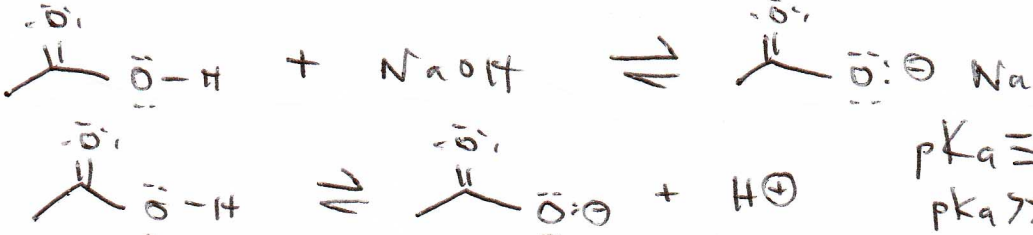
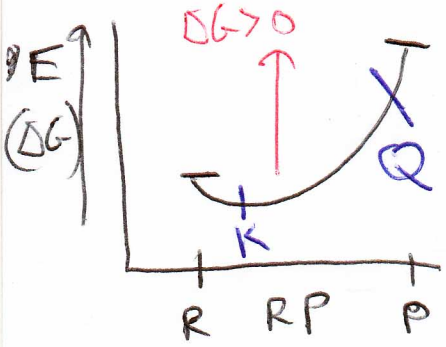


$pK_a \equiv -\log_{10} K_a$

$pK_a >> 1$

weak-acid $\longrightarrow$ low dissociation $\longrightarrow$ $K_a << 1 \longrightarrow \Delta G > 0$



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

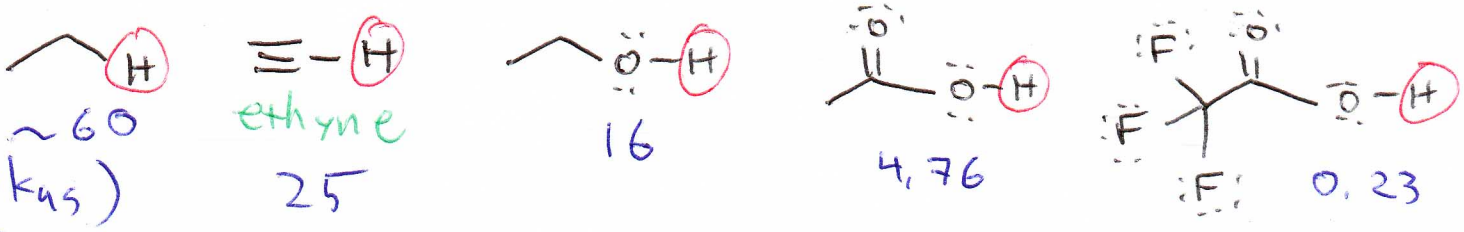
If acetic acid is forced to dissociate;

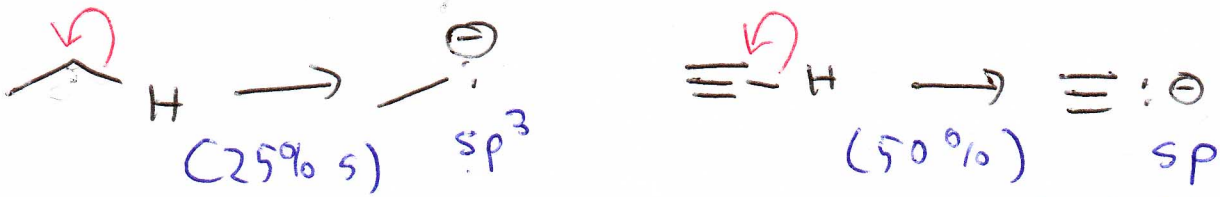
1) There are only products, no reactants, so $Q >> K$
2) Only the reverse rxn for the dissociation of acetic acid is possible (no reactants),
3) The system is driven to a higher-potential energy.

Since the equilibrium for acetic acid has been forced towards products, acetate will react with water to re-form acetic acid and re-establish equilibrium.

neutralized $\neq$ neutral

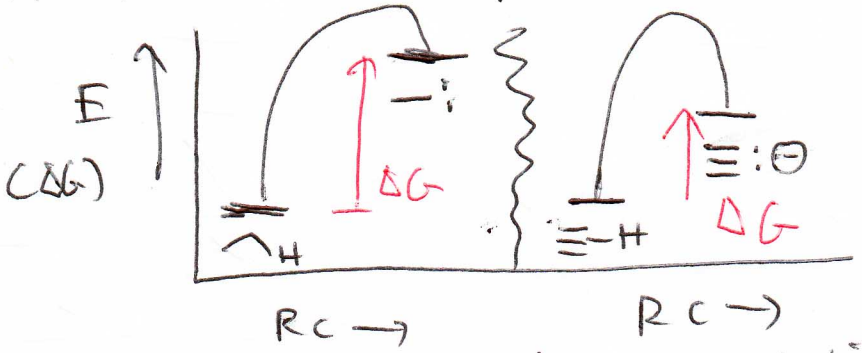
end of exam 2





s-character → % of s orbital in a hybrid

In polyelectronic systems, s orbitals are lower in energy than p orbitals. Hybrids with greater s-character are therefore lower in energy, so electrons in an sp orbital are lower in energy than those in an sp^3 orbital.



Structural effects that stabilize a product make it easier for the product to form. In this case, it makes the alkyne more easily dissociate, → lower pKa

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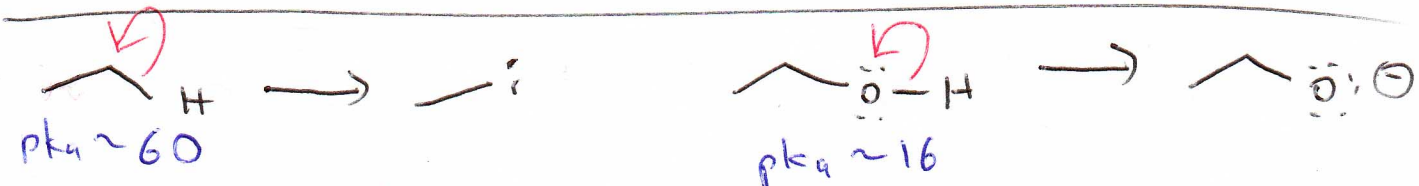


Inductive effect – Since oxygen is more electronegative than carbon, it more readily pulls electron density away from hydrogen, making the hydrogen dissociate more easily, making ethanol more acidic, → lower pKa

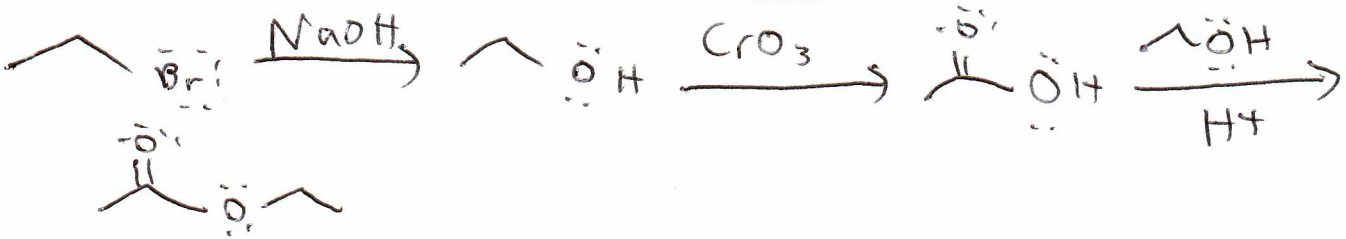
Oxygen tolerates a negative charge more easily than carbon.

pka ~16

4.76

14?

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