UF | UNIVERSITY of FLORIDA

Pre-Health Post-Baccalaureate Program
CHM2211 Study Guide & Practice Problems

Date:

10/19 – 10/23

Topics Covered:

Alpha and Beta

Fischer vs. The King

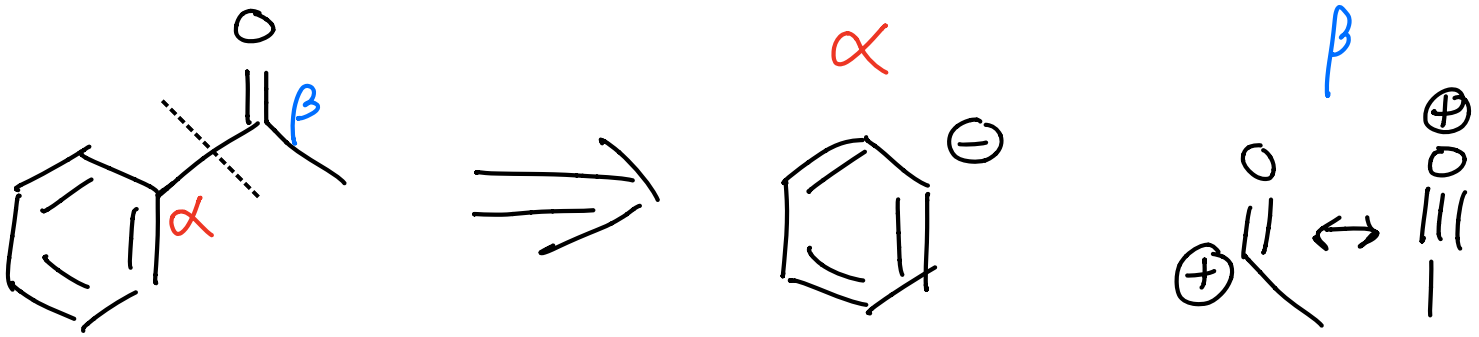
Aromatic Amines

Created by Isaac Loy

Alpha and Beta

- Being able to recognize α and β synthons helps tremendously with retrosynthesis (which lets us look at a target molecule and work backwards to figure out how we got there).
- Up to this point, we have used acetylides. Now, we will incorporate recent nucs and staircase members to further our retrosynthetic abilities.

- A reaction that we have already looked at is the formation of acetophenone. Below we will look at this target molecule and work backwards to find the α and β synthons:

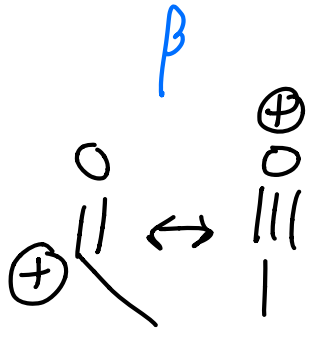


α - attack
β - beg

- This, however, does not give us the starting material and reagent(s). Instead, it gives us a representation of the chemistry that's taking place.

– In the above example, the α is formed by a benzene ring that has undergone EAS. The β is formed from one of our reactive staircase molecules which have especially electrophilic carbonyl carbons:

Synthons



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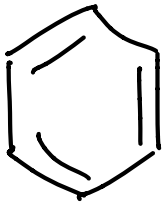
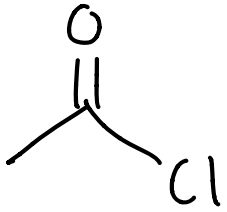
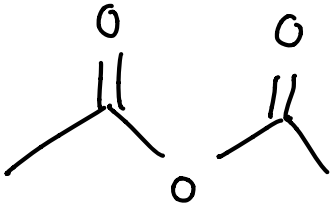




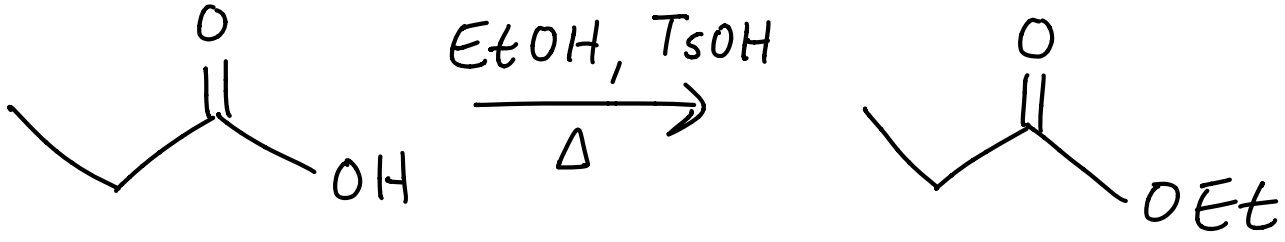
or



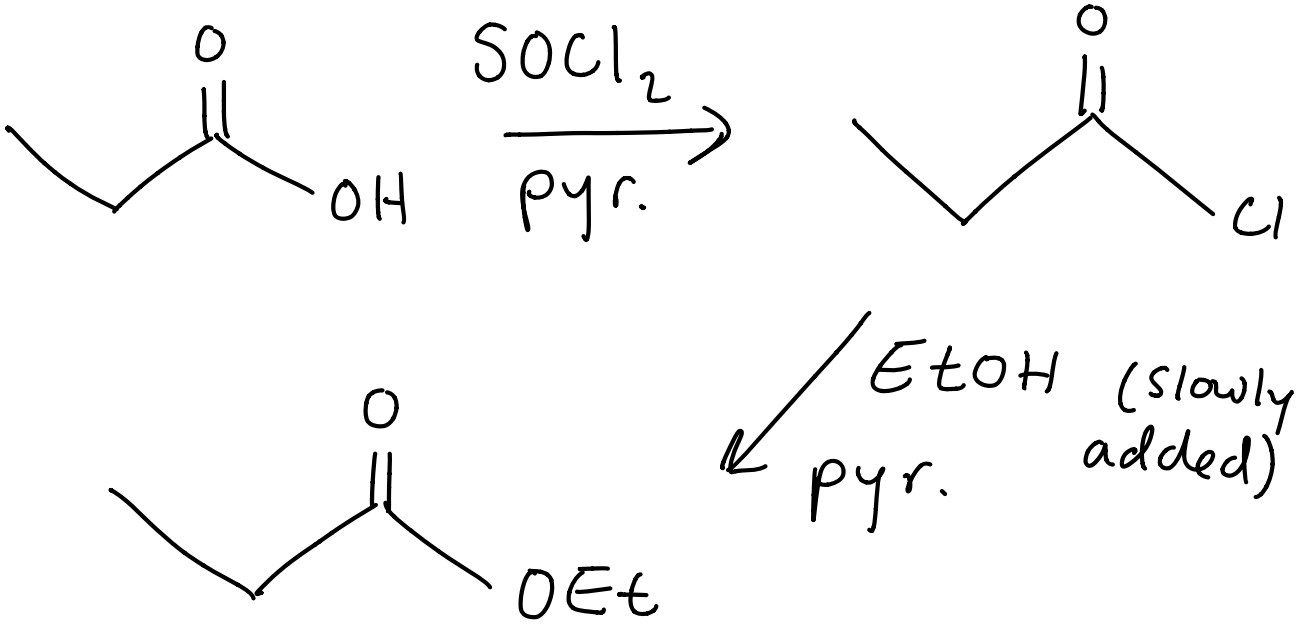
Fischer vs. The King

- Let's say we want to make an ester from a C.A. ... how would we do this?

- Approach #1: The Fischer



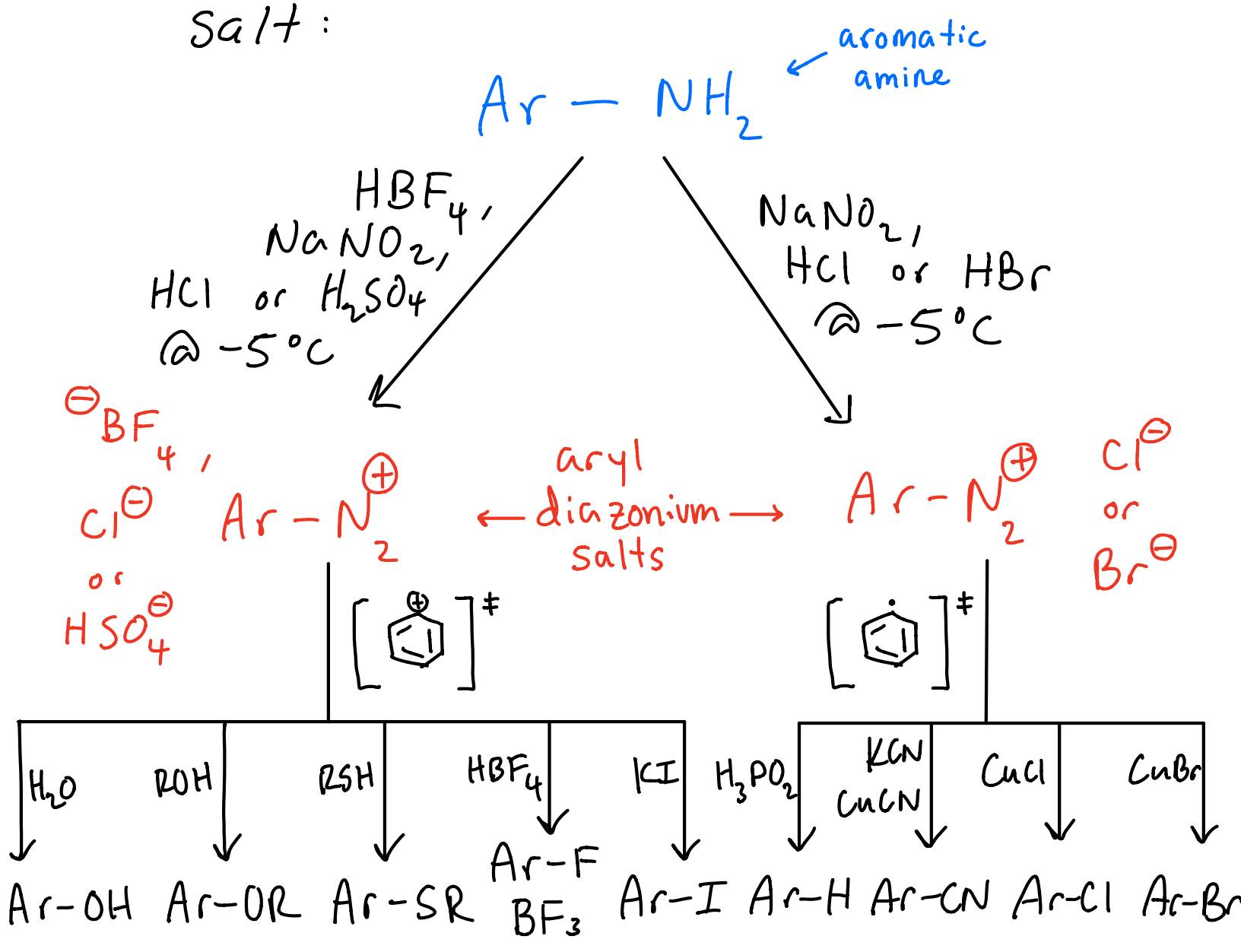
- Approach #2: The King



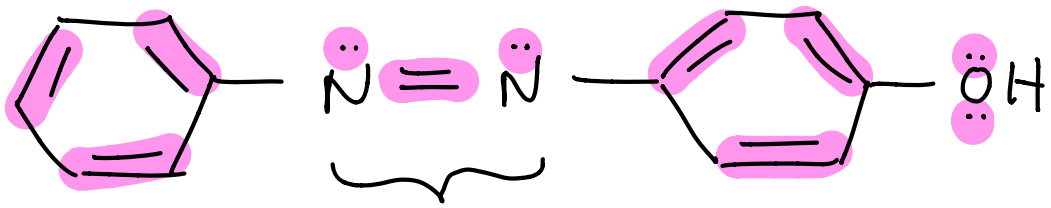
- Look at Dr. J's handout on this topic for harder examples (cyclic vs. linear, monomer vs. polymer)

Aromatic Amines

- Aromatic amines are useful in creating a plethora of important molecules.
- The important intermediate that all of these reactions share is the aryl diazonium salt:



- Know the mechanism for aryl diazonium salt formation (I didn't include it here because it's a follow-up questron)
- This class of reactions is important not only because it allows us to make phenol, benzene, and halo-benzenes from aniline, but also because it allows us to make colorful azo dyes
- Color is a result of large conjugated systems connected by azo linkages:



azo linkage

- The oxygen L.P. can end up as far away as the ortho and para positions on the other benzene ring
- UV-vis spectroscopy, coupled with M.O. theory, allows us to draw connections between the presence of color and HOMO/LUMO