

Carboxylic Acid Derivatives #1: Practicing Rxns of Carboxylic Acid Derivatives

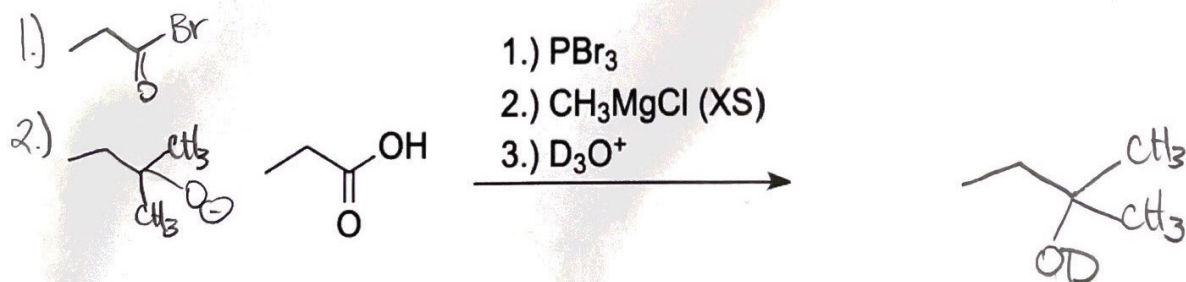
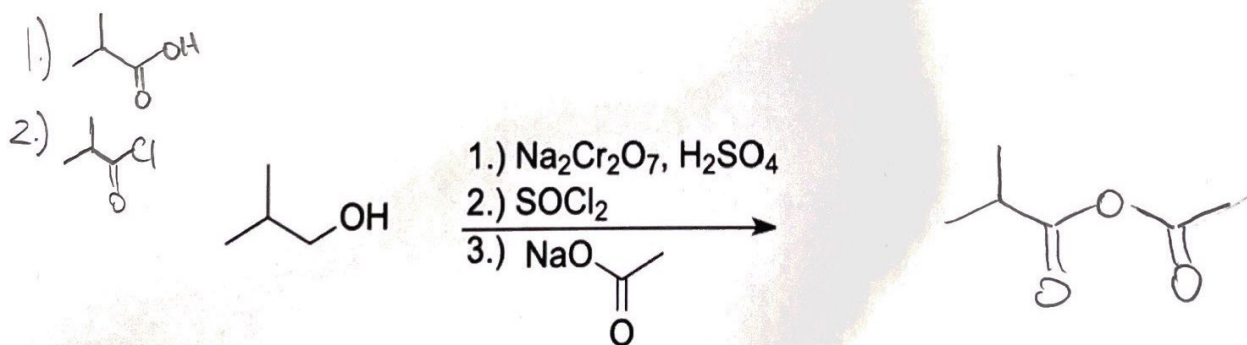
Okay, gang. Being the first of two worksheets in relation to Carboxylic Acid Derivatives, this worksheet is designed to be more straight forward practice. I know it seems like you just learned 6.02E23 new reactions, but most of those "new" reactions mostly boil down to the **Addition-Elimination Mechanism** and whether or not you perform nucleophilic attack once or twice.

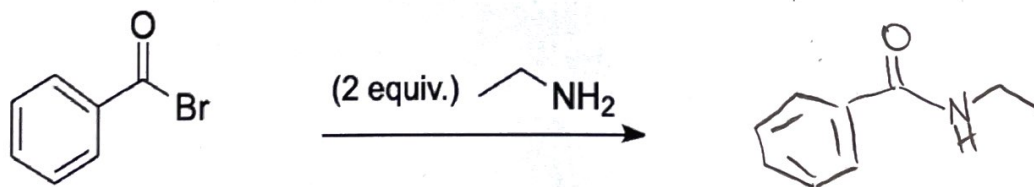
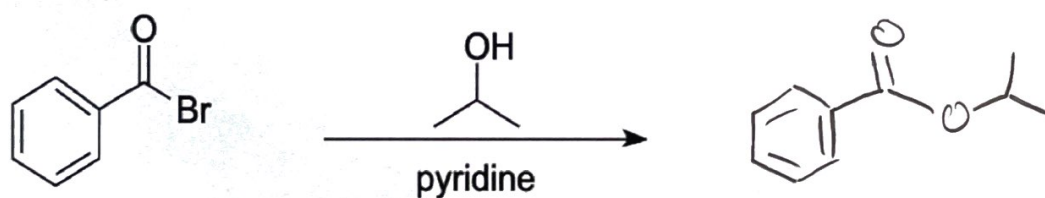
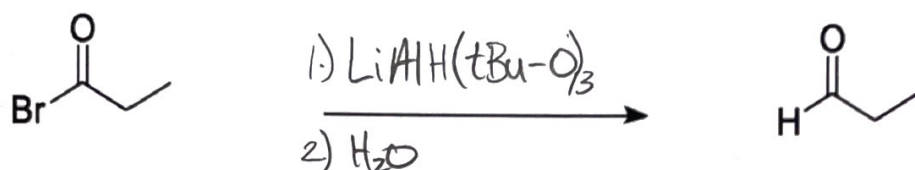
Below, you're going to see a reaction section for acid halides, acid anhydrides, esters, and amides each. There will be a mixture of complete the reaction/fill in the reagent/provide the reactant questions, all aimed at getting you comfortable with these new functional groups.

After this worksheet, jump over to the second worksheet in this series, which is meant to crank the difficulty up and really put your knowledge to the test. The other content within this series will also be included on the other worksheet.

But for now, good luck and you got this.

Acid Halides

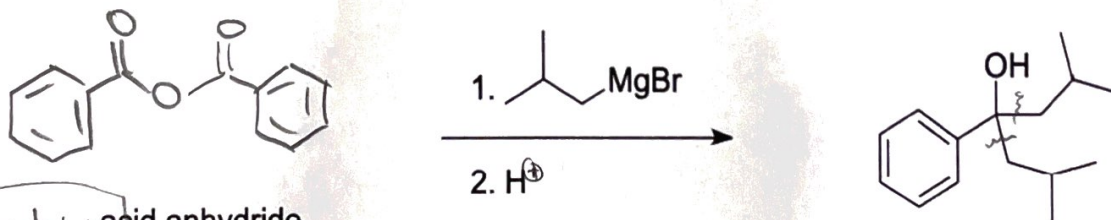
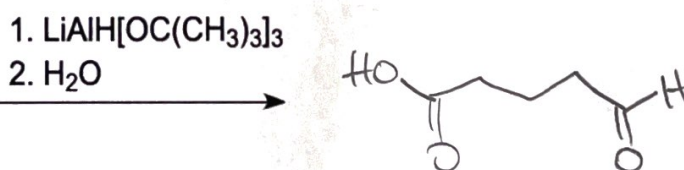
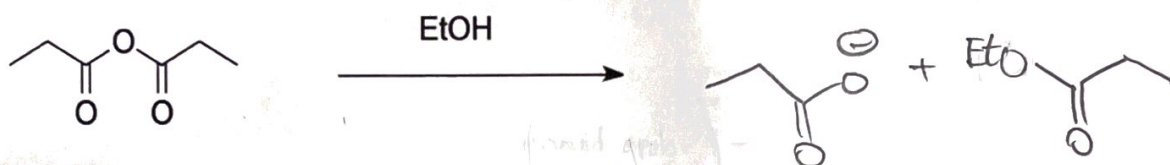
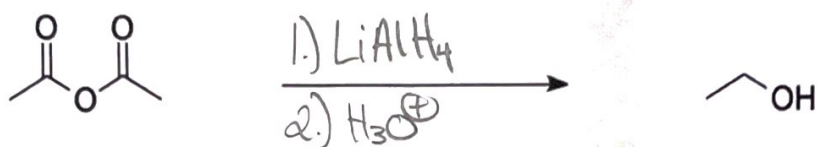
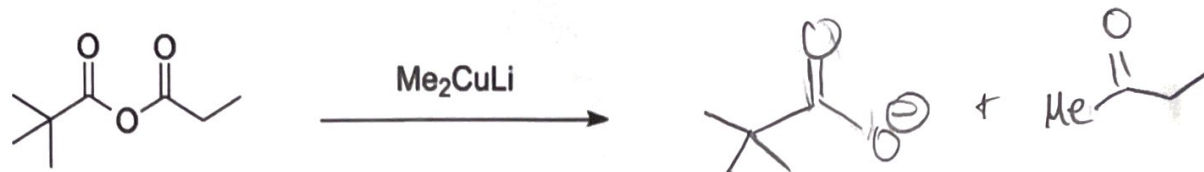




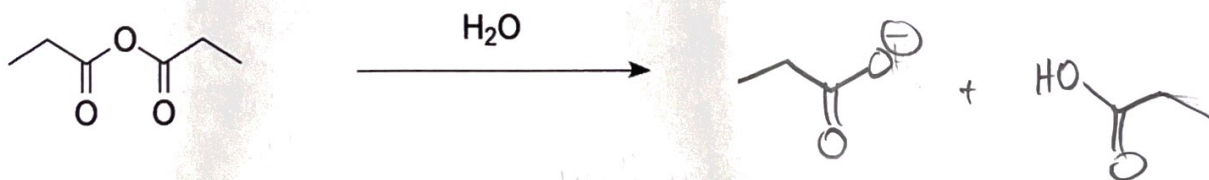
The last two reactions in the section above include pyridine and two equivalents of amine, respectively. This extra amount of base is included for the same reason—briefly explain why it is needed.

A base is needed to deprotonate the newly added nucleophile so that it "stays on", preventing another nuc: from attacking the carbonyl & kicking it off.

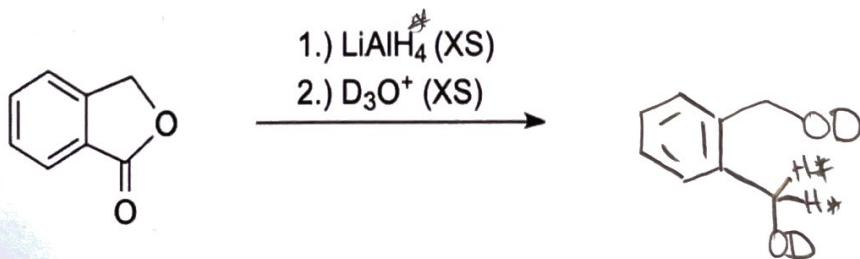
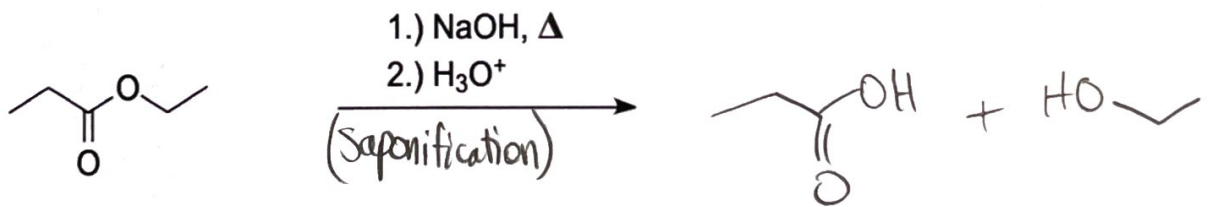
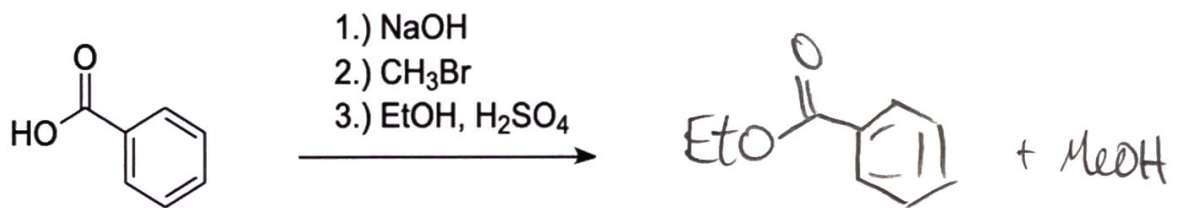
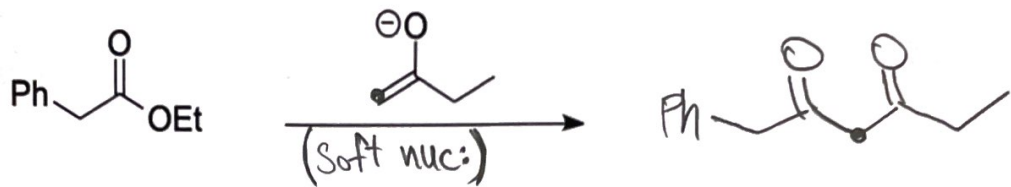
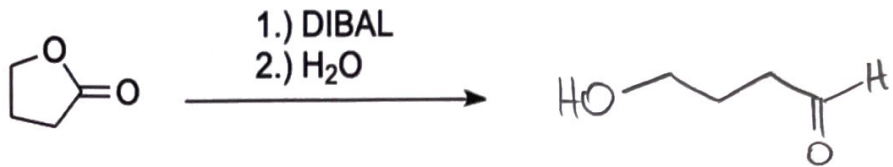
Acid Anhydrides

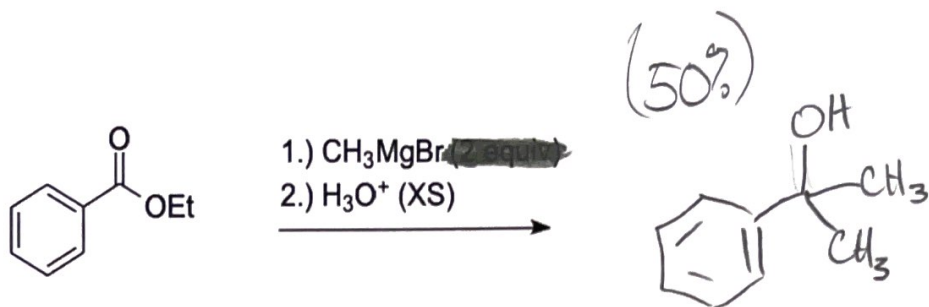


* Symmetrical acid anhydride *



Esters

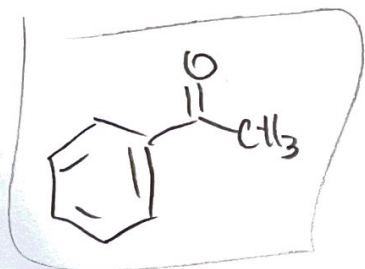
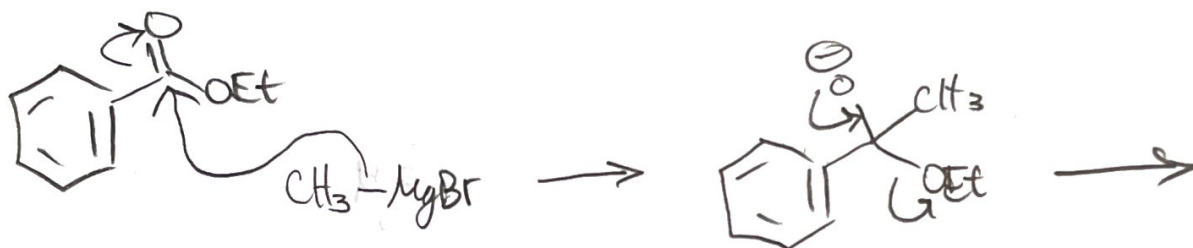




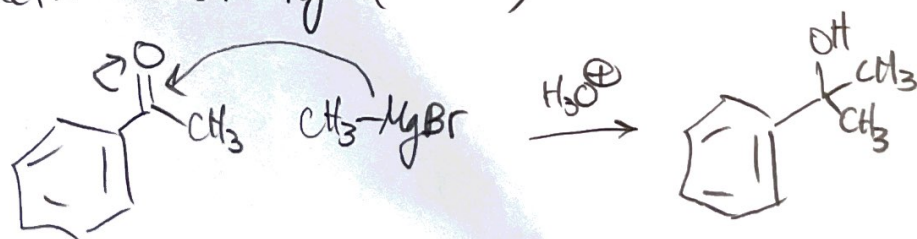
In reference to the last question in this Ester section, closer analysis shows the reaction mixture contains 50% Grignard product and 50% untouched reactant. While this is expected, briefly explain why this is observed.

Add. Elim.

First Grignard attack must occur on an ester:

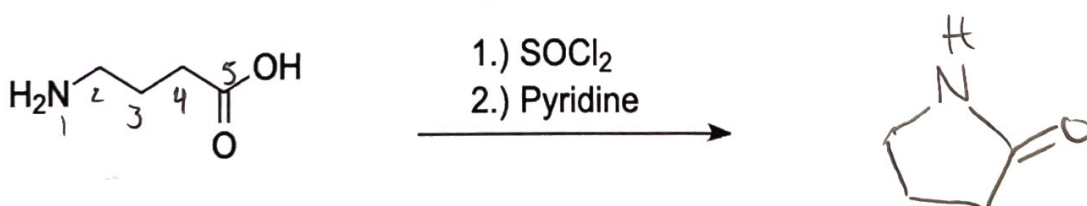
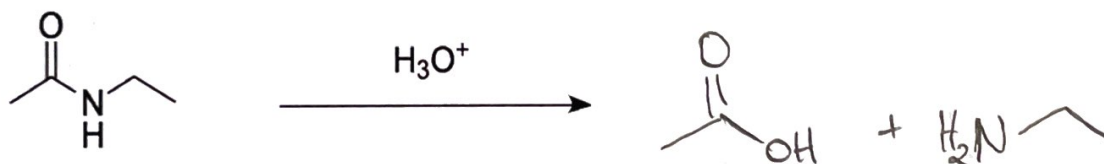
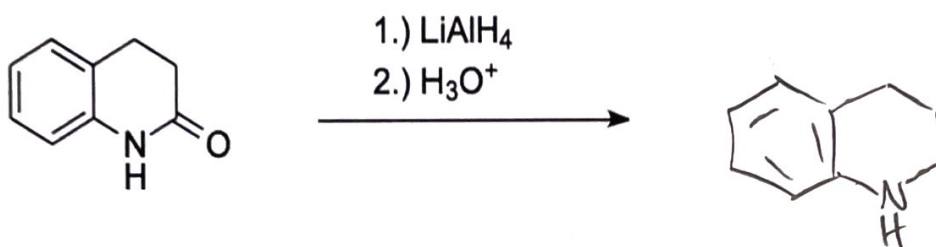
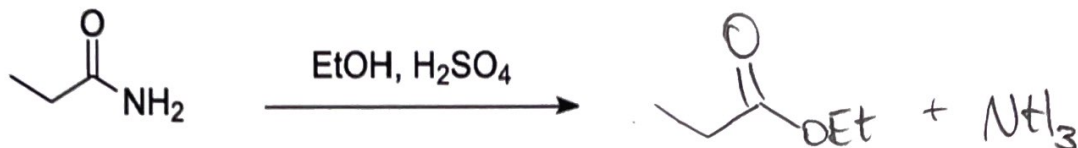


Once first attack occurs, the next Grignard has the choice between attacking an ester, or a newly produced ketone, a more reactive carbonyl. The Grignard goes w/ the more reactive carbonyl (ketone)



2 Grignards are consumed for every one ester, so 50% of the esters are untouched

Amides



In reference to the last question in this Amide section, what is the purpose of the pyridine in the 2nd step of the reaction? And, for bonus, what is a cyclic amide called?

Needed for clean up acid-base rxn after amine attack

cyclic amide \Rightarrow lactam