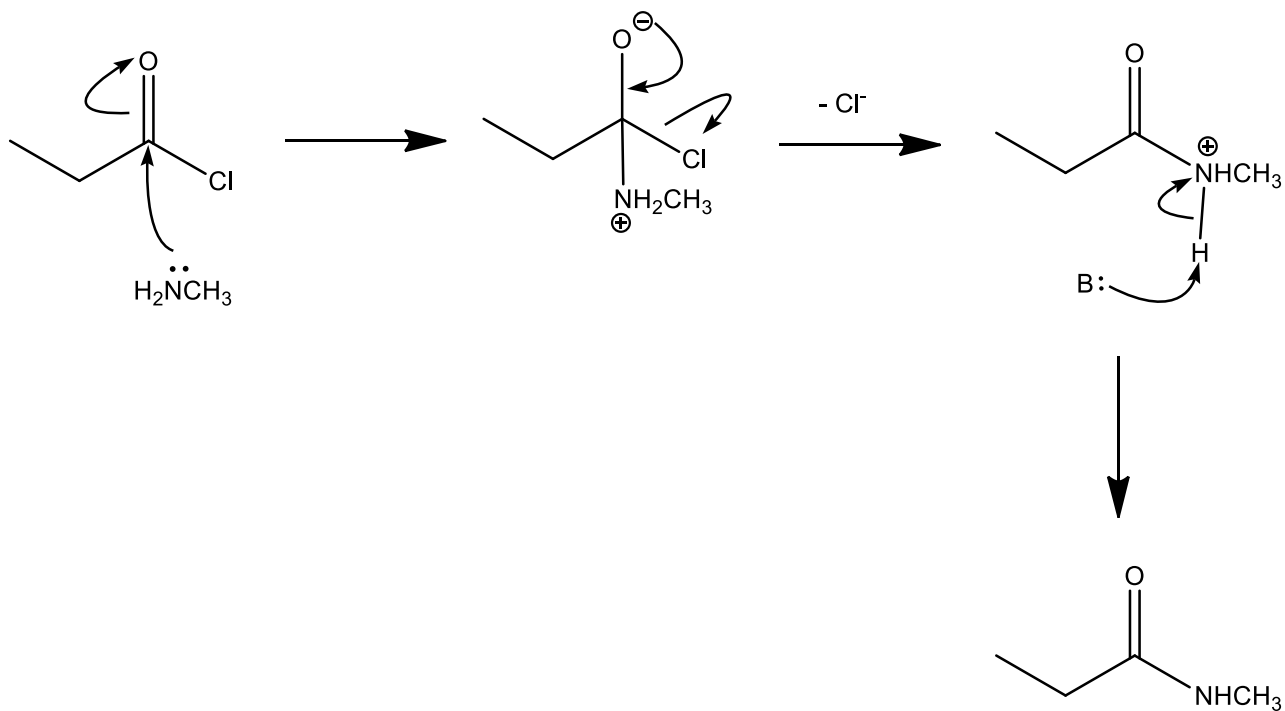


CHEM1611 Worksheet 9 – Answers to Critical Thinking Questions

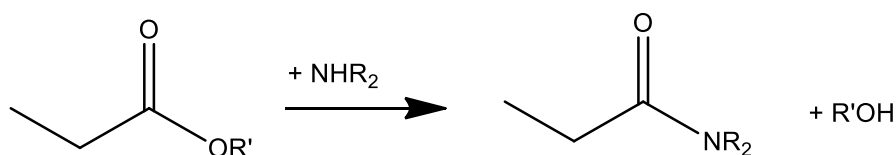
The worksheets are available in the tutorials and form an integral part of the learning outcomes and experience for this unit.

Model 1: Carboxylic Acid Derivatives

1. See below. The base, B, could be solvent or H_2NCH_3 .

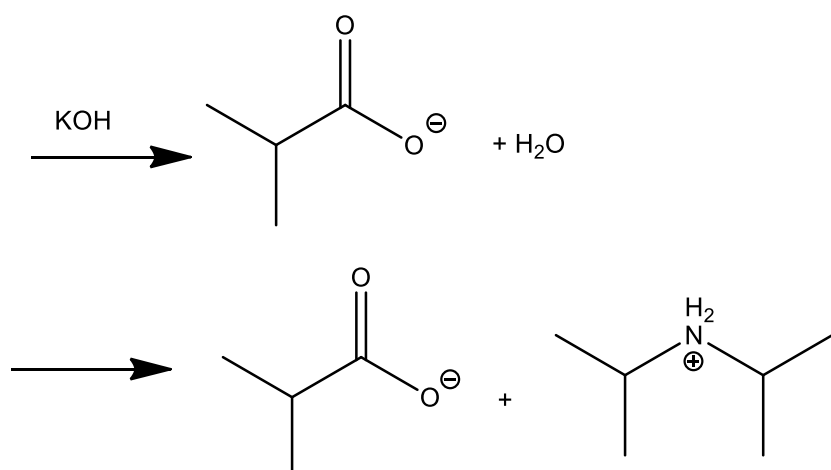


2. Addition of an amine:



3. An alcohol (with its alkyl group corresponding, as shown above, to the $-\text{OR}'$ group in the ester).

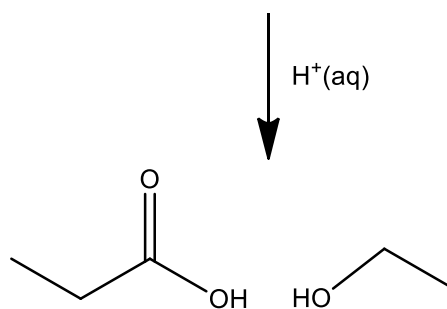
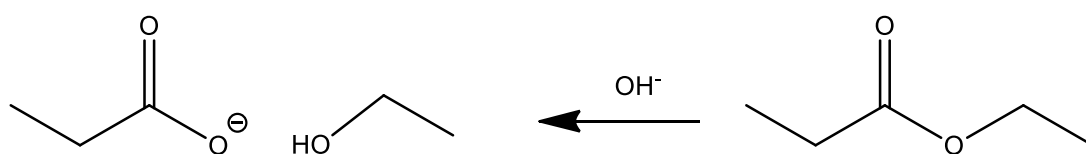
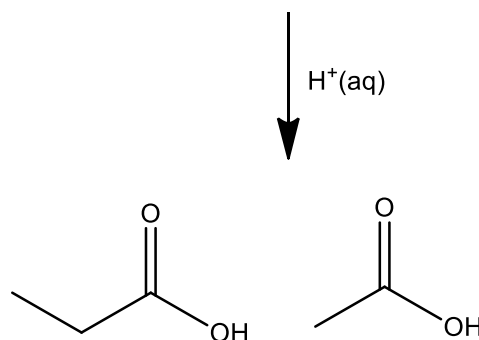
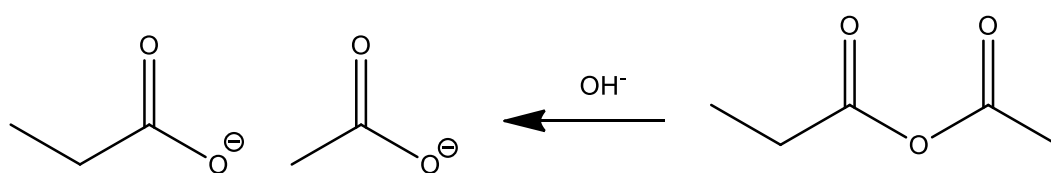
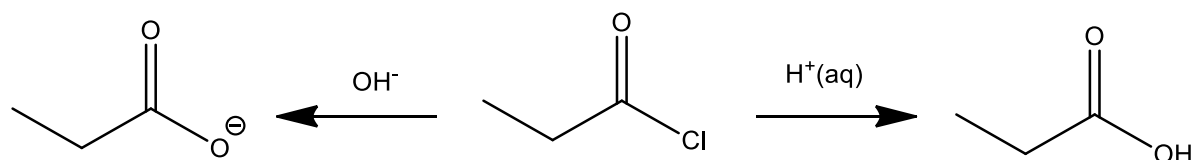
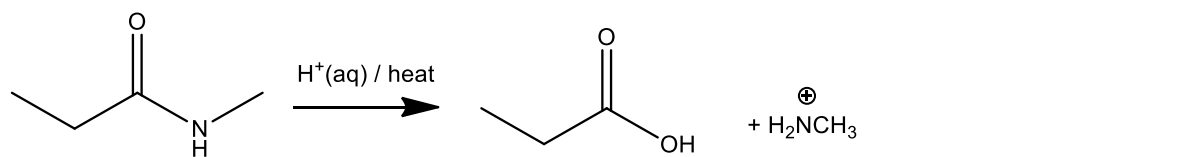
4. Simple H^+ transfer reactions occur:



5. Step 1: CH_3OH is added and H_2O is removed. The acid and alcohol *combine* to make an ester in the *condensation* reaction.

Step 2: H_2O is added and CH_3OH is removed in this *hydrolysis* reaction.

6. See below.



7. An acid chloride is more reactive to nucleophiles like water than an amide.