

Chapter 13. Functional Derivatives of Carboxylic Acids

Learning objectives:

1. Recognize the names and structures for the following functional groups: acid halide, acid anhydride, ester, amide, lactone, and lactam.
2. Write the general electron-pushing (arrow-pushing) mechanisms for the nucleophilic acyl substitution of acid halide, acid anhydride, ester, and amide.
3. Explain the order of reactivity toward nucleophilic acyl substitution among acid halide, acid anhydride, ester, and amide based on the pK_a of the conjugate acid of the leaving groups on these four acid derivatives.
4. Provide appropriate reagents and reaction conditions for the feasible interconversions among acid halide, acid anhydride, carboxylic acid, ester, and amide.

Sections to be covered (in the order of delivery):

- 13.1 Structure and Nomenclature
- 13.2 Characteristic Reactions
- 13.3 Reaction with Water – Hydrolysis
- 13.4 Reaction with Alcohol
- 13.5 Reaction with Ammonia and Amines
- 13.6 Interconversion of Functional Derivatives
- 13.7 Esters with Grignard Reagents
- 13.8 Reduction

Recommended additional problems

13.8 – 13.22, 13.26 – 13.35, 13.42