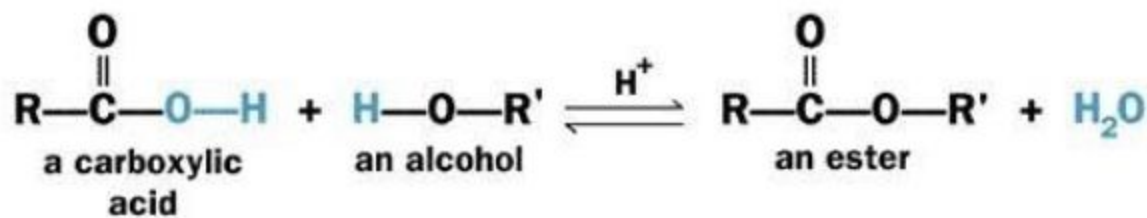
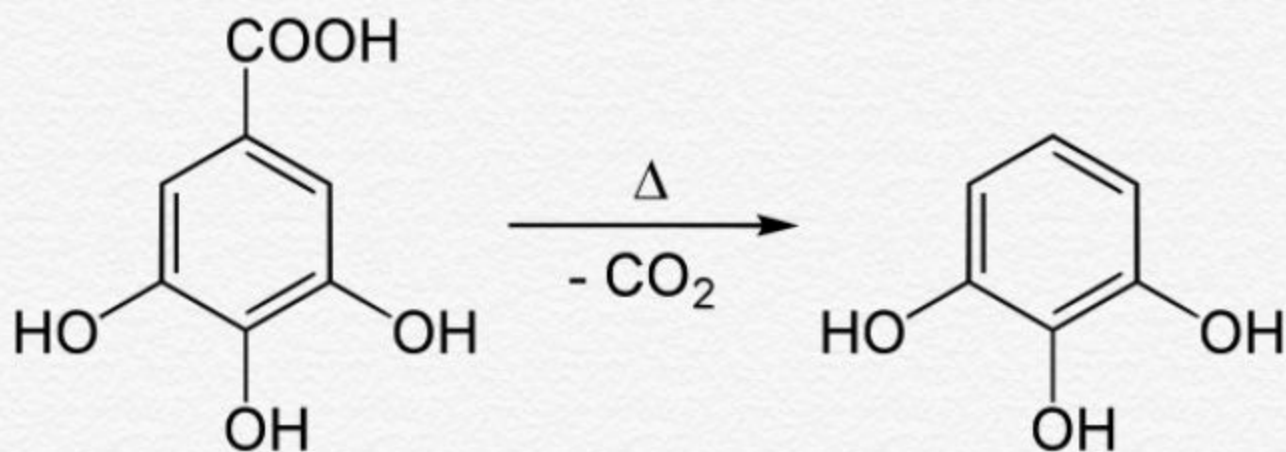
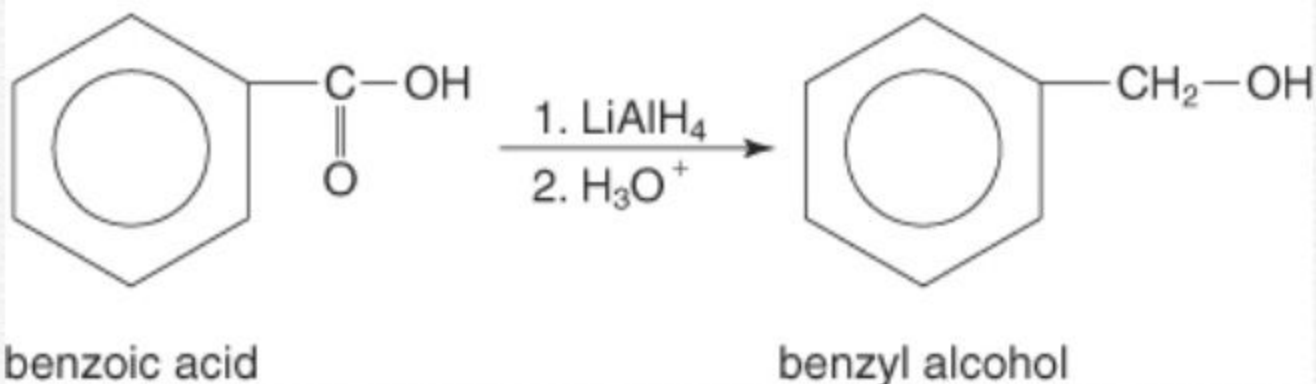
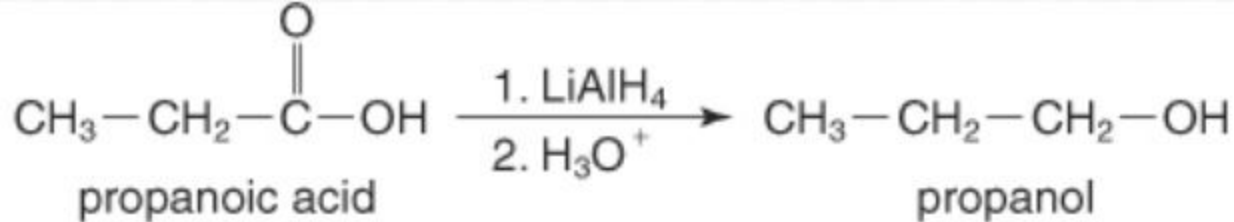


All acid derivatives can be hydrolyzed (cleaved by water) to yield carboxylic acids; the conditions required range from mild to severe, depending on the compound involved. The oxidation of primary alcohols is a common method for the synthesis of carboxylic acids:

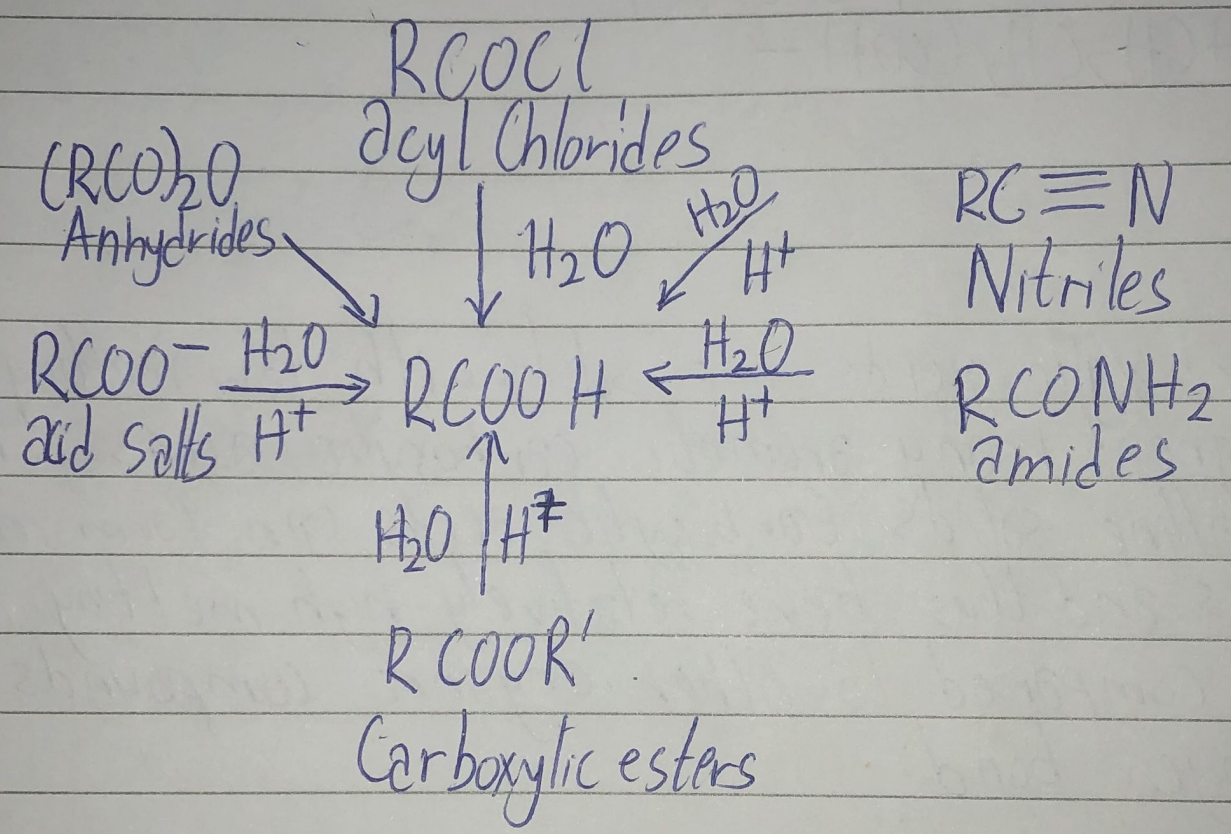
$RCH_2OH \rightarrow RCOOH$. This requires a strong oxidizing agent, the most common being chromic acid (H_2CrO_4), potassium permanganate ($KMnO_4$), and nitric acid (HNO_3). Aldehydes are oxidized to carboxylic acids more easily (by many oxidizing agents), but this is not often useful, because the aldehydes are usually less available than the corresponding acids



(Where R and R' are general hydrocarbon groups)

3] Hydrolysis of acid chlorides with water to produce Carboxylic acids
 Hydrolysis of acid anhydrides leads to carboxylic acids

4]



Most of the methods for the synthesis of carboxylic acids are hydrolysis of acid derivatives and oxidation of various compounds

Akinajeye Oluwoferanmi David

19/MHS 03/001

Anatomy

CHM 102

1] HCOOH - Methanoic acid

$\text{HOOCCH}_2\text{CH}_2\text{CH}_2\text{COOH}$ - Butanedioic acid

$\text{CH}_3\text{CH}_2\text{CH}_2\text{COOH}$ - Butanoic acid

$\text{HO}_2\text{C}-\text{CO}_2\text{H}$ - Carboxylic acids

$\text{CH}_3(\text{CH}_2)_4\text{COOH}$ - Caproic acid

$\text{CH}_3\text{CH}=\text{CHCH}_2\text{CH}_2\text{COOH}$ -

2] Appearance

Larger carboxylic acids are solids with low melting points. There are a great many aromatic carboxylic acids, which are all crystalline solids. Carboxylic acids can form intermolecular hydrogen bonds and thus have relatively high melting and boiling points compared to other organic compounds that cannot hydrogen bond.

i) Boiling point

The boiling points of carboxylic acids increases as the molecules get bigger. They have even higher boiling points than alkanes and alcohols. Carboxylic acids, similar to alcohols, can form hydrogen bonds with each other as well as van der Waals dispersion forces and dipole-dipole interactions.

iii) Solubility

Carboxylic acids are soluble in water. Carboxylic acids do not dimerise in water, but forms hydrogen bonds with water. Carboxylic acids are polar and due to the presence of the hydroxyl in the carboxyl group, they are able to form hydrogen bonds with water molecules.