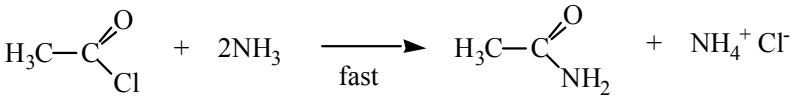
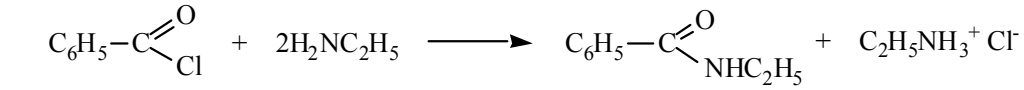
Synthesis of Amides



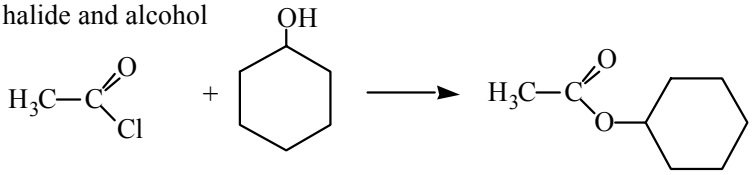
acetyl chloride — acetamide, ethanamide



benzoyl chloride — ethylamine — N-ethyl benzamide

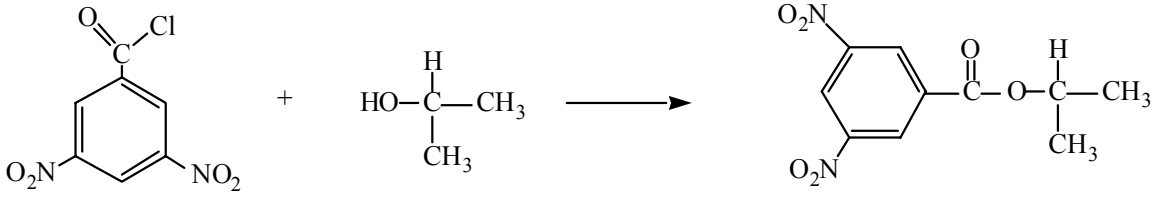
Synthesis of Esters

1) Acyl halide and alcohol



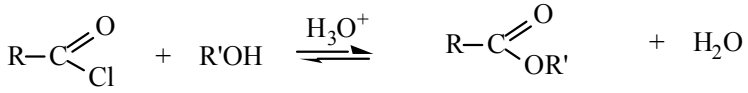
acetyl chloride — cyclohexanol — cyclohexyl acetate, cyclohexyl ethanoate

Preparation of 3,5-dinitrobenzoates



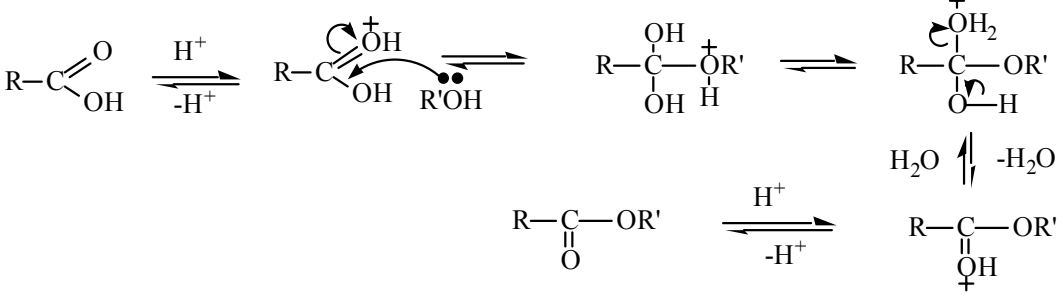
2-propyl 3,5-dinitrobenzoate
solid since high MW

2) Fischer esterification



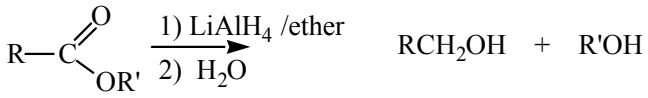
This reaction is driven to the right by using excess R'OH or by removing the water as it is formed

The mechanism is acid-catalyzed <u>nucleophilic substitution</u> at the acyl carbon. The mechanism is important.



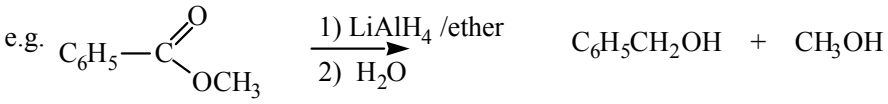
Reactions of Esters

1) Reduction

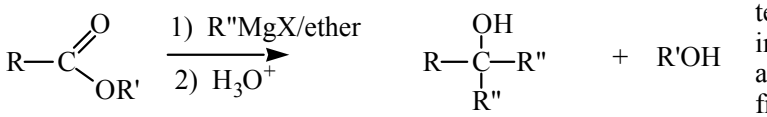


esters reduce more readily than carboxylic acids

e.g.

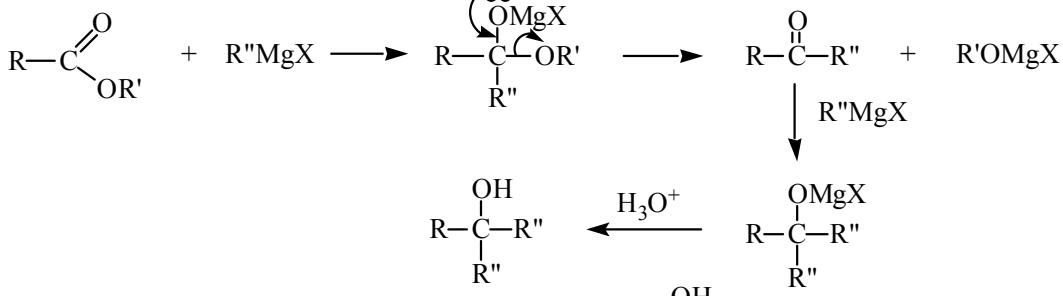


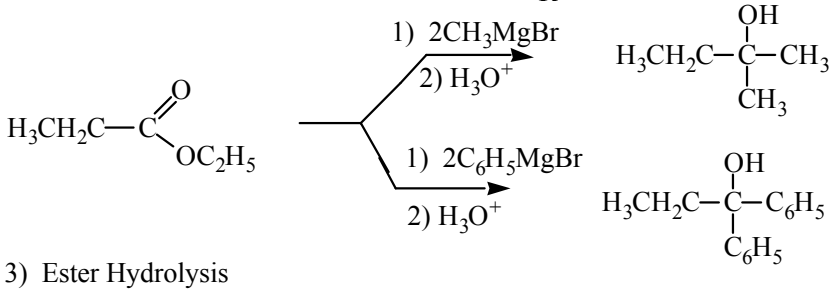
2) Grignard reaction



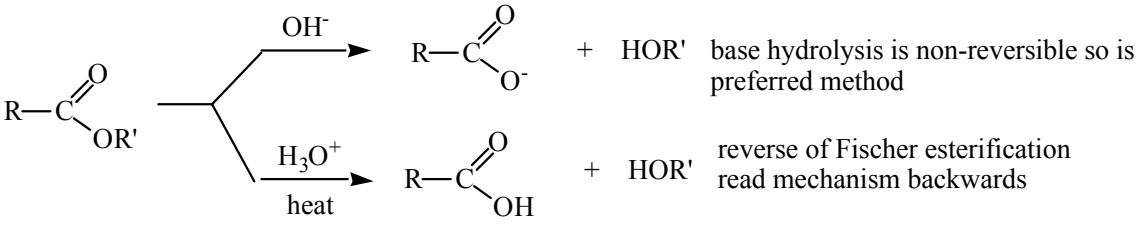
tertiary alcohol is formed in which two of the R groups are the same. They both come from the Grignard reagent

Mechanism





3) Ester Hydrolysis

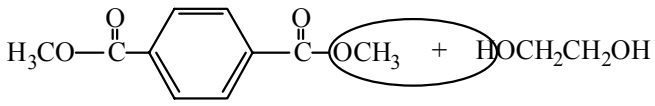


base hydrolysis is non-reversible so is preferred method

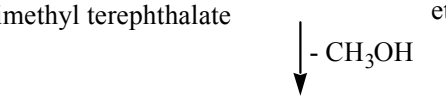
reverse of Fischer esterification read mechanism backwards

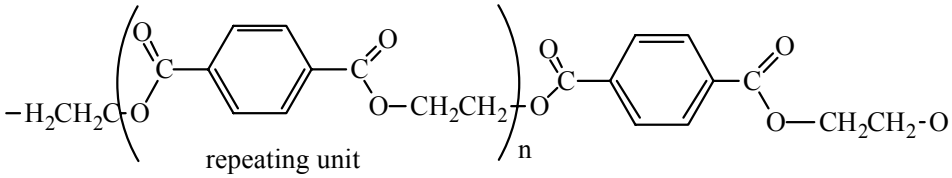
Condensation Polymers - formed by the removal of a small molecule

1) Terylene, Fortrel, Dacron, Mylar film



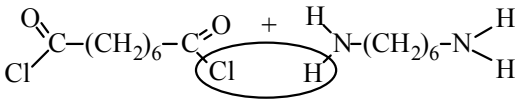
dimethyl terephthalate ethylene glycol

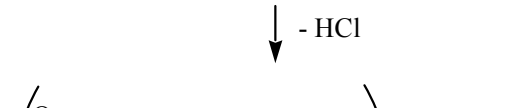


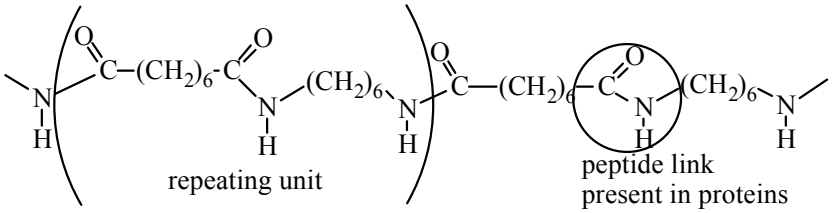


repeating unit n

2) Nylon







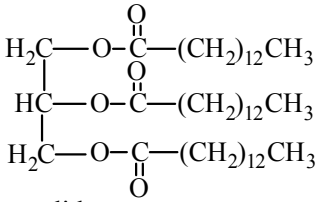
repeating unit peptide link present in proteins also amide group

Nylon 66

Fats and Oils - found in nature

These materials are esters of glycerol and are long-chain fatty acids

e.g. trimyristin, the fat from nutmeg



it is not usual to have all of the acids attached to glycerol the same; we usually have a mixed ester

fats are defined as solids at room temperature and are usually from animals

oils are liquids at room temperature and are from the seeds of plants

When fats are treated with base they hydrolyse to the free fatty acids and glycerol.