

Chemistry 3.5

Advanced Organic Chemistry

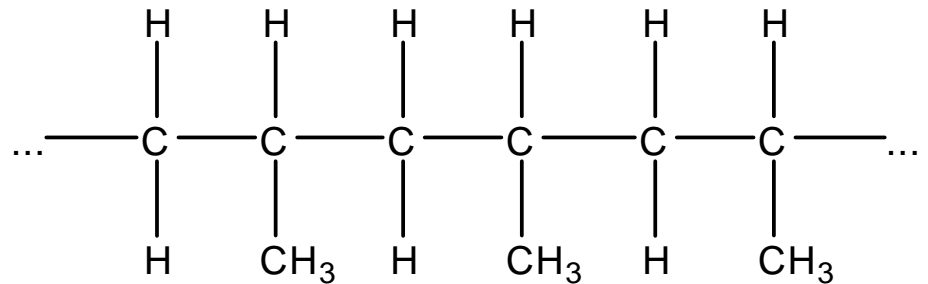
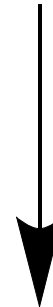
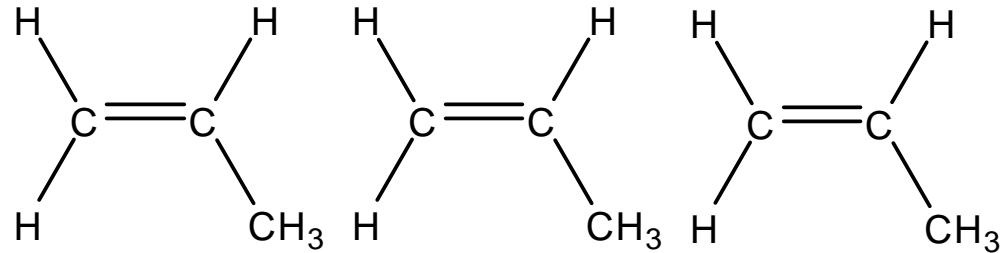
Polymerisation

Polymers

- Polymers- long chain molecule that is made from many monomers joined together
- Two types of polymers level 3 needs to know:
 - Additional polymer
 - monomers joined together by breaking of double bond
 - Condensation polymer
 - Monomers joined together by condensation reaction

Additional Polymer

- Recap from level 2
- Monomer contains double bond
- Each repeating unit is the same structure of monomer except the double bond is replaced with a single bond



Condensation polymer

- Monomers joined together by condensation reaction
- Two types of condensation polymer
 - Polyester
 - Alcohol and acyl chloride
 - Polyamide (**Nylon**)
 - Amine and acyl chloride

Monomers

- Condensation polymer usually involves two different monomers with a “double ended” functional group molecules

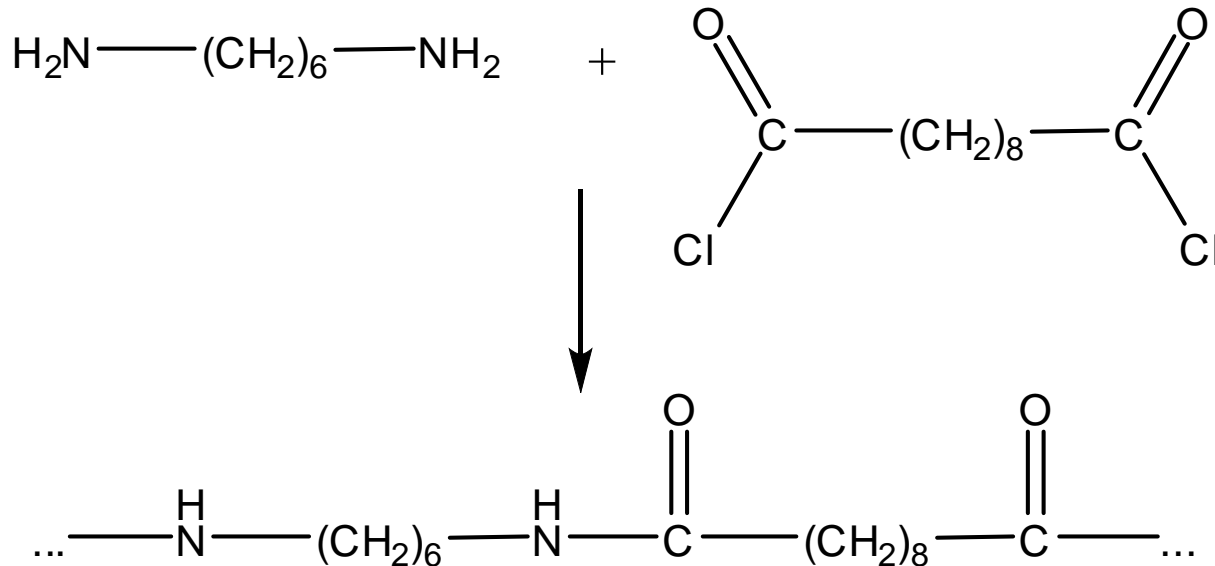
diacyl chloride + dialcohol \rightarrow Polyester

diacyl chloride + diamine \rightarrow Nylon

- Diacyl chloride can be replaced by dicarboxylic acid... however it will involves other reagent such as H_2SO_4 (conc)

Nylon 6,10

- Usually Nylon is named after two numbers
- The first number “6” indicates how many carbon atoms the diamine contains
- The second number “10” indicates how many carbon atoms the diacyl chloride contains



Heat and moisture

- Condensation polymer such as polyesters or nylons break down when it is exposed to heat and moisture
- This is because hydrolysis reaction of the ester (or amide) functional groups that joined the monomer together
- That is why condensation polymer is often used as biodegradable polymer

Double functional monomers

- A condensational polymer can be formed by a single monomer which contains both active functional group
 - Similar to amino acid
- The repeating unit of the polymer would be very close to the monomer itself