

Definations

- Polymers are large molecules formed by the linking up of many small molecules
- Monomers are small molecules that link up to form a polymer
- Polymerization is the reaction where many monomers link up to form a polymer
- There are two types of polymers

→ Addition Polymers

→ Condensation Polymers

Addition Polymers

- Formed by addition reaction in which many small molecules are added to each other to form a large molecule, without the formation of bi-products

- Takes place only in compounds containing carbon to carbon double bond

→ Cut off one part of double bond

→ Check what is around double bond

→ They will be place above and below the two carbons

→ Only take place on double bond

- Unsaturated monomers for saturated polymers

- Mainly plastics

→ Polyethene

→ Polypropene

→ Polychloroethene

→ Polytetrafluoroethene

→ Polyphenylethene

Condensation polymers

- Polymers formed by condensation reaction in which water is formed as bi-products

- It can be made by same or different monomers

- It has two classes

→ Synthetic polymers

→ Natural polymers

Synthetic Polymers

Nylon (Common name)

- Made with Dioic acid and Diamine

→ Dioic loses both OH

→ Diamine loses both H

- Amide linkage (C—N)

- Other name Poly Amide

- Used to make clothes, rope, tires etc

Terylene (Common name)



Synthetic Polymers (cont)

- Made with Dioic acid and Diol
- Dioic loses both OH
- Diol loses both H
- Ester linkage ($C-\overset{\text{O}}{\parallel}-O-R$)
- Used to make cushions, mattresses etc

Natural Polymers

Carbohydrates

- Monosaccharides (monomers)
- Glucose - simple sugars
- Disaccharides (dimers)
- Maltose
- Sucrose
- Polysaccharides (polymers)
- Starch
- Glycogen
- Cellulose
- Glucose (loses both OH) condenses to make starch and water
- Glucosidic bond/linkage ($\text{box}-O-\text{box}$)

Proteins

- Amino acids (monomer)
- Polypeptide (polymer)
- Protein
- Two amino acids (both lose H and OH) condense to make protein (poly peptide/amide) and water
- Amide linkage/Peptide linkage ($N-\text{box}-C$)

Fats

- Macromolecules but not polymers
- Made by reaction of one glycerol and three fatty acids
- Glycerol loses H and Fatty acids loses OH
- Ester linkage ($O-C-\text{zig zag}$)
- + Protein chain continues as ($N-\text{box}-C-N-\text{CoIBox}-C$)

