

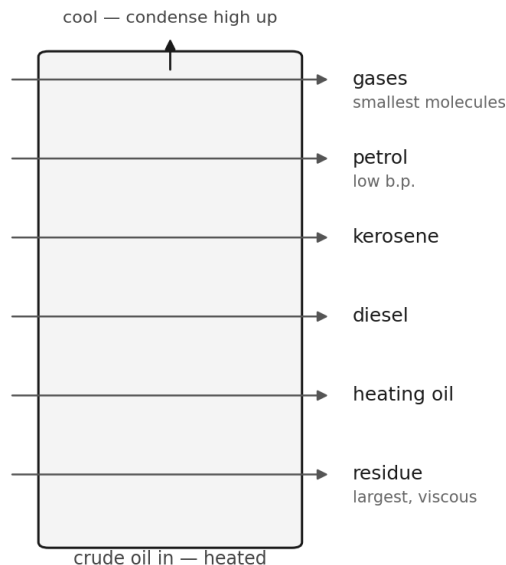
Exercise walk-through

7.3

Synthetic and naturally occurring polymers (4.7.3.1–4.7.3.2)

AQA · GCSE · Chemistry

Crude oil and fractions



- Alkanes C_nH_{2n+2} — methane, ethane, propane, butane.
- Distillation — evaporate, condense by boiling point; small high, large low.
- Bigger molecules — hotter boiling, thicker, less flammable.

Polymers

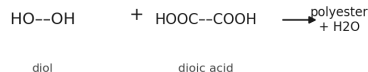
addition — monomer to repeating unit



n of them join — no other product

condensation — two monomers, water out

(2 functional groups)



- Addition — monomers join, nothing lost, unit equals monomer.
- (HT) condensation — two functional groups each, water lost, polyester.
- Natural — DNA nucleotides; proteins, starch, cellulose.

Exercises 2.1·2.3

2.1 What functional group must a monomer have for addition polymerisation? [1]

2.2 Name the polymer formed from propene. [1]

2.3 Name the small molecule lost in condensation polymerisation. [1]

Exercises 2.1·2.3

2.1 What functional group must a monomer have for addition polymerisation? [1]

2.1 C=C, a carbon–carbon double bond.

2.2 Name the polymer formed from propene. [1]

2.2 Poly(propene).

2.3 Name the small molecule lost in condensation polymerisation. [1]

2.3 Water (usually).

Exercises 3.1·3.3

3.1 Draw the repeating unit of poly(butene), given butene $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$. [3]

3.2 (*HT*) Explain how a polyester forms from a diol and a dioic acid, naming the linkage formed. [4]

3.3 (*HT*) Describe DNA's structure and name the monomers of proteins, starch and cellulose. [4]

Exercises 3.1·3.3

3.1 Draw the repeating unit of poly(butene), given butene $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}_3$. [3]

3.1 Repeating unit drawn with the backbone from two carbons that were double-bonded; side groups $-\text{H}$ and $-\text{CH}_2\text{CH}_3$ attached; bond lines extending left and right, showing continuation.

3.2 (*HT*) Explain how a polyester forms from a diol and a dioic acid, naming the linkage formed. [4]

3.2 Each diol molecule has two $-\text{OH}$ groups and each acid two $-\text{COOH}$ groups; ester links form between an $-\text{OH}$ of one monomer and a $-\text{COOH}$ of the other; releasing a molecule of water at each link; the alternating chain is a polyester with ester linkages.

3.3 (*HT*) Describe DNA's structure and name the monomers of proteins, starch and cellulose. [4]

3.3 DNA – two polymer chains made of four different nucleotides wound as a double helix; proteins from amino acids; starch and cellulose from sugars.