

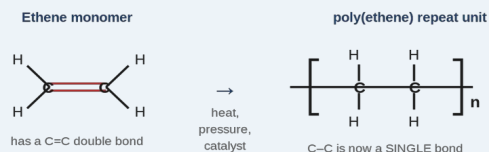
4.8 Synthetic Polymers

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1. KEY VOCABULARY

TERM	MEANING
Polymer	A very long molecule made of many repeating units.
Monomer	The small molecule that joins to make a polymer.
Addition polymerisation	Many unsaturated monomers join with nothing else made.
Repeat unit	The small section of the chain that repeats.
Biodegradable	Able to be broken down by microorganisms.

2. ADDITION POLYMERISATION



Addition polymerisation: many small unsaturated monomers join into one long chain.
 The polymer is the **ONLY** product — nothing else is made.
 Most addition polymers are unreactive and not biodegradable — a disposal problem.

3. HOW IT WORKS

Many monomers with a C=C double bond join together end-to-end.
The C=C double bonds open up to form single bonds between the monomers.

The polymer is the ONLY product — nothing else is made.

4. COMMON POLYMERS

MONOMER	POLYMER
Ethene	Poly(ethene)
Propene	Poly(propene)
Chloroethene	Poly(chloroethene) — PVC

5. DISPOSAL & THE ENVIRONMENT

Most addition polymers are unreactive and not biodegradable — microorganisms cannot break them down.

Landfill fills up; burning can release toxic gases. Recycling helps but is not always easy.

6. THE WHY

Why polymers are not biodegradable: their carbon chains are very unreactive, so microorganisms have no way to break them down.

Why addition polymers form so easily: the reactive C=C double bond in each monomer opens up to link the chains.

7. COMMON EXAM MISTAKES

- ✗ "Addition polymerisation makes water as well."
- ✓ Addition polymerisation makes **ONLY** the polymer.
- ✗ "The monomer and repeat unit are different formulae."
- ✓ Same atoms — but the repeat unit has single bonds, not C=C.
- ✗ "Polymers rot away in landfill."
- ✓ Most are not biodegradable — they persist for a very long time.

8. SELF-CHECK · cover & quiz

Can you...

- Define polymer, monomer and repeat unit?
- Explain how addition polymerisation works?
- Draw the repeat unit of poly(ethene) from ethene?
- Name three monomers and the polymers they form?
- Explain why addition polymers are not biodegradable?
- Describe the problems of disposing of polymers?