Addition polymers: from monomer to repeat unit

Student activity • observation and reasoning

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The question

Where does the double bond go when the chain grows?

Build repeat units from four named alkene monomers, showing the backbone and continuation bonds. Reverse a repeat unit to recover its monomer.

Equipment

• Booklet, pencil, periodic table and optional molecular model kit

Desk activity only; keep small model pieces away from mouths.

Course coverage: Shared core: 4.44–4.46. Poly(ethene), poly(propene), poly(chloroethene) and poly(tetrafluoroethene).

Plan, model or apparatus sketch

Draw a labelled structure or model to explain your reasoning for this lesson.

Method and reasoning

Read the whole sequence before starting

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1. Draw ethene and change C=C to a single backbone bond while adding continuation bonds from both carbons.

2. Bracket –CH_2–CH_2– and write n outside; draw bonds through the bracket boundaries.

3. Repeat for propene, retaining CH_3 as a side group on alternate backbone carbons.

4. Repeat for chloroethene CH_2=CHCl and tetrafluoroethene CF_2=CF_2.

5. Reverse a –CH_2–CHCl– repeat unit to its alkene monomer; do not add extra hydrogen.

6. Explain why addition polymerisation joins monomers without losing a small molecule.

Cleanup

- Return shared equipment and retain corrected reasoning.

Record your evidence

Blank spaces are for your own work

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Reference and task data

Condensed repeat-unit guides: $[–CH_2–CH_2–]_n$, $[–CH_2–CH(CH_3)–]_n$, $[–CH_2–CHCl–]_n$ and $[–CF_2–CF_2–]_n$. Your displayed drawings must show all bonds, brackets, continuation bonds and n; condensed text is not itself a fully displayed drawing.

Task	My structure / working	Reason / correction
Ethene / propene		
Chloroethene / tetrafluoroethene		
Reverse deduction		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

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1. What is a monomer?

2. Draw the poly(ethene) repeat unit.

3. Which group stays attached in poly(propene)?

4. Recover the monomer from –CH_2–CHCl–.

5. Draw poly(tetrafluoroethene).

6. Is water eliminated in addition polymerisation?