What are Addition Polymers?

Worksheet

Addition polymers are long-chain molecules formed when many monomer units with C=C double bonds add together in a chain reaction, one after another, without losing atoms.

Questions

1. What structural feature do all monomers in addition polymerization have?

A) A hydroxyl (-OH) group
B) A C=C double bond
C) A carboxyl (-COOH) group
D) Two amino groups

2. Which is an addition polymer?

A) Polyamide (nylon)
B) Polyester
C) Polyethylene (PE)
D) Polysaccharide

3. In addition polymerization, what happens to the C=C double bond?

A) It is removed completely
B) It is oxidized to C=O
C) It breaks and forms two new C-C single bonds
D) It stays unchanged

4. Why is PVC (polyvinyl chloride) an addition polymer?

A) It loses HO during formation
B) It is made from vinyl chloride monomers with C=C bonds
C) It contains chlorine atoms
D) It is water-soluble

5. Polyethylene (PE) is made from ethene monomers. Write the monomer structure and describe how they link.

6. Why is addition polymerization called 'addition'?

7. Polypropylene is made from propene (CH=CH-CH). What is the repeating unit of the polymer?

8. Define: What is an addition polymer?

9. Define: What is the key structural feature of monomers in addition polymerization?

10. Define: Name two common addition polymers and their uses.

Answer Key

1. B) A C=C double bond - Addition polymers form from monomers with C=C bonds that break and link together.

2. C) Polyethylene (PE) - PE is made from ethene by addition polymerization. Nylon and polyester are condensation polymers.

3. C) It breaks and forms two new C-C single bonds - The double bond breaks, and each carbon forms a single bond with the neighbouring monomer unit.

4. B) It is made from vinyl chloride monomers with C=C bonds - PVC is made by polymerizing vinyl chloride (CH=CHCl), an addition process with no byproducts.

5. Monomer = CH=CH (ethene) Double bond breaks: C=C C-C Thousands of ethene units link via single bonds forming (-CH-CH-) This is polyethylene (PE), used in bags and bottles.

6. Because monomers add together via addition reactions. No small molecules (like HO) are removed during polymerization. All atoms in the monomers end up in the final polymer chain.

7. Propene = CH=CH-CH Double bond breaks: C=C C-C Repeating unit = (-CH-CH(CH)-) This creates polypropylene (PP), a tough plastic.

8. A polymer formed when monomer units with C=C double bonds add together, linking via single bonds.

9. An unsaturated C=C double bond (or triple bond) that can break and form new single bonds.

10. Polyethylene (PE) - bags, bottles; Polypropylene (PP) - containers, car parts.