

Addition polymerisation

Alisha Kakar: A single paperclip can link to another and another forming a long chain.

That's what happens in polymerisation.

A monomer is a small molecule, demonstrated here by a paperclip that can join to other molecules.

When many monomers link together, they form a polymer, a long chain molecule made of repeating units.

Can you see how the monomer repeats here?

There are different types of polymerisation depending on how the monomers link.

We're focusing on one type, addition polymerisation.

When monomers with a carbon carbon double bond like ethene join together, the double bond breaks and the molecules connect to make one long chain.

It's called an addition polymer because the monomers simply add together.

Nothing else is produced.

When lots of ethene polymers join in this way, they create polyethylene, also known as polythene.

Polymers can be very long.

So instead of drawing the whole chain, we just show a small repeating section.

This is called a repeating unit diagram.

Let's draw one for poly(chloroethylene).

The monomer is chloroethylene.

It has a carbon carbon double bond, three hydrogen atoms and one chlorine atom.

When lots of chloroethylene monomers join together, they form the addition polymer poly(chloroethylene).

In the equation, we show this with an n before the monomer and an arrow to show the reaction.

The n shows that the monomer unit repeats many times to make the polymer.

Next, we complete the equation by drawing the addition polymer.

You draw a small section of the chain which is the repeating part.

This repeating part is one unit of the original monomer, but with the double bond broken.

You draw a single carbon carbon bond and lines extending out from each end to show it continues along the chain.

Finally, put brackets around the repeating unit and write n in the bottom right corner to show it repeats many times.

That's your repeating unit diagram complete.

Now, it's over to you.

Can you complete the repeating unit diagram for polypropylene?

Here's the first half of the equation.

You can pause the video while you have a think.

And here it is.

This is the repeating unit diagram for polypropylene.

Did you remember to remove the double bond between the carbon atoms?

And don't forget to add your n outside the brackets to show how many times the monomer is repeated.

Addition polymerization is all about joining alkenes together to create giant molecules.

A bit like this paperclip chain.

Just remember brackets, bonds and n.