



From *Education
in Chemistry*
rsc.li/3iGD6ul

Materials: polymers, ceramics and composites

How is a polymer formed?



eic

Starter

- What is the difference between an element, compound and a mixture?

Give as many examples as possible.

- Extension – what is an alloy?



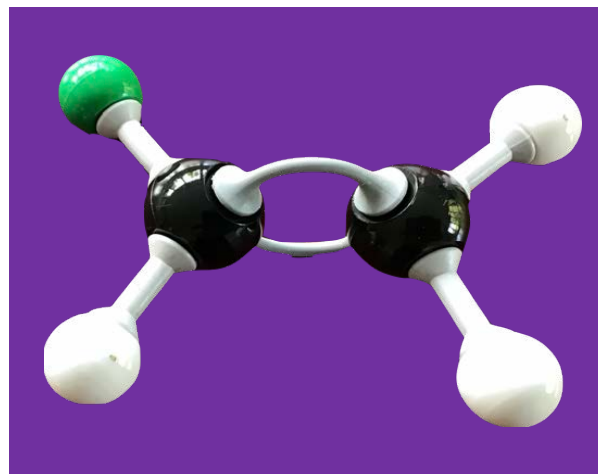
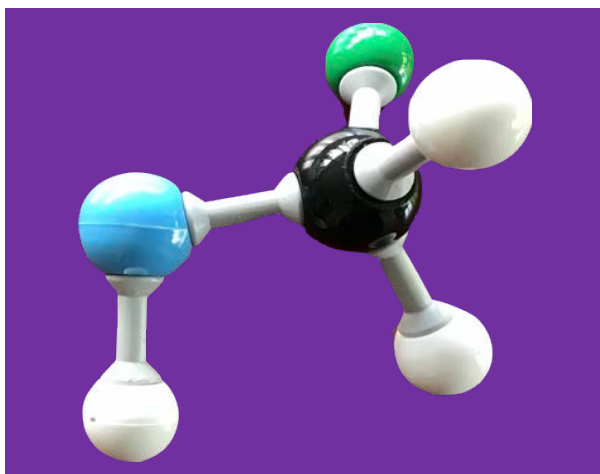
Starter

An element is made up of 1 type of atom.



Starter

A compound is made up of two (or more) different types of atom chemically bonded together.





Starter

A mixture is made up of two (or more) different elements or compounds not chemically bonded together.

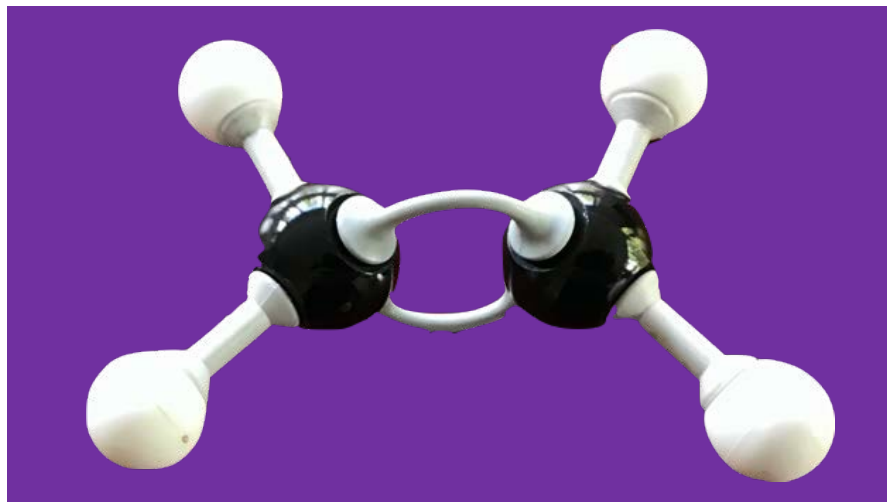


Properties of polymers

Make a molecule of ethene.

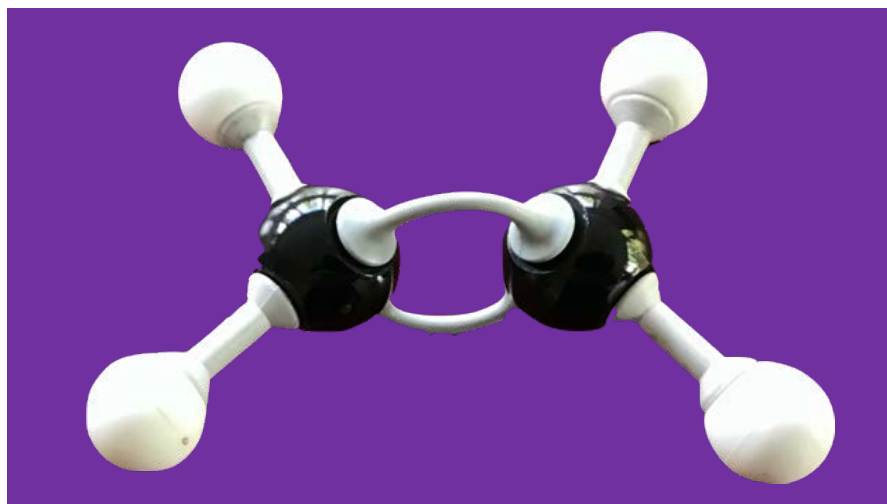
You will need:

- 2 black atoms
- 4 white atoms
- 2 long grey 'bonds'
- 4 short grey 'bonds'





Monomer properties

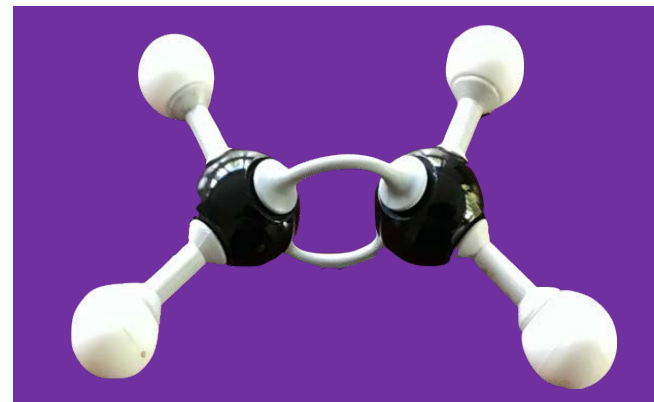


What properties do you predict this will have?



Monomer properties

What properties do you predict this will have?



High melting point

Small molecule

Low boiling point

Large molecule

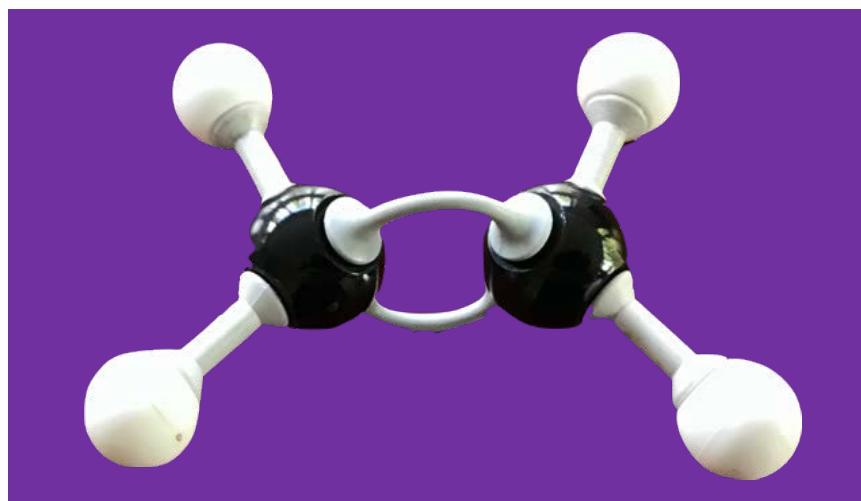
High boiling point

Low melting point

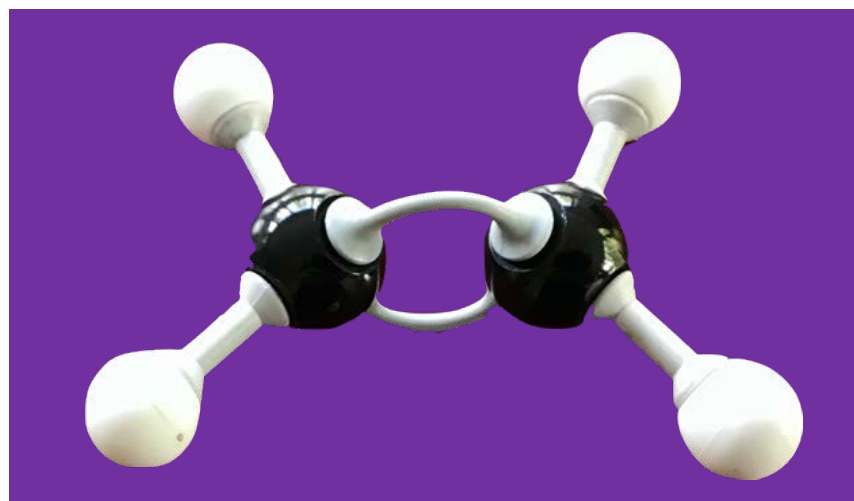
Reactive

Unreactive

Polymerisation



+





Polymerisation

What will we form?



Monomer

+

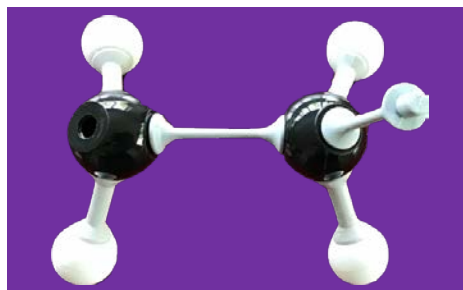


Monomer

+

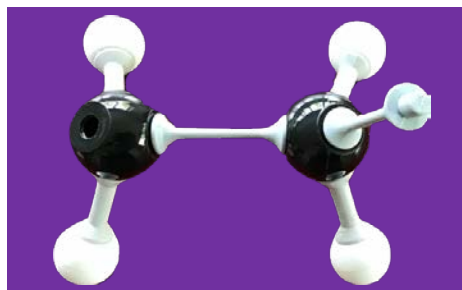


Polymerisation



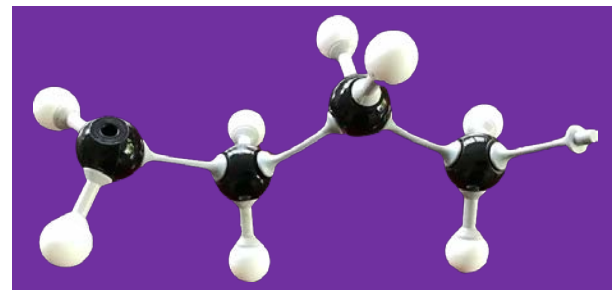
Monomer

+



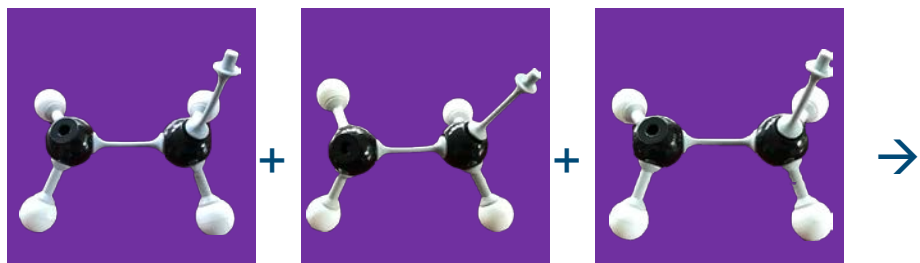
Monomer

→



Dimer

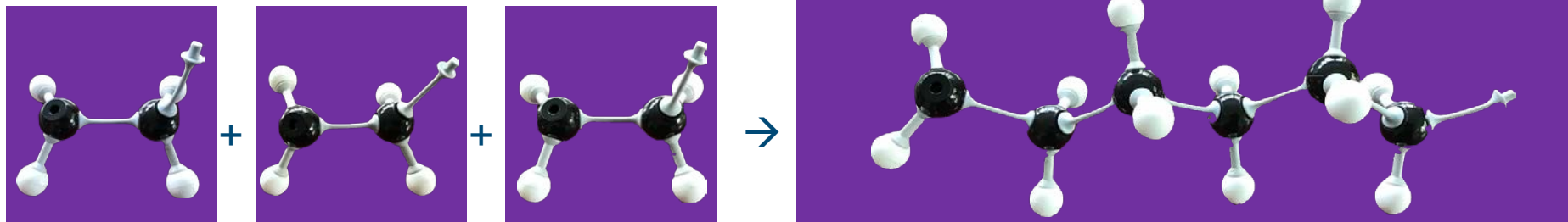
Polymerisation



Monomer + Monomer + Monomer → ?

Can you predict the name of what is formed when three monomers react together?

Polymerisation

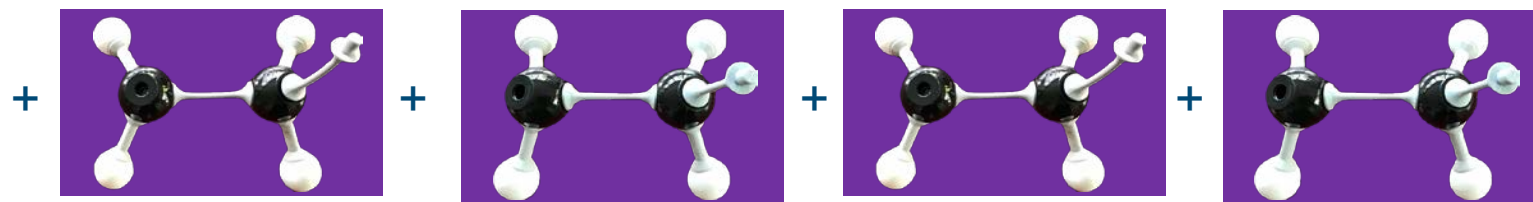
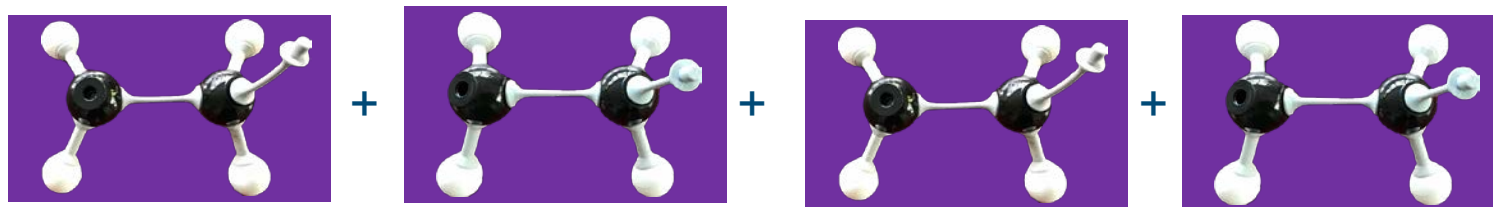


Monomer + Monomer + Monomer →

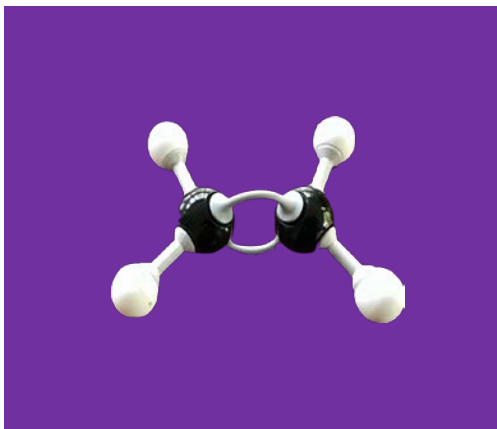
Trimer



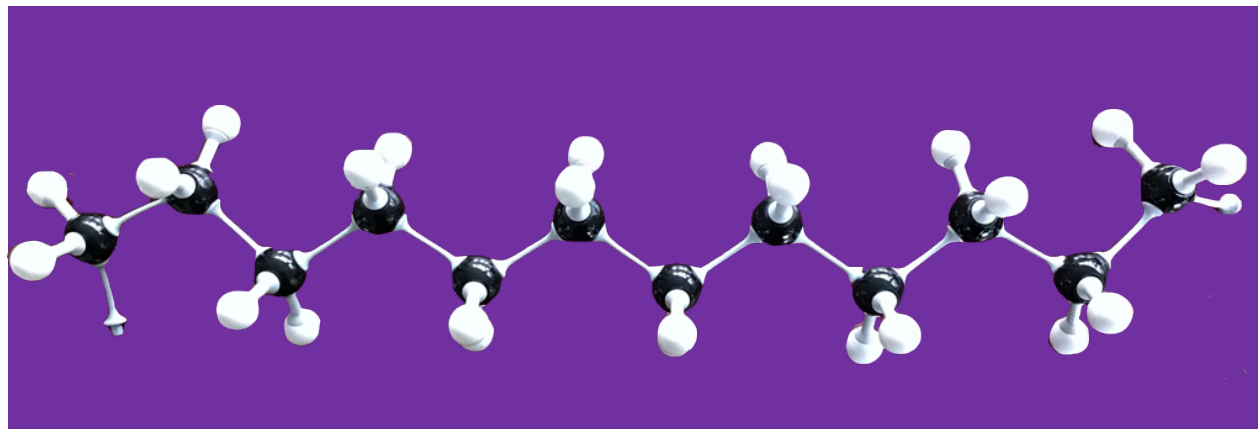
Polymerisation



Polymerisation



Monomer



Polymer

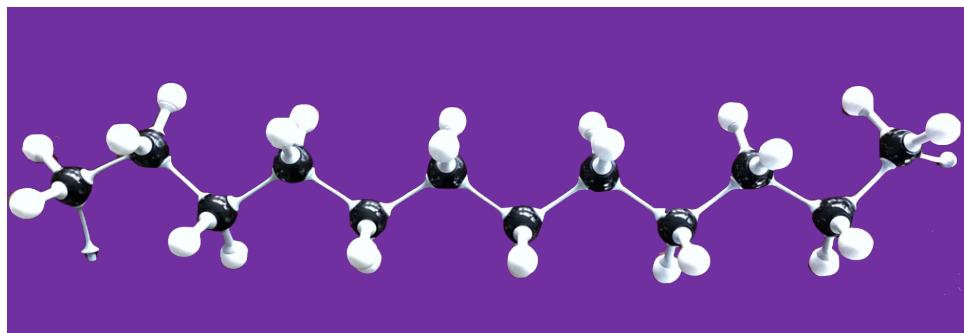
Compare the monomer to the polymer.

How are they similar? How are they different?



Polymerisation

Which of these properties do you think the polymer will have?



High melting point

Small molecule

Low boiling point

Large molecule

High boiling point

Low melting point

Reactive

Unreactive