

In this experiment we are going to react metallic sodium with chlorine gas to produce sodium chloride.

There are different ways to carry out this experiment.

For this version we will use:

A fume cupboard.

A Bunsen burner.

A heatproof tile.

A gas jar with lid.

A scalpel.

Paper towel.

Sodium metal and chlorine gas.

Let's start the experiment.

A small piece of sodium metal is cut using a scalpel, no more than a few millimetres on each side.

This is possible because the alkali metals, including sodium are soft metals.

The rest of the sodium is returned to the jar and the lid is put on.

A paper towel is used carefully to remove excess oil.

Chlorine is a toxic gas, so prepare and empty the gas jar in a fume cupboard.

You can see the green colour of the chlorine in the gas jar.

The sodium is placed on the heatproof tile.

Then play the flame of a Bunsen burner on it.

It melts quite easily to form a hemisphere but it does not catch fire easily.

The yellow colour in the flame is produced by vapourised sodium.

Before it cools, we take the lid off the gas jar and invert it over the hot sodium.

Immediately, the sodium burns in the chlorine and the gas jar fill with white particles.

These particles are sodium chloride.

Once cool, you can remove the jar. It is safest to do this in a fume cupboard as there may be some chlorine left in the jar.

You can see there is white powder on the inside of the jar and on the tile.

This is sodium chloride crystals. The same salt used for flavouring food.

By using a precipitation reaction, you can show the crystals contain chloride by dissolving some of the residue in distilled water and then adding silver nitrate solution.

You get a white precipitate of silver chloride, the test for chloride ions.

This shows that there has been a chemical change and that a chloride has been produced.

Let's recap the experiment:

A small piece of sodium is placed on a heatproof tile.

Then place the Bunsen burner flame on it.

Take the lid off the gas jar and invert it over the hot sodium.

The sodium burns in the chlorine, producing an orange flame and white particles.

These particles are sodium chloride.

Once cooled, remove the jar in a fume cupboard.

White sodium chloride powder is left behind.

Key points

Chlorine is a toxic gas, so prepare and empty the gas jar in a fume cupboard.

Sodium is highly reactive, so only use a small piece should be used.