

Metal hydroxide precipitate tests

Big Manny: Some metals reveal their identity, not through colour or shape, but by the colour of the solid that they produce.

Metal hydroxide precipitate tests are used to identify metal ions in a solution.

We're going to investigate how this happens.

When we add sodium hydroxide to solutions of some metal cations, a solid forms.

Now that solid is called a precipitate, and it can tell us which metal ion is present in a solution.

Now, this experiment requires six test tubes for six common metal ions.

A solution of copper two plus, iron two plus, iron three plus, calcium two plus, magnesium two plus and aluminium three plus.

Now we're also going to need some sodium hydroxide solution to add to the metal ions.

Of course, before we start, it's safety first.

Make sure you're wearing eye protection and gloves.

Always handle sodium hydroxide carefully, as it's very corrosive.

We'll take a small sample of the metal ion solution and add a few drops of sodium hydroxide.

If a solid forms, that's a precipitate.

Now we're going to record the results in this table here.

The first solution is copper two plus.

When we add sodium hydroxide, we can see that a blue solid forms very quickly.

Copper ions produce a blue precipitate.

The next one is iron two plus.

So we're going to add a few drops of sodium hydroxide in there.

And straight away, yeah.

We can see that it makes a lovely nice green precipitate form.

We can add that to our results table.

Alright cool.

So the next one, yeah, is iron three plus.

The difference between them is the charge on the ion.

Now iron two plus has lost two electrons and iron three plus has lost three electrons.

So we're going to do the same thing again and add some sodium hydroxide to the solution.

And we can see that straight away, it makes a brown precipitate.

So we're going to add that to our results table as well.

Now the next three on the list, calcium, magnesium and aluminium all have something in common.

They produce a white precipitate.

I'm going to show you, yeah.

So right here, we've got some calcium two plus.

And we're going to add a few drops of sodium hydroxide, yeah.

And we can see that straight away, it produces a white precipitate.

So we can add that to our results table.

Now for the next test, yeah, we're going to do some magnesium two plus.

So we're going to get a little bit of sodium hydroxide and add in a few drops in there.

And we can see that the colourless solution has turned to a white precipitate.

So, now we're going to add that to our results table.

And finally we've got a bit of aluminium three plus here.

So we're going to do the same thing.

Add a few drops of sodium hydroxide.

And we can see that the colourless solution is forming a white precipitate.

So we can add that to our results table as well.

I can't lie though, yeah.

Aluminium is slightly different.

So what we're going to do is add excess sodium hydroxide.

So that means we're going to add more of the reactant than what is needed.

And we can see that the precipitate actually redissolves back into the solution.

Alright cool.

Let's look at our results table in full, yeah.

Now an easy way to remember is transition metals equal colourful precipitates.

Metals from groups one, two and three, form white precipitates.

Obviously, aluminium, that's the odd one out.

Its precipitate dissolves in excess sodium hydroxide.

Hydroxide precipitate tests, give us a reliable way to tell metal ions apart, revealing their identity by the colour of solid they produce.