

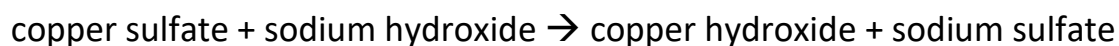
Ion Analysis

Success Criteria

- I can name common ions
 - I can use ions to write the formula of ionic compounds
 - I can apply the solubility rules
 - I can write ionic equations for precipitation reactions
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Solubility rules:

If copper sulfate solution was mixed with sodium hydroxide solution, then two new substances can be formed.



Using the “solubility rules” that will be provided, it can be seen that copper hydroxide is insoluble while sodium sulfate is soluble. A precipitate of copper hydroxide would be formed. A precipitate is the creation of a solid from solutions.

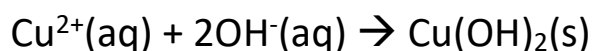
Solubility rules will be supplied in this assessment.

The Solubility Rules.

1. All Group 1 compounds are soluble (all sodium compounds are soluble)
2. All ammonium compounds are soluble
3. All nitrate compounds are soluble
4. Most sulfate compounds are soluble except for calcium sulfate, barium sulfate and lead sulfate
5. Most halides (chlorides and iodides) are soluble except for those compounds with silver and lead
6. All carbonate compounds are insoluble except those of Group 1 and ammonium ion
7. All oxides, hydroxides are insoluble except those of Group 1 and ammonium ion

Ionic equations:

A net ionic equation shows only the chemical species that are involved in a reaction. E.g. if a *solution* containing copper(II) ions is mixed with a *solution* containing hydroxide ions, then a solid (known as a precipitate) of copper hydroxide is formed. This is because the new compound formed, copper hydroxide, is insoluble.



Check the solubility rules. Rule 7. Says all hydroxides are insoluble except those of Group 1 and ammonium ion. Copper is NOT in Group 1 as it is a 'transition metal'.

Cracking the code: Join dot to dot with a ruler!

$\text{Cu}^{2+}(\text{aq})$	•	•	a solution containing hydroxide ions
$\text{Cu}^{2+}(\text{aq}) + \text{OH}^{-}(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s})$	•	•	solid
$\text{Cu}(\text{OH})_2(\text{s})$	•	•	unbalanced ionic equation
precipitate	•	•	formula for the compound copper hydroxide
$\text{OH}^{-}(\text{aq})$	•	•	a solution containing copper ions
$\text{Cu}(\text{OH})_2$	•	•	solution (dissolved in water – aqua)
$\text{Cu}^{2+}(\text{aq}) + 2\text{OH}^{-}(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s})$	•	•	a precipitate of copper hydroxide
(s)	•	•	balanced ionic equation
(aq)	•	•	solid formed when 2 solutions are mixed

Answers

Cracking the code: Join dot to dot with a ruler!

$\text{Cu}^{2+}(\text{aq})$ a solution containing hydroxide ions

$\text{Cu}^{2+}(\text{aq}) + \text{OH}^{-}(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s})$ solid

$\text{Cu}(\text{OH})_2(\text{s})$ unbalanced ionic equation

precipitate formula for the compound copper hydroxide

$\text{OH}^{-}(\text{aq})$ a solution containing copper ions

$\text{Cu}(\text{OH})_2$ solution (dissolved in water – aqua)

$\text{Cu}^{2+}(\text{aq}) + 2\text{OH}^{-}(\text{aq}) \rightarrow \text{Cu}(\text{OH})_2(\text{s})$ a precipitate of copper hydroxide

(s) balanced ionic equation

(aq) solid formed when 2 solutions are mixed