# Preparing a soluble salt: supporting resources

### This resource supports the practical video Preparing a soluble salt, available here: <rsc.li/3pmV9sw>

## Using the structure strips

Writing about chemistry encourages learners to reflect on their understanding, formulate new ideas and make links between ideas in new ways. Learners also need to practice for longer-answer questions in examinations. Structure strips provide scaffolded prompts and help overcome ‘fear of the blank page’. The learner sticks the strip into the margin of their exercise book or onto an A4 sheet of paper and writes alongside it. Use this long- answer question to consolidate learning after the practical and/or for revision. (Read more at rsc.li/2P0JDlW.)

**Long-answer question:**

*Zinc is an essential dietary mineral required for growth and a healthy immune system.*

*Patients suffering from a zinc deficiency may be required to take a zinc supplement containing zinc sulfate.*

*Write a method for preparing a sample of pure dry zinc sulfate crystals from a metal oxide and acid.
You must include details of the chemicals and equipment you will use, and any safety considerations.*

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| --- | --- | --- | --- | --- |
| **Preparing a salt Structure strip** | **Preparing a salt Structure strip** | **Preparing a salt Structure strip** | **Preparing a salt Structure strip** | **Preparing a salt Structure strip** |
| Name the metal oxide and acid you will use. | Name the metal oxide and acid you will use. | Name the metal oxide and acid you will use. | Name the metal oxide and acid you will use. | Name the metal oxide and acid you will use. |
| Write a word and symbol equation for the neutralisation. | Write a word and symbol equation for the neutralisation. | Write a word and symbol equation for the neutralisation. | Write a word and symbol equation for the neutralisation. | Write a word and symbol equation for the neutralisation. |
| Write a method for the neutralisation reaction. | Write a method for the neutralisation reaction. | Write a method for the neutralisation reaction. | Write a method for the neutralisation reaction. | Write a method for the neutralisation reaction. |
| *Remember you may use bullet points.* | *Remember you may use bullet points.* | *Remember you may use bullet points.* | *Remember you may use bullet points.* | *Remember you may use bullet points.* |
| Which of the reactants needs to be in excess? | Which of the reactants needs to be in excess? | Which of the reactants needs to be in excess? | Which of the reactants needs to be in excess? | Which of the reactants needs to be in excess? |
| Describe how to separate the excess reactant from the salt solution. | Describe how to separate the excess reactant from the salt solution. | Describe how to separate the excess reactant from the salt solution. | Describe how to separate the excess reactant from the salt solution. | Describe how to separate the excess reactant from the salt solution. |
| Describe how to remove excess water from the solution. | Describe how to remove excess water from the solution. | Describe how to remove excess water from the solution. | Describe how to remove excess water from the solution. | Describe how to remove excess water from the solution. |
| What conditions are | What conditions are | What conditions are | What conditions are | What conditions are |
| needed to produce | needed to produce | needed to produce | needed to produce | needed to produce |
| different sizes of salt | different sizes of salt | different sizes of salt | different sizes of salt | different sizes of salt |
| crystals? | crystals? | crystals? | crystals? | crystals? |
| What safety precautions must you consider? | What safety precautions must you consider? | What safety precautions must you consider? | What safety precautions must you consider? | What safety precautions must you consider? |

### Structure strip: suggested answer content

**Preparing a salt Structure strip**

|  |  |
| --- | --- |
| Name the metal oxide and acid you will use. | Zinc sulfate is a salt. Salts can be produced from a neutralisation reaction between a metal oxide and an acid. To produce zinc sulfate the metal oxide needed is zinc oxide and the acid needed is sulphuric acid. The neutralisation reaction is as follows: |
| Write a word and symbol equation for the neutralisation. | zinc oxide + sulfuric acid → zinc sulfate + waterZnO + H2SO4 → ZnSO4 + H2OMethod* Measure 15 cm3 of sulfuric acid and transfer into a boiling tube.
* Half fill a beaker with boiling water.
* Stand the boiling tube in the hot water bath for 2–3 mins.
* Measure out 2 g of zinc oxide powder using a measuring boat on a top pan balance.
* Add half the zinc oxide to the sulfuric acid in the boiling tube.
* Gently swirl the boiling tube to mix the zinc oxide with the acid and then place the boiling tube back in the hot water bath.
* Add the rest of the zinc oxide once the reaction subsides.

*Note: learners may write a method for the neutralisation using a Bunsen burner rather than a water bath method.*An excess of zinc oxide is needed to fully react with the hydrochloric acid. There will be some solid zinc oxide powder left over once the reaction has completed.To separate the excess zinc oxide from the zinc sulfate solution use filter paper and a funnel. Set up the filter funnel over a conical flask to collect the zinc sulfate solution, leaving behind the solid zinc oxide as a residue.Remove the excess water from the zinc sulfate solution by heating the conical flask on a tripod and gauze over a roaring blue Bunsen flame. Do not allow the flask to boil dry. Anti-bumping granules can be added to the solution prior to heating to ensure a smooth boiling action.Once the solution has cooled, transfer it to an evaporating basin and allow the rest of the water to evaporate, leaving dry zinc sulfate crystals. If the evaporation happens quickly (in a warm, draughty environment) then small crystals will form. If the evaporation happens slowly (in a cold environment with no draughts) then large crystals will form.* Wear safety glasses when working with acids and alkalis as they are irritants.
* Handle glassware and hot equipment safely. Using a hot water bath for the neutralisation reaction mitigates some of the risks involved with handling hot glassware.
* Dispose of zinc sulfate crystals safely as they are labelled corrosive, irritant and a hazard to the environment.

*(Any other relevant safety considerations here.)* |
| Write a method for the neutralisation reaction.*Remember you may use bullet points.* |
| Which of the reactants needs to be in excess? |
| Describe how to separate the excess reactant from the salt solution. |
| Describe how to remove excess water from the solution. |
| What conditions are needed to produce different sizes of salt crystals? |
| What safety precautions must you consider? |

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