

WJEC (Wales) Chemistry GCSE

Specified Practical 2.3a

Determination of relative reactivities of metals through displacement reactions

[Methods are adapted from the Royal Society of Chemistry]

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Displacement Reactions

Some metals are **more reactive** than others. Strips of metal can be added to a solution of a metal compound to analyse reactivity. More reactive metals **displace** (remove and replace) **less reactive** metals from a compound.

Aim

To investigate **metallic displacement** reactions in order to derive the **relative reactivities** of the metals.

Equipment

- 16-hole spotting tile
- Dropping pipette
- Beaker
- Marker pens
- 1 cm strip lengths of:
 - Copper foil
 - Lead foil
 - Magnesium ribbon
 - Zinc foil
 - 0.1 M solutions of:
 - Copper(II) sulfate
 - Lead(II) nitrate
 - Magnesium sulfate
 - Zinc sulfate

Method

- 1. Using a dropping pipette, put a few drops of zinc sulfate solution in four of the depressions in the **spotting tile**. Ensure you label this row with the solution name.
- 2. Repeat for each metal solution, rinsing the pipette between each one.
- 3. Place each **strip of metal** into the depressions until the spotting tile appears as in the diagram.
- 4. Observe for **5** minutes and write down any observations of reactions.

Safety Precautions

- Lead(II) nitrate is toxic and dangerous for the environment. It is harmful if ingested so any skin which comes into contact with it should be washed immediately.
- Copper(II) sulfate, zinc sulfate and magnesium sulfate are all irritants. Safety goggles must be worn at all times and any skin which comes into contact with them must be washed immediately. Clean up any spillages immediately.

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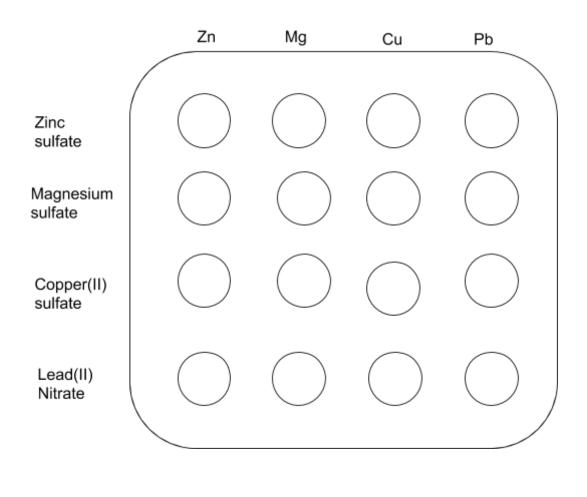




Results

- **Displacement** will take place if the metal added to the metal salt solution is more reactive than the metal in the metal salt solution.
- Magnesium will displace copper(II) sulfate, lead(II) sulfate and zinc sulfate.
- Zinc will displace lead(II) sulfate and copper(II) sulfate.
- Lead will displace copper(II) sulfate.
- **Copper** will not displace any of the metal salts.

Diagram



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