

Displacement reactions of metals

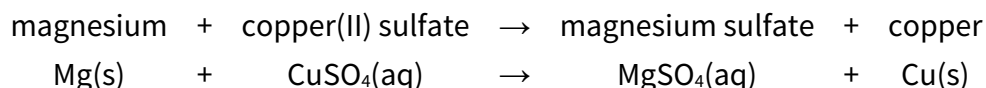
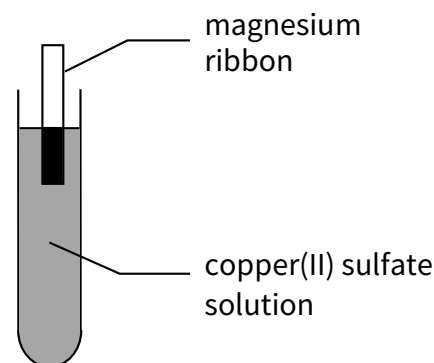
Reactions in solution

Remember

A metal will displace a less reactive metal from solutions of its compounds.

For example, magnesium is more reactive than copper. When magnesium is put into copper(II) sulfate solution:

- magnesium sulfate solution forms
- copper coats the magnesium.



Questions

1. For each of the following experiments involving a metal being put into a solution, decide whether a reaction will happen. If you think a reaction will **not** happen, explain why you think this.

If you think a reaction **will** happen:

- describe what you expect to see
- explain why you think this will happen
- write an equation for the reaction.

(a) iron and copper(II) sulfate solution

(b) zinc and magnesium sulfate solution

(c) copper and silver nitrate solution

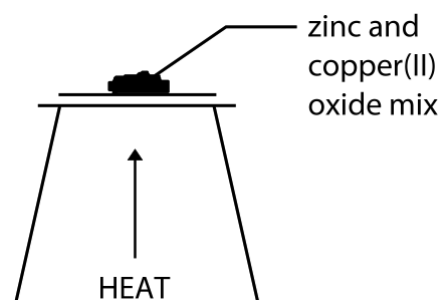
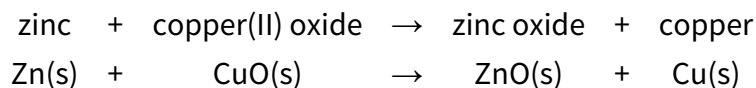
(d) zinc and iron(II) nitrate solution

Reactions with metal oxides

Remember

A metal will displace a less reactive metal from its oxide.

For example, zinc is more reactive than copper. A vigorous reaction happens when a mixture of zinc powder and copper(II) oxide is heated. Zinc oxide and copper form:



Questions

2. For each of the following experiments involving heated mixtures of powders, decide whether a reaction will happen. If you think a reaction will **not** happen, explain why you think this.

If you think a reaction **will** happen:

- describe what you expect to see
- explain why you think this will happen
- write an equation for the reaction.

(a) iron and copper(II) oxide

(b) aluminium and iron(III) oxide

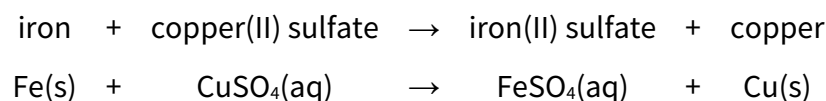
(c) copper and iron(III) oxide

(d) magnesium and zinc oxide

Displacement reactions of metals – ANSWERS

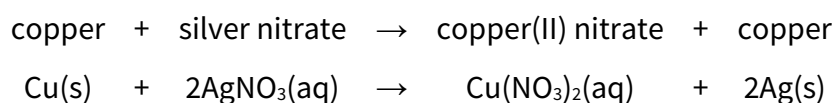
Reactions in solution

1. (a) A reaction will happen. Iron(II) sulfate solution will form and copper will coat the iron. This is because iron is more reactive than copper, so it can displace copper from copper(II) sulfate.

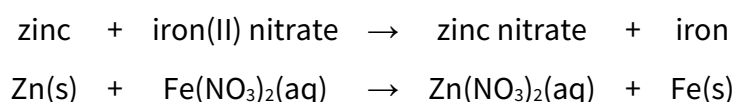


- (b) A reaction will not happen. This is because zinc is less reactive than magnesium, so it cannot displace magnesium from magnesium sulfate.

- (c) A reaction will happen. Copper(II) nitrate solution will form and silver will coat the copper. This is because copper is more reactive than silver, so it can displace silver from silver nitrate.

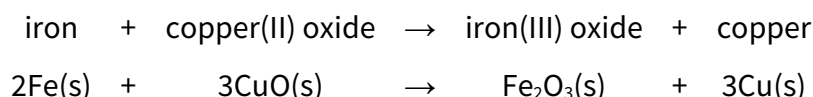


- (d) A reaction will happen. Zinc nitrate solution will form and iron will coat the zinc. This is because zinc is more reactive than iron, so it can displace iron from iron(II) nitrate.

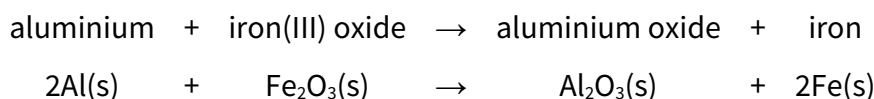


Reactions with metal oxides

2. (a) A reaction will happen. Iron(III) oxide and copper will form. This is because iron is more reactive than copper, so it can displace copper from copper(II) oxide.

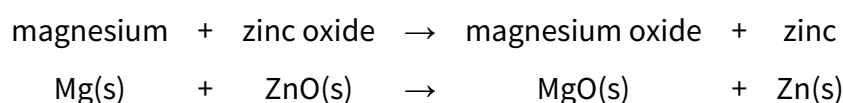


- (b) A reaction will happen. Aluminium oxide and iron will form. This is because aluminium is more reactive than iron, so it can displace iron from iron(III) oxide.



- (c) A reaction will not happen. This is because copper is less reactive than iron, so it cannot displace iron from iron(III) oxide.

- (d) A reaction will happen. Magnesium oxide and zinc will form. This is because magnesium is more reactive than zinc, so it can displace zinc from zinc oxide.



The questions only ask for an equation, so you may accept a word equation, a balanced equation, or both. Accept iron(II) or iron(III) compounds as it is not necessarily obvious what will form first.