

CAIE Chemistry IGCSE

9.1 Properties of metals

Flashcards

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What are the general physical properties of metals?



What are the general physical properties of metals?

- High melting and boiling points
- Good conductors of heat and electricity
- Malleable
- Ductile



Why do metals have relatively high melting and boiling points?



Why do metals have relatively high melting and boiling points?

Metals are giant structures with strong metallic bonding. There is strong electrostatic attraction between the positive ions and the negative electrons so lots of energy is required to break these bonds to change state.



In terms of their structure, why are metals good electrical conductors?



In terms of their structure, why are metals good electrical conductors?

Metals contain delocalised electrons which are free to move throughout the structure and carry charge.



In terms of their structure, why are metals good thermal conductors?



In terms of their structure, why are metals good thermal conductors?

Metals contain delocalised electrons which are free to move throughout the structure and transfer thermal energy from one place to another.



Why are metals malleable?



Why are metals malleable?

The positive ions are arranged in uniform rows which are able to slide over one another. This makes a metal malleable.



What is produced when a metal reacts with acid?



What is produced when a metal reacts with acid?

Salt and hydrogen



What type of reaction occurs when a metal reacts with an acid? Why does this reaction occur?



What type of reaction occurs when a metal reacts with an acid? Why does this reaction occur?

Displacement reaction:

The metal is more reactive than hydrogen so it will displace hydrogen and combine with the ion from the acid (e.g. chloride or sulfate ion).



Write the word equation for the reaction
between metals and hydrochloric acid



Write the word equation for the reaction between metals and hydrochloric acid

Metal + Hydrochloric acid \rightarrow Metal chloride + Hydrogen



Write the word equation for the reaction
between metals and sulfuric acid



Write the word equation for the reaction between metals and sulfuric acid

Metal + Sulfuric acid \rightarrow Metal sulfate +
Hydrogen



How does the position of a metal in the reactivity series affect whether it will react with a dilute acid?



How does the position of a metal in the reactivity series affect whether it will react with a dilute acid?

If a metal is above hydrogen in the reactivity series, it will react with dilute hydrochloric or sulfuric acid to form a salt and hydrogen.



Why don't metals lower than hydrogen in the reactivity series react with dilute hydrochloric or sulfuric acid?



Why don't metals lower than hydrogen in the reactivity series react with dilute hydrochloric or sulfuric acid?

They are less reactive than hydrogen so are unable to displace hydrogen from the acid to form a salt.



How could you compare how different metals react with an acid?



How could you compare how different metals react with an acid?

- Pour the chosen acid into a conical flask.
- Add the metal to the flask.
- Record any observations (including the rate at which bubbles are produced).
- Repeat with different metals and compare.



What is produced when a metal reacts
with cold water?



What is produced when a metal reacts with cold water?

Metal hydroxide and hydrogen



Write the word and chemical symbol equations for the reaction between lithium and cold water



Write the word and chemical symbol equations for the reaction between lithium and cold water

Lithium + water \rightarrow Lithium hydroxide and hydrogen



What is produced when a metal reacts with steam?



What is produced when a metal reacts with steam?

Metal oxide and hydrogen



What state is steam in?



What state is steam in?

Gaseous state

Steam - $\text{H}_2\text{O (g)}$



Write the word and chemical symbol equations for the reaction between magnesium and steam



Write the word and chemical symbol equations for the reaction between magnesium and steam

Magnesium + Steam \rightarrow Magnesium oxide and hydrogen



What is produced when a metal reacts with oxygen?



What is produced when a metal reacts with oxygen?

Metal oxide



Write the word and chemical symbol equations for the reaction between magnesium and oxygen



Write the word and chemical symbol equations for the reaction between magnesium and oxygen

Magnesium + oxygen \rightarrow Magnesium oxide

