

O-level

Action of metals with water

Most metals react with water to produce hydrogen and the hydroxide of the metal

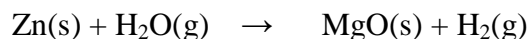
The table below show action of water with metals

| Metal | Reaction with H ₂ O | Order of reactivity |
|-------|--|---------------------|
| K | Burns giving off white fumes and form a lilac flame it produced a cracking sound $2K(s) + 2H_2O(l) \rightarrow H_2(g) + 2KOH(aq)$ | K (1) |
| Na | - Reacts with water, floats, does not burn in one place - it gives off white fumes and hissing sound $2Na(s) + 2H_2O(l) \rightarrow H_2(g) + 2NaOH(aq)$ | Na (2) |
| Ca | Sinks in water, gives off hydrogen bubbles, generating heat and turning water milky $Ca(s) + 2H_2O \rightarrow H_2(g) + Ca(OH)_2$ | Ca (3) |
| Mg | Reacts very slowly with cold water. $Mg(s) + H_2O(l) \rightarrow Mg(OH)_2(aq)$ Heated magnesium catches fire in steam and burns brightly. Forming white powder. $Mg(s) + H_2O(g) \rightarrow MgO(s) + H_2(g)$ | Mg (4) |

Aluminium, zinc, lead, and copper do not react with water.

Aluminium and zinc do not react with water because their surface is protected with oxide layer.

Zinc reacts with steam to form an oxide



Exercise

- The substance that can react with water at room temperature is
 - Magnesium
 - Zinc
 - Iron
 - calcium
- Element M reacts with cold water while N reacts with steam. Q displaces M from solution of its salt. Which one of the following is the order of reactivity of elements beginning with the most reactive?

- A. Q,M,N
 - B. M,N,Q
 - C. N,M,Q
 - D. Q,N,M
3. Which one of the following metals react with cold water to produce hydrogen?
- A. Aluminium
 - B. Calcium
 - C. Iron
 - D. zinc

| | | | | |
|----|-----|------|---|------------|
| 1. | | | Steam was passed over heated magnesium | |
| | (a) | (i) | State what was observed | (01 mark) |
| | | (ii) | Write equation for the reaction that took place | (1 ½ mark) |
| | (b) | | The solid produced in (a)(ii) was added dilute hydrochloric acid. | |
| | | (i) | State what is observed | (01 mark) |
| | | (ii) | Write equation for the reaction that took place | (1 ½ mark) |



