

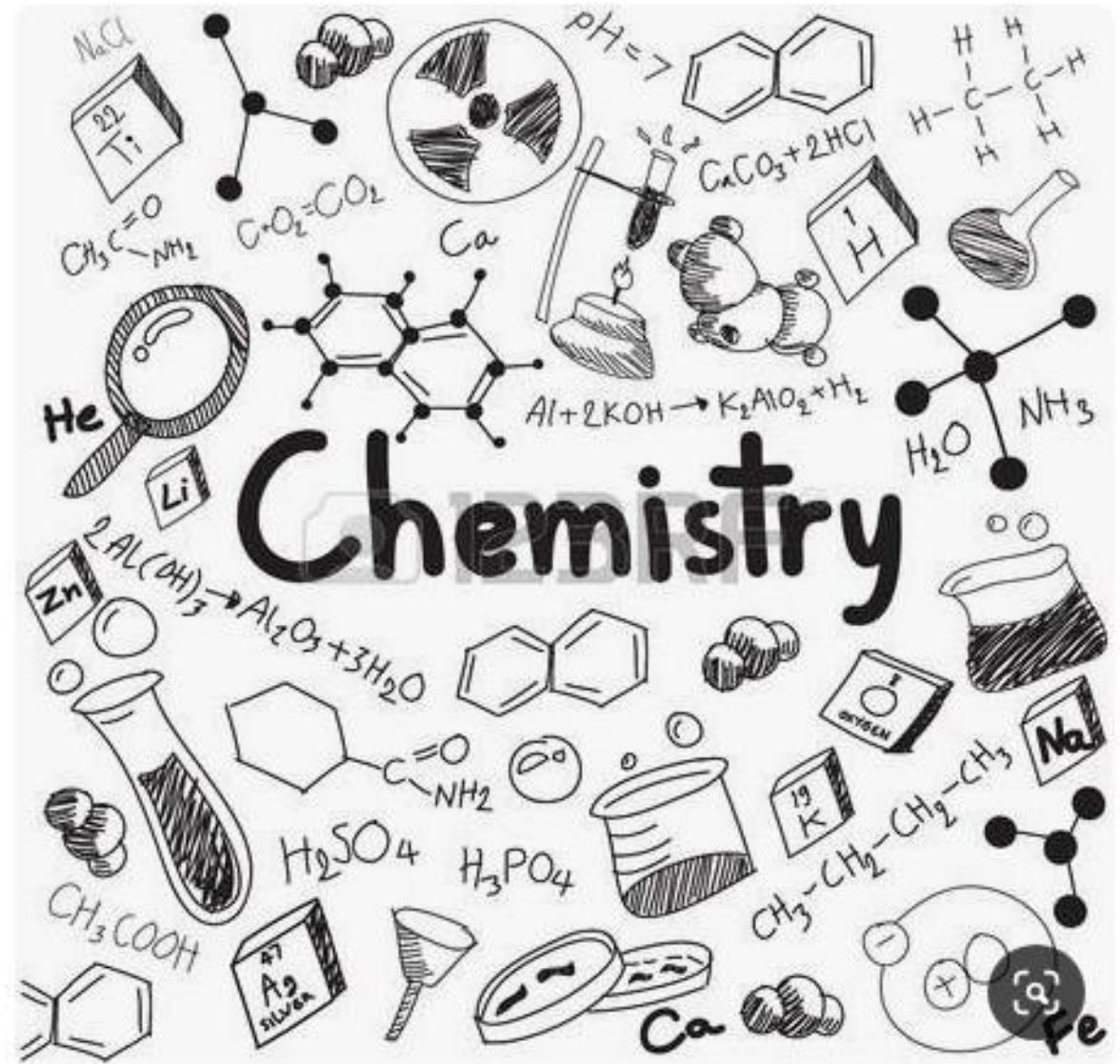


The National
Orthodox School
Shmaisani

Lesson #1: (Reactions of
metals)

Scholastic Year: 2022-2023

Grade: 7CS



Accredited by



Cambridge Assessment
International Education
Cambridge International School

edexcel

CIS
COUNCIL OF
INTERNATIONAL
SCHOOLS



Objective:

1. To investigate the reactivity of metals
2. To describe how metals react with oxygen & water.

Resources:

Power point presentation

Videos

Complete Chemistry for Cambridge Secondary 1

Reactions of metals

We can examine the reactivity of metals by observing their reactions with **oxygen, water, acid** and whether it displaces other metals in **displacement reactions**.

To do this, we need to do three tests for the elements:

1. Reactions with oxygen.
2. Reactions with water.
3. Reactions with acids.



Reactions with oxygen



Reactions with water



Reactions with acids

Reactions with oxygen

metal+ oxygen → metal oxide

Reaction with open air

- Most metals react with oxygen in the air. Some react fast, once they are exposed to open air, forming a layer of metal oxide, others need to be burned to allow the reaction to take place.

Burning metals

- When metals are burned in oxygen, they will give flames with different colors and different amounts of energy will be given out.

Understanding reactivity with oxygen <https://www.youtube.com/watch?v=RA3rQ2JXtLI>

Metal	Symbol	Appearance	Observation
Magnesium	Mg	Grey colour	Strong reaction, a white flash appeared after burning it. It changed into a white powder which is magnesium oxide.
Copper	Cu	Red- brown colour	A thin layer of grey color formed on the surface (copper oxide) An orange flame appeared during the test.
Iron	Fe	Grey colour	White flash appeared during the test. The colour of iron wool changed into black forming iron oxide.
Zinc	Zn	Shiny silver colour	Orange flame is formed After burning, some of the zinc changed into white powder which is zinc oxide (size of the sample had changed)



Mg



Cu



Fe



Zn

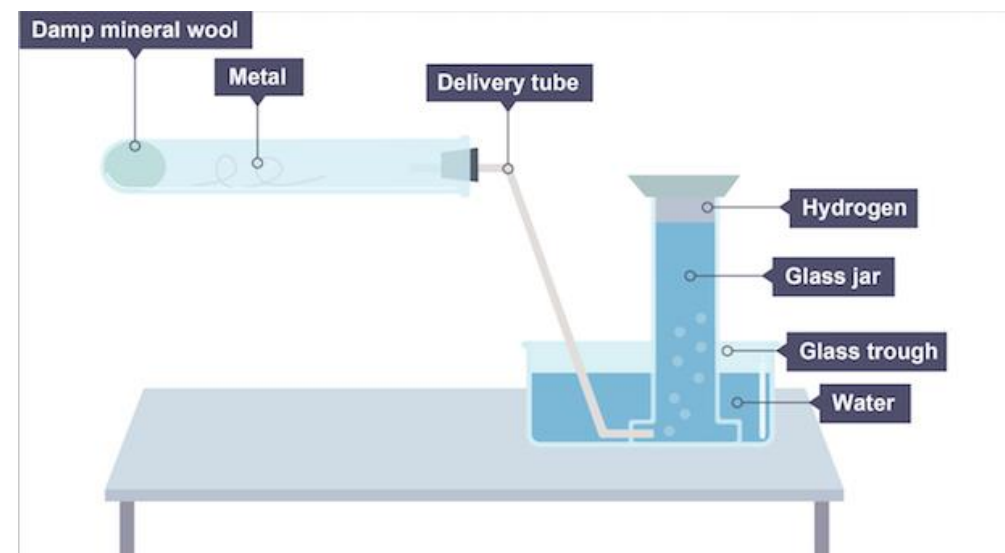
Reactions with water



Reaction with cold water

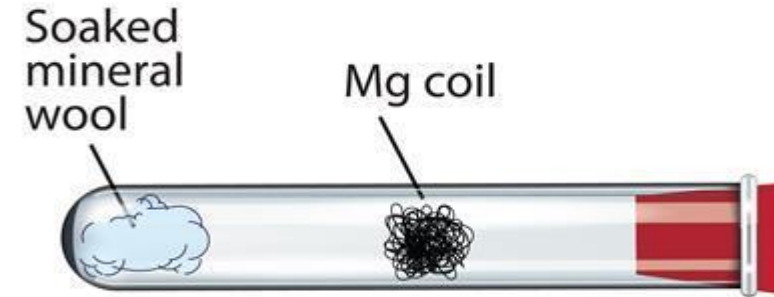
- Some metals react with cold water (water at room temperature) such as potassium, sodium, lithium and calcium, forming metal hydroxide and hydrogen gas.
- An indicator (phenolphthalein/ universal indicator/ litmus paper) can be used to help to compare the rate of reactivity of the metal. The faster the change of color, the higher the rate of reactivity.

Reaction with steam

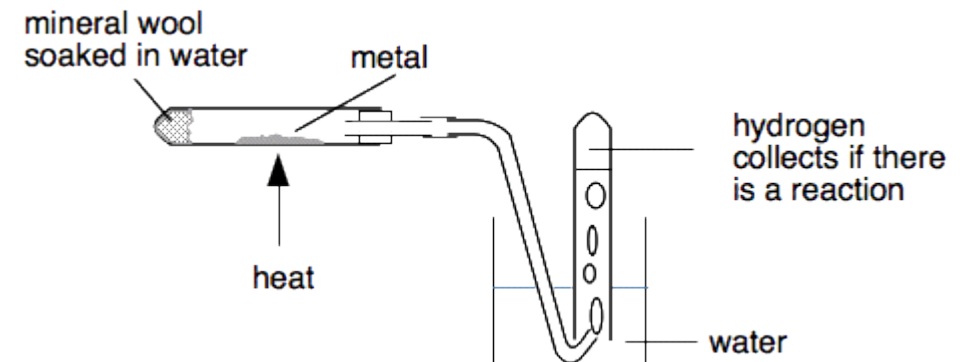


The damp mineral wool is heated to generate steam.

- The damp mineral wool is heated to generate steam.

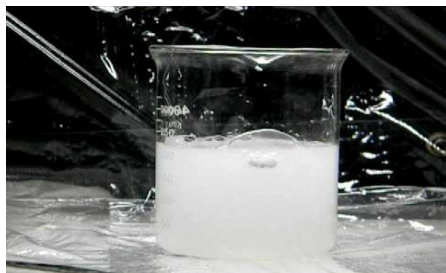


- Steam will cause a chemical reaction with the metal sample.
- If the metal was reactive, hydrogen gas will be produced. The gas will pass through the delivery tube and then it will be collected in the measuring cylinder.
- The amount of gas produced helps to compare the reactivity rate of the metals. The more gas the higher the rate of reactivity.

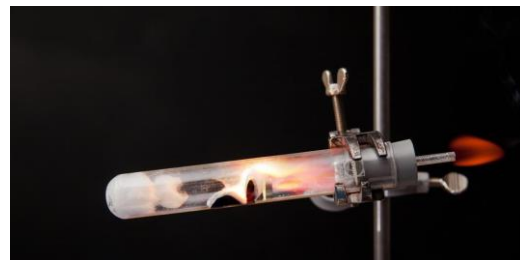


Understanding reactivity with water/ steam

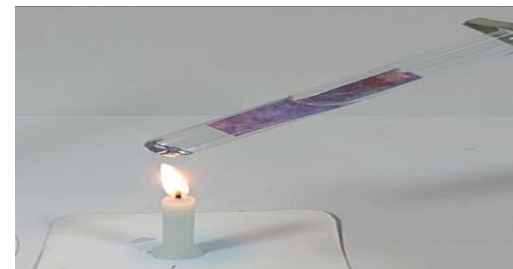
Metal	Observations in water
Calcium https://www.youtube.com/watch?v=QDKkdhXGv5c	calcium metal begins to bubble vigorously as it reacts with water, producing hydrogen gas, and calcium hydroxide. Rise in temperature (exothermic reaction)
Magnesium https://www.youtube.com/watch?v=1oscKlyi_pY	Magnesium reacts slowly with cold water forming small bubbles on the surface of the ribbon. Many bubbles are formed when heated.
Zinc (aluminium/ iron) https://www.youtube.com/watch?v=dBGx2PFhoGw	Slow reaction with cold water (The color of indicator changes slowly) then the reaction gets faster with hot water, but less bubbles are produced comparing to magnesium
Sodium https://www.youtube.com/watch?v=jl_JY7pqOM	Vigorous reaction with cold water, rapid change in color of the indicator, fizzing on the surface, hydrogen gas given out, exothermic reaction



Ca



Mg



Zn



Na