Chapter 35: Metals

Properties of Metals.

1. Shiny, metallic appearance.

2. Solid. (except mercury at room temperature)

3. Malleable (can be hammered into sheets)

4. Ductile (stretched into wires)

5. Very dense (except the alkali metals)

6. High melting points

7. Good conductors of heat and electricity.

8. They corrode to form oxides.

Corrosion of Metals.

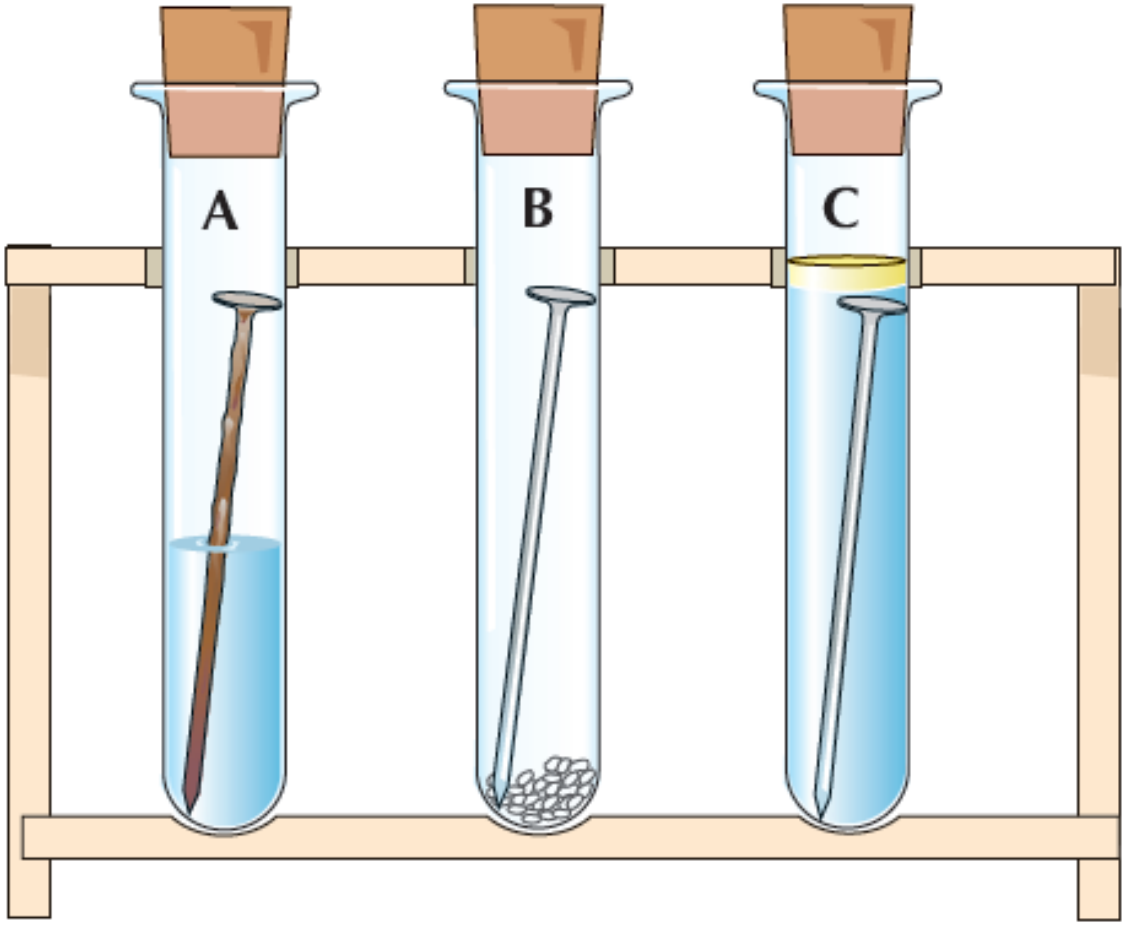
Def: Oxidation is the process by which a metal reacts with **oxygen** to form an **oxide**.

If sodium is burned, sodium oxide is formed. The heat helps it react with the oxygen in the air.

However, when iron comes into contact with water and oxygen in the air, rusting is formed or iron oxide.

To Ivestigate the Conditions Necessary for Rusting.

Test tube A: Water
Test tube B: Calcium chloride
Test tube C: Boiled water and a layer of oil



Test tube **A** has water and oxygen both present.

Test tube **B** has only oxygen present. (Note: the calcium chloride removes water vapour from the air)

Test tube **C** has boiled water (no oxygen present) and a layer of oil on top (prevents oxygen entering the water)

Which one will rust???? **Test tube A!!**

Preventing Rusting.

So rusting occurs when the electrons in a metal bond with oxygen. To prevent this we must put a cover on the metal to stop the metal from touching the air or water around it.

1. Painting:- cars, gates, bicycles.....

2. Greasing and oiling:- Used where moving parts are involved

3. Galvanising:- buckets, involves coating iron with zinc.

4. Chrome plating:- sink taps, involves coating steel with chromium

Metal Alloys.

Alloys are formed by melting and mixing metals together. The most common example is bronze and steel.

Alloys are much harder and more resistant to corrosion. This is because of the molecular make up of the alloy.

Examples

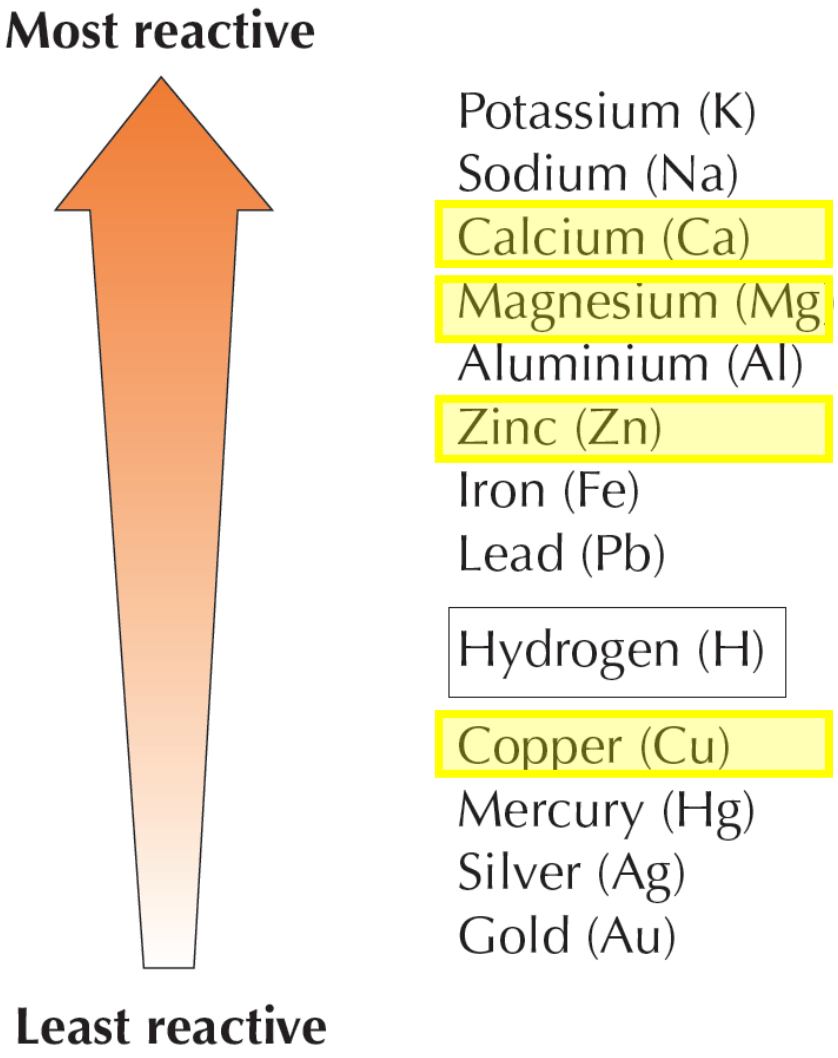
Bronze: Made up of copper and tin. Good for making statues and medals because it can be melted down and poured easily.

Brass: Made up of copper and zinc. Used to make ornaments

Steel: Made from iron and carbon. Very hard and used to make machinery.

Solder: Made from tin and lead. Low melting point, used to join wires together.

The Activity Series of Metals



The list on the left shows how reactive metals are to each other. They are placed in order to the result of three tests.

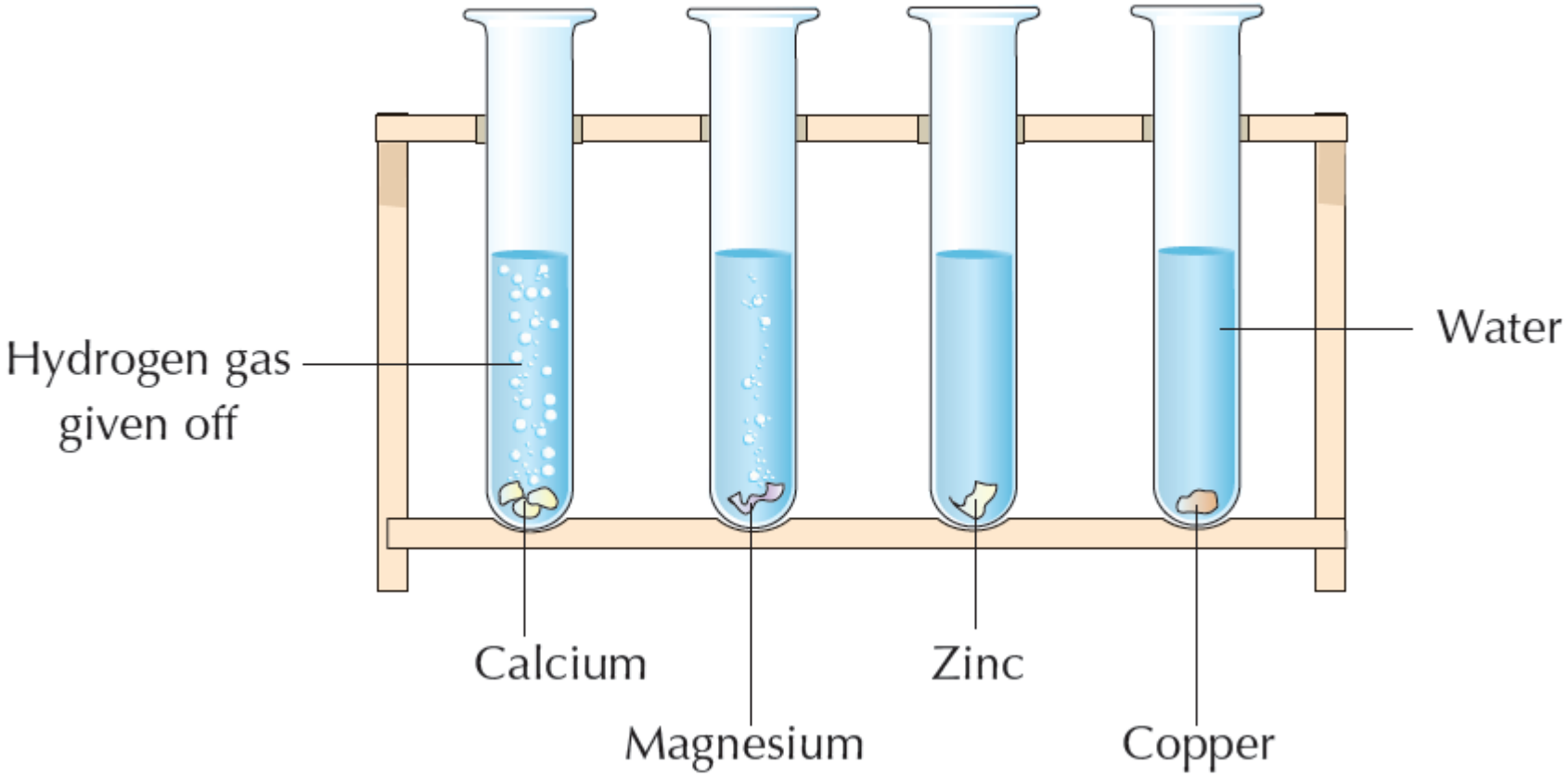
2.Oxygen

3. Water

4. HCL

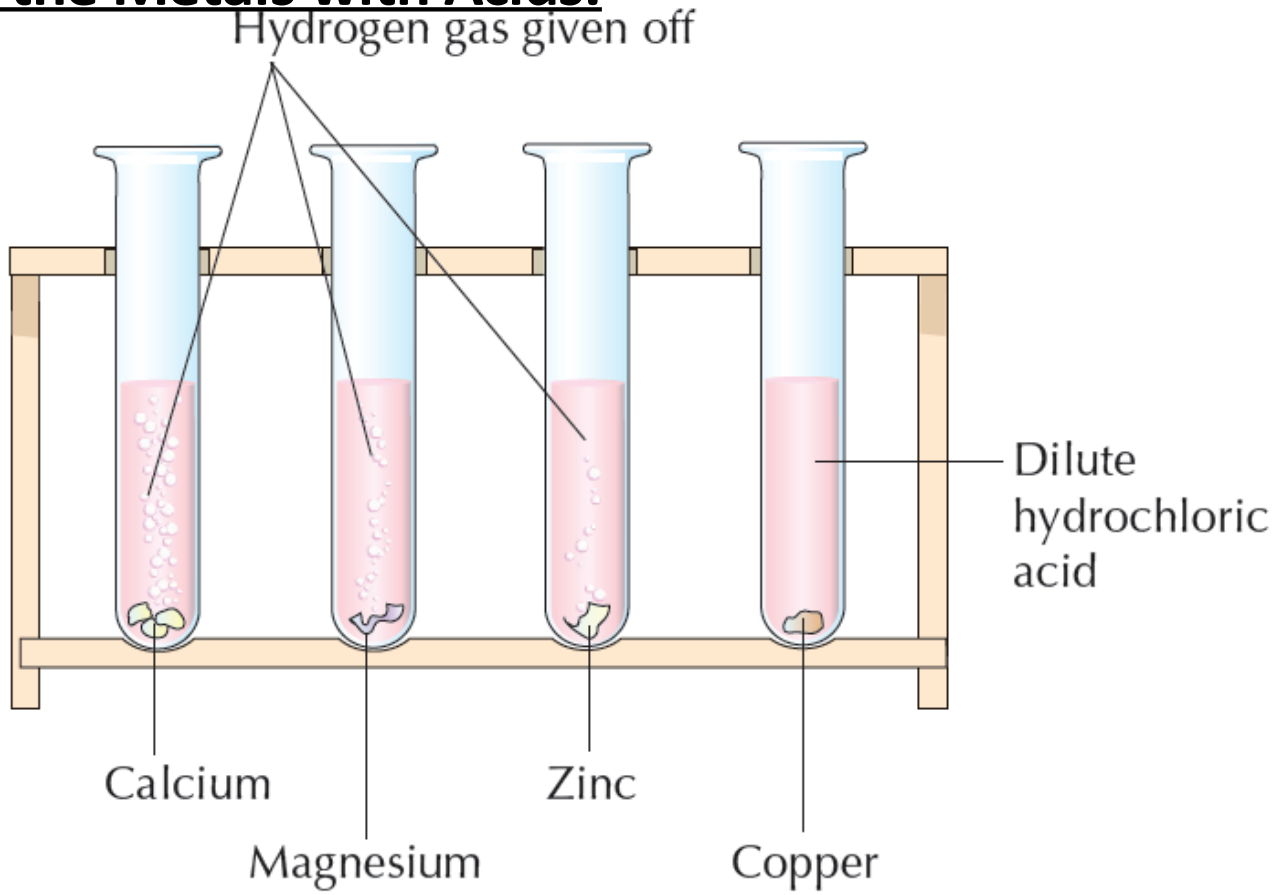
We are only interested in the highlighted ones.

Reaction of the Metals with Water.



Metals	Reaction with Water
Calcium	Reacts vigorously with cold water
Magnesium	Reacts vigorously with steam
Zinc	Reacts slowly with steam
Copper	No reaction

Reaction of the Metals with Acids.



Metals	Reaction with Acid
Calcium	Extremely Violent
Magnesium	Reacts vigorously
Zinc	Less vigorous reaction
Copper	No reaction