

### Physical Properties Chemical Properties of Metals

**Metals** are used in making **machinery, automobiles, aeroplanes, buildings, trains, satellites, gadgets, cooking utensils, water boilers**, etc.

**Sodium** and **potassium** are **soft metals** that can be **cut with a knife**. **Mercury** is a **liquid metal**.

The **metal base** in an **electric iron** is for **conducting heat**, not **electricity**. Metals are very **good conductors of heat**, too. That's why **cooking utensils, irons, heaters**, etc. are all made of **metals**.

Metals can be easily shaped into **wires**. This **property of metals** is called **ductility**.

Metals can be easily **shaped** into thin **flat sheets**. This characteristic of metals is called **malleability**.

Metals make a **sound** when **struck with hard objects**. Metals can be **polished** to a **shiny appearance**. That's why **gold and silver jewellery** shine so much.

**Iron** reacts with **atmospheric oxygen** and **moisture** to form **iron oxide**, which is commonly known as **rust**. **Metals** burn in the **presence of oxygen** to form **metal oxides**, which are **basic** in nature.

For example, if you **burn a strip of magnesium**, **magnesium** will burn in oxygen to form **magnesium oxide**.

**Magnesium oxide** dissolves in water to form **magnesium hydroxide**, which is **basic in nature**.

When a **copper vessel** is exposed to **moist air**, a **green coating** forms on its surface. The coating is a mixture of **copper hydroxide** and **copper carbonate**.

**Nails rust** because of the **moisture** present in **air**.

**Sodium** reacts **vigorously with water** and **oxygen**, and produces so much **heat** that it **catches fire!**

That's why sodium is **stored in kerosene** - to prevent it from coming into contact with **moisture** and **oxygen**.

**Red litmus paper** turns **blue** in solutions **basic in nature**. **Lime juice** contains **citric acid**. **Acids** react with **salts of metals**.

Metals react with acids, such as **hydrochloric acid** and **sulphuric acid**, to give out **hydrogen gas**.

**Copper** does not react with **dilute hydrochloric acid** even on heating, but it reacts with **dilute sulphuric acid** on heating.

Metals react with **bases**, such as **sodium hydroxide**, to produce **hydrogen gas**.

More **reactive metals** can **displace** the **less reactive** metals in a **compound**.

### Physical Properties Chemical Properties of Non-Metals

**Sulphur, phosphorus, nitrogen, chlorine, iodine, boron, silicon, carbon, bromine, fluorine** and **oxygen** are **non-metals**.

Non-metals exist in all the **three states**.

**Silicon** and **carbon** are **solids**; **bromine** is a **liquid**; **chlorine, fluorine** and **oxygen** are **gases**.

**Non-metals** are **non-lustrous, non-malleable** and **not ductile**, except for **carbon fibres**, which are **ductile**. Non-metals do not produce any sound when hit, which means they are **not sonorous**.

Non-metals do not conduct **heat and electricity**, except for **graphite**.

Non-metals **react** with **oxygen** and form **acidic or neutral oxides**.

For example, **sulphur** reacts with **oxygen** to form **sulphur dioxide**, which is **acidic**.

**Carbon monoxide** and **nitric oxide** are **neutral oxides**.

**Phosphorus** is a very **reactive non-metal**. It **catches fire** if exposed to air. To prevent the **contact of phosphorus** with **atmospheric oxygen**, it is **stored in water**.

Non-metals **do not react with acids**.

The **reaction** of non-metals with **bases** is **complex**.

For example, when **chlorine** reacts with a **base like sodium hydroxide**, it gives multiple products like **sodium hypochlorite, sodium chloride** and **water**.