Reaction of metals with dilute acid:

Metals form respective salts when react with dilute acid.

Metal + dil. acid ⇔ Metal salt + Hydrogen

**Reaction of sodium metal with dilute acid:** Sodium metal gives sodium chloride and hydrogen gas when react with dilute hydrochloric acid.

\[ 2Na + 2HCl \rightarrow 2NaCl + H_2 \]

**Reaction of potassium with dilute sulphuric acid:** Potassium sulphate and hydrogen gas are formed when potassium reacts with dilute sulphuric acid.

\[ 2K + H_2SO_4 \rightarrow K_2SO_4 + H_2 \]

**Reaction of magnesium metal with dilute hydrochloric acid:** Magnesium chloride and hydrogen gas are formed when magnesium reacts with dilute hydrochloric acid.

\[ Mg + 2HCl \rightarrow MgCl_2 + H_2 \]

**Reaction of aluminium with dilute hydrochloric acid:** Aluminium chloride and hydrogen gas are formed.

\[ 2Al + 6HCl \rightarrow 2AlCl_3 + 3H_2 \]

**Reaction of zinc with dilute sulphuric acid:** Zinc sulphate and hydrogen gas are formed when zinc reacts with dilute sulphuric acid. This method is used in laboratory to produce hydrogen gas.

\[ Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2 \]

Copper, gold and silver are known as noble metals. These do not react with water or dilute acids.

**Metal Oxides:** Chemical Properties

Metal oxides are basic in nature. Aqueous solution of metal oxides turns red litmus blue.

**Reaction of metal oxides with water:** Most of the metal oxides are insoluble in water. Alkali metal oxides are soluble in water. Alkali metal oxides give strong base when dissolved in water.

**Reaction of sodium oxide with water:** Sodium oxide gives sodium hydroxide when reacts with water.

\[ Na_2O + H_2O \rightarrow 2NaOH \]

**Reaction of magnesium oxide with water:** Magnesium oxide gives magnesium hydroxide with water.

\[ MgO + H_2O \rightarrow Mg(OH)_2 \]

**Reaction of potassium oxide with water:** Potassium oxide gives potassium hydroxide when reacts with water.

\[ K_2O + H_2O \rightarrow 2KOH \]

**Reaction of zinc oxide and aluminiumoxide:** Aluminium oxide and zinc oxide are insoluble in water. Aluminium oxide and zinc oxide are amphoteric in nature. An amphoteric substance shows both acidic and basic character. It reacts with base like acid and reacts with acid like a base.

When zinc oxide reacts with sodium hydroxide, it behaves like an acid. In this reaction, sodium zicate and water are formed.

\[ ZnO + 2NaOH \rightarrow Na_2ZnO_2 + H_2O \]
Zinc oxide behaves like a base when reacts with acid. Zinc oxide gives zinc chloride and water on reaction with hydrochloric acid.

\[
\text{ZnO} + 2\text{HCl} \rightleftharpoons \text{ZnCl}_2 + \text{H}_2\text{O}
\]

In similar way aluminium oxide behaves like a base when reacts with an acid and behaves like an acid when reacts with a base.

Aluminium oxide gives sodium aluminate along with water when reacts with sodium hydroxide.

\[
\text{Al}_2\text{O}_3 + 2\text{NaOH} \rightleftharpoons 2\text{NaAlO}_2 + \text{H}_2\text{O}
\]

Aluminium oxide gives aluminium chloride along with water when it reacts with hydrochloric acid.

\[
\text{Al}_2\text{O}_3 + 6\text{HCl} \rightleftharpoons 2\text{AlCl}_3 + 3\text{H}_2\text{O}
\]