

CHEMISTRY STUDY MATERIALS FOR CLASS 10

(NCERT Based notes of Chapter -03)

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METALS AND NON-METALS

CHEMICAL PROPERTIES OF METALS

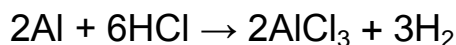
REACTION OF METALS WITH DILUTE ACID:

Metals form respective salts when react with dilute acid.

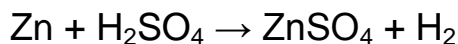


Examples:

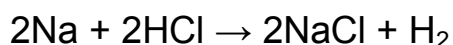
- Reaction of aluminium with dilute hydrochloric acid: Aluminium chloride and hydrogen gas are formed.



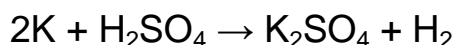
- Reaction of zinc with dilute sulphuric acid: Zinc sulphate and hydrogen gas are formed when zinc reacts with dilute sulphuric acid. This method is used in laboratory to produce hydrogen gas.



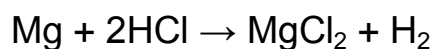
- Reaction of sodium metal with dilute acid: Sodium metal gives sodium chloride and hydrogen gas when react with dilute hydrochloric acid.



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



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



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

		Metal		Reaction with AIR	Reaction with WATER	Reaction with ACIDS	
WEIGHT	(Light)	Potassium	K	Burn vigorously to form metal oxides	React with cold water H₂O (l) to form H ₂ (g) and (metal)OH _(aq)	Strong reaction with diluted acid (aq) to form H ₂ (g). Metal replaces H in compound to form a salt.	
		Sodium	Na				
		Calcium	Ca				
		Magnesium	Mg	Burn with decreasing vigour down the series to form metal oxides	Only reacts with steam H₂O(g) to form H ₂ (g) and metal oxide		
		Aluminium	Al				
		Zinc	Zn				
		Iron	Fe				
		Lead	Pb	React slowly (when heated) to form an oxide layer	No reaction		React with concentrated acid (l) . Metal replaces H to make a salt. Some of the acid decomposes into NO₂ (g) and H₂O (l) .
		Copper	Cu				
		Mercury	Hg				
	(Heavy)	Silver	Ag	No reaction	No reaction		
		Gold	Au				

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:

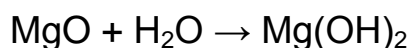
Most of the metal oxides are insoluble in water. Alkali metal oxides are soluble in water. Alkali metal oxides give strong base when dissolved in water.

Examples:

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



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

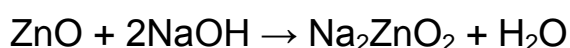


- Reaction of potassium oxide with water: Potassium oxide gives potassium hydroxide when reacts with water.

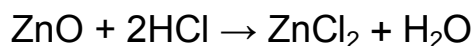


- Reaction of zinc oxide and aluminium oxide: Aluminium oxide and zinc oxide are insoluble in water. Aluminium oxide and zinc oxide are amphoteric in nature. An amphoteric substance shows both acidic and basic character. It reacts with base like acid and reacts with acid like a base.

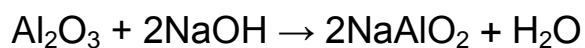
When zinc oxide reacts with sodium hydroxide, it behaves like an acid. In this reaction, sodium zincate and water are formed.



- Zinc oxide behaves like a base when reacts with acid. Zinc oxide gives zinc chloride and water on reaction with hydrochloric acid.



- 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.



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

