

REACTION OF METALS WITH OTHER METALS

- Reaction of metals with other metal salts :



- All metals are not equally reactive. A more reactive metal displaces a less reactive metal from its salt solution.

For example:

When an iron nail is placed in a copper sulphate solution, the blue colour of CuSO_4 fades away slowly and a reddish brown copper metal is formed.



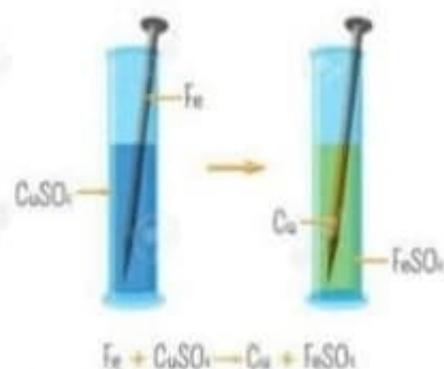
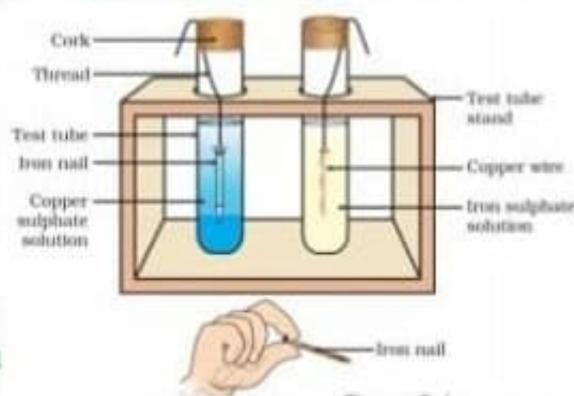
ACTIVITY

Dip copper wire in a solution of iron sulphate and the iron nail in the solution of copper sulphate.

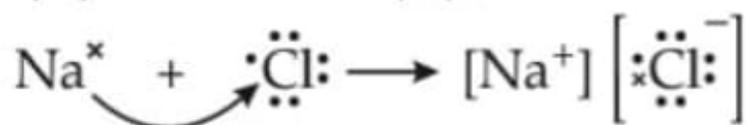
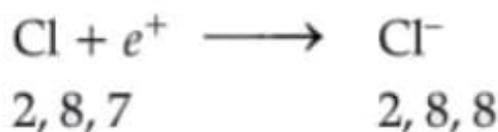
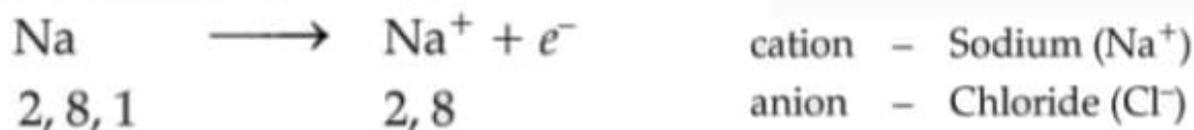
OBSERVATION

- There is no change in the test tube containing copper wire and iron sulphate solution.
- The colour of solution of the test tube containing iron nail and copper sulphate solution changed from blue to green. The green colour of the solution indicates that Fe^{2+} ions are present in the solution.
- A brown coating is observed on the iron nail. This indicates that copper is deposited on the iron nail by displacing iron.
- Thus iron is more reactive than copper. It displaces copper from copper sulphate and forms ferrous Sulphate.

All metals are not equally reactive. Reactive metals can displace less reactive metals from their compounds in solution. This forms the basis of reactivity series of metals.

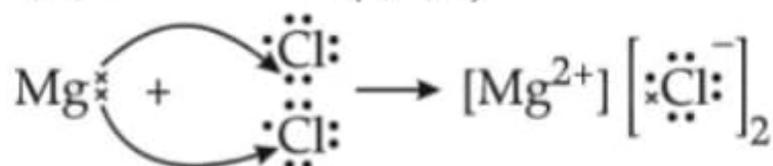
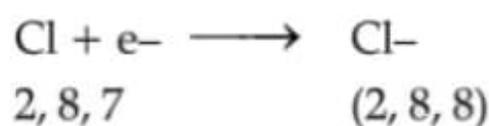
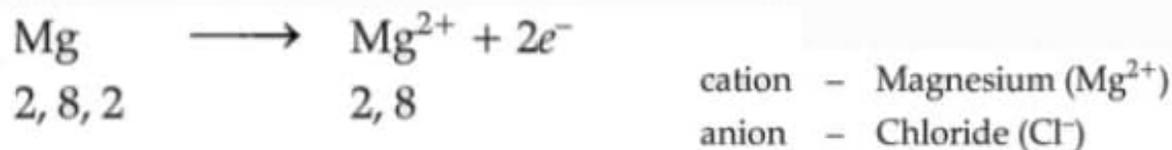


FORMATION OF SODIUM CHLORIDE (IONIC COMPOUND)



- Sodium and chloride ions being oppositely charged, attract each other and are held by strong electrostatic forces of attraction to exist as sodium chloride (NaCl).
- Sodium chloride does not exist as molecules but aggregates of oppositely charged ions.
- Compounds formed by transfer of electrons from metal to non-metal are known as ionic compound.

FORMATION OF MAGNESIUM CHLORIDE (IONIC COMPOUND)



PROPERTIES OF IONIC COMPOUNDS

- **Physical nature:** Ionic compounds are solids and are somewhat hard because of the strong force of attraction between the positive and negative ions. These compounds are generally brittle and break into pieces when pressure is applied.
- **Melting and Boiling points:** Ionic compounds have high melting and boiling points (see Table 3.4). This is because a considerable amount of energy is required to break the strong inter-ionic attraction.
- **Solubility:** Electrovalent compounds are generally soluble in water and insoluble in solvents such as kerosene, petrol, etc.
- **Conduction of Electricity:** The conduction of electricity through a solution involves the movement of charged particles. A solution of an ionic compound in water contains ions, which move to the opposite electrodes when electricity is passed through the solution. Ionic compounds in the solid state do not conduct electricity because movement of ions in the solid is not possible due to their rigid structure. But ionic compounds conduct electricity in the molten state. This is possible in the molten state since the electrostatic forces of attraction between the oppositely charged ions are overcome due to the heat. Thus, the ions move freely and conduct electricity.