Topics: Metals and Non-Metals
Subtopics: Occurrence of Metals

Questions

1.Name two metals which are found in nature in the free state.
2.Define the following terms :
(i) Mineral, (ii) Ore and (iii) Gangue.
3.What chemical process is used for obtaining a metal from its oxide.
4.In the electrolytic refining of a metal M, what would you take as the anode, the cathode and the electrolyte ?
5.Carbonate and sulphide ores are usually converted into oxides during the process of extraction.Give reasons.
6.An ore on heating in air produces sulphur dioxide.Describe briefly any two steps involved in the conversion of this concentrated ore into related metal.
7.An ore on treatment with dilute hydrochloric acid produces brisk effervescence. What type of ore is this? What steps will be required to obtain metal from the enriched ore.
8. Write the chemical name of the coating that forms on silver and copper articles when these are left exposed to moist air.
9.Explain the process of galvanisation. What purpose is served by it?
10.Define an alloy. How are alloys prepared?

Answers

1.Gold and platinum

2.(i) Minerals : The natural materials in which the metals or their compounds are found in earth are called minerals.
(ii) Ore : Those minerals from which the metals can be extracted conveniently and profitably are called ores.
(iii) Gangue : The unwanted impurities like sand, rocky material, earth particles, lime stone, mica, etc in an ore are called gangue.

3.Reduction process is used for obtaining a metal from its oxide.
For example, zinc oxide is reduced to metallic zinc by heating with carbon.

$$ZnO(s) + C(s) \rightarrow Zn(s) + CO(g)$$

4.Cathode – Pure metal
Anode – Impure metal
Electrolyte – Metal salt solution

5.It is easier to reduce a metal oxide into free metal. Since it is easier to obtain metals from their oxides than from their carbonates or sulphides directly, therefore, the carbonate and sulphide ores are first converted to oxides for extracting the metals.

6.
(i) Roasting: The concentrated sulphide ore is heated strongly in the presence of oxygen to convert it into its oxide.

$$2ZnS(s) + 3O_2(g) \longrightarrow 2ZnO(s) + 2SO_2(g)$$

(ii)Reduction : This oxide of metal is reduced with suitable reducing agent to get free metal.

$$ZnO(s) + C(s) \xrightarrow{heat} Zn(s) + CO(g)$$

7.
(a) Carbonate ore:
(i) Calcination: Carbonate ore is heated in limited supply of air and oxide is obtained, e.g.

$$ZnCO_3\ (s) \xrightarrow{heat} ZnO\ (s) + CO_2\ (g)$$

(ii) **Reduction with carbon:** Oxide ore is heated with carbon

$$ZnO\ (s) + C\ (s) \longrightarrow Zn\ (s) + CO\ (g)$$

8. Ag_2S (silver sulphide) is formed on silver, basic copper carbonate $CuCO_3$. $CU(OH)_2$ is formed on copper.

9.The process of coating zinc over iron is called galvanisation. It is used to prevent rusting of iron.

10.Alloy is a homogeneous mixture of two or more metals. One of them can be non-metal. Alloys are prepared by melting two or more metals together.