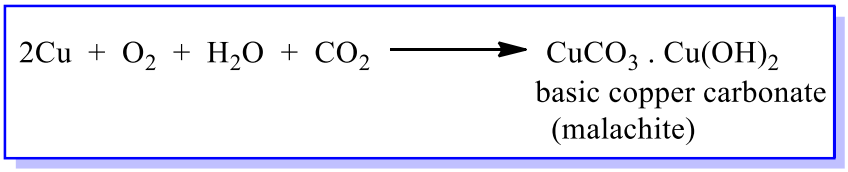
1. What are transition metals? Why are they called so?
   Those metals which have partially filled d-orbital in their elemental or common oxidation states are called transition metals. They are called transition elements because they are present between s-block and p-block elements and their properties are intermediate between the s-block and p-block elements.

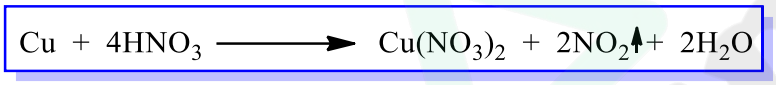
2. Copper metal becomes black/green when exposed to air for long time, why?

   In presence of moist air, a green layer of basic copper carbonate is formed. Hence, copper metal becomes green when exposed to air for long time.



3. What happens when copper (coin) is treated with conc. HNO_3?

   Copper nitrate is formed.

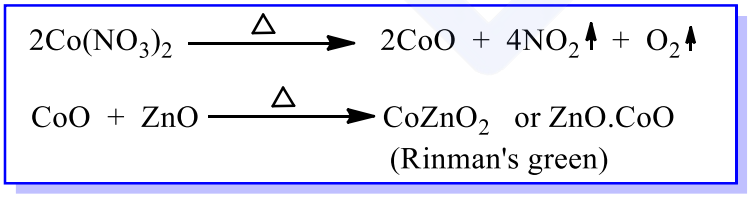


4. Why is zinc not considered as transition element?
   Zinc is not considered a transition metal because it does not have partly filled (i.e. incomplete) d-orbital. It has 3d-orbital fulfilled , $[Ar]3d^{10}4s^2$. It does not exhibit general characteristics of transition elements, eg. zinc forms colourless compounds.

5. What is Rinman's green? How it is prepared? Write its one important use.

   Cobalt zincate is called Rinman's green. It is prepared by heating zinc oxide with cobalt nitrate.

   It is used as green pigment.



6. What is lithopone? How it is prepared?

Zinc sulphate reacts with barium sulphide to form a white paint commercially called lithopone.

$$ZnSO_4 + BaS \longrightarrow \underbrace{ZnS + BaSO_4\downarrow}_{\text{lithopone}} \quad \text{or} \quad ZnSO_4.BaS$$

7. Write molecular formula of Philosopher's wool. How it is prepared?

Zinc oxide (ZnO) is called philosopher's wool. It is prepared by strongly heating zinc in air.

$$2\,Zn + O_2 \xrightarrow{500^0C} 2\,ZnO$$

8. What is Nessler's reagent? How is it prepared? Give its one use.

Alkaline solution of potassium tetra iodo mercurate (II), i.e. solution of K_2HgI_4 in KOH or NaOH is called Nessler's reagent. It is prepared by treating mercuric chloride with excess of KI.

$$HgCl_2 + 2KI \longrightarrow HgI_2 + 2KCl$$

$$HgI_2 + 2KI \longrightarrow \underset{\text{(Nessler's reagent)}}{K_2[HgI_4]}$$

It is used to detect the presence of ammonia or ammonium salt.

9. What is the composition of stainless steel? Write its one use.

Stainless steel is the alloy of iron containing at least 10.5% chromium and other alloying elements such as nickel (1-8%). Generally, stainless steel is mixture of Fe, Cr, Ni and C.

It resist corrosion and used in making automobile parts, surgical instruments, knives, etc.

10. Freshly prepared ferrous sulphate should be used while it is used as a laboratory reagent, why?
When ferrous sulphate is exposed to air for a long time, it gets oxidized by atmospheric air to basic ferric sulphate, therefore it should be freshly prepared in the laboratory.

$$4FeSO_4 . 7H_2O + O_2 \longrightarrow \underset{\text{(brown ppt.)}}{4Fe(OH)SO_4} + 5\,H_2O$$

11. Rusting (corrosion) of iron and methods of prevention.

The corrosion of iron is called rusting. Rust is chemically the hydrated ferric oxide [$Fe_2O_3.xH_2O$].

Iron does not rust in dry air, however, the presence of moisture, carbon dioxide and oxygen are major factors for rusting of iron. General reaction of rust formation is:

$$Fe + O_2 + x\,H_2O \longrightarrow \underset{\text{(rust)}}{Fe_2O_3 \cdot xH_2O}$$

Prevention:

- By coating iron surface with a metallic film of corrosion-resistant metals such as zinc, tin, nickel, etc.
- By a thin coating of paints, enamels, etc.
- By treating with antirust solutions of conc. Nitric acid, phosphoric acid, etc.

12. Why do silver ornaments turn black (get tarnished) when exposed to air?
Silver gets tarnished when exposed to air containing traces of hydrogen sulphide due to formation of black ppt of silver sulphide.

$$2\,Ag + H_2S \longrightarrow \underset{\text{(black ppt.)}}{Ag_2S\downarrow} + H_2\uparrow$$

13. Why does silver nitrate produce permanent black stain on the skin?

OR

Why does ink made of silver nitrate is used to mark the skin or nail during election?

In the presence of organic matter (skin) and sunlight, silver nitrate decomposes to give a permanent black stain of metallic silver. Hence, ink made of silver nitrate is used to mark the skin or nail during election.

$$2AgNO_3 \xrightarrow{h\nu} 2Ag\downarrow + 2NO_2 + O_2$$

14. What is lunar caustic? Why it is called lunar caustic?
Silver nitrate ($AgNO_3$) is called lunar caustic. It leaves black stain when comes in contact with skin in presence of sunlight. It produces a burning sensation like caustic soda and leaves a black stain like the moon (lunar) on the skin. So, it is called lunar caustic.

$$2AgNO_3 \xrightarrow{h\nu} 2Ag\downarrow + 2NO_2 + O_2$$

15. Why is teeth filling is done with an alloy of gold and silver?
The dentist uses an alloy of gold and silver because this is harder than gold and silver alone and thus durable, strong, and affordable.