



Page No 133:

Solution 30

Diamond.

Solution 31

Since graphite is a good conductor of electricity, it is used in making electrodes.

Solution 32

Sulphur and phosphorus.

Solution 33

The surface of some metals acquires a dull appearance when exposed to air for a long time because metals form a thin layer of oxides, carbonates or sulphide on their surface by the slow action of various gases present in air.

Solution 35

(a) Hydrogen.

(b) Magnesium oxide.

(c) Aluminium oxide.

(d) Sodium; Diamond.

(e) Less.

Solution 36

(a) Metals are malleable i.e. they can be beaten into thin sheets with a hammer.

Example: Aluminium.

Metals are ductile i.e. they can be drawn into thin wires.

Example: Copper.

(b) Aluminium and copper.

(c) Malleability.

(d) Ductility.

Solution 37

Sodium and potassium metals react violently with cold water.

Observations:

1. Metal starts moving over the surface of water making a hissing sound.

2. Metal starts reacting with water causing little explosions.

3. Soon the metal catches fire and starts burning.

If the gas evolved burns with a 'pop' sound, it indicates that it is hydrogen gas.

Solution 38

(a) Metal oxides are basic in nature and turn red litmus blue. For example: Magnesium oxide.

Non-metal oxides are acidic or neutral in nature. The acidic oxides turn blue litmus red. For example: Carbon dioxide.

(b) (i) Acidic oxide: S, C

(ii) Basic oxide: Na, K

(iii) Neutral oxide: H

Solution 39

(a) Those metal oxides which show basic as well as acidic behavior are known as amphoteric oxides.

Example: Aluminium oxide and zinc oxide.

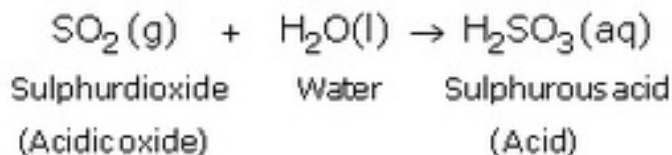
(b) Acidic oxide -  $\text{CO}_2$ , CO,  $\text{SO}_2$  and  $\text{N}_2\text{O}$ ; Basic oxide -  $\text{Na}_2\text{O}$ ,  $\text{MgO}$ ; Neutral oxide -  $\text{H}_2\text{O}$ .

(c)  $\text{ZnO}$ ,  $\text{Al}_2\text{O}_3$ .

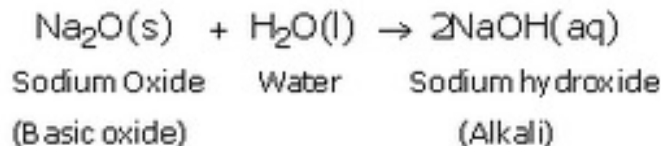
Solution 40

(a)  $\text{SO}_2$  is acidic in nature. When dissolved in water, it produces

sulphurous acid.



(b)  $\text{Na}_2\text{O}$  is basic in nature. When dissolved in water, it forms an alkali called sodium hydroxide.



Solution 41

(a) When non-metals react with oxygen, they form acidic oxides or neutral oxides.

Example: Carbon reacts with oxygen to form an acidic oxide called carbon dioxide. Hydrogen reacts with oxygen

(b) When metals combine with oxygen, they form basic oxides.

Example: Sodium reacts with oxygen to form a basic oxide called sodium oxide.

Solution 42

Metals do not liberate hydrogen gas with nitric acid because nitric acid is a strong oxidizing agent. So, as soon as hydrogen gas is formed in the reaction between a metal and dilute nitric acid, the nitric acid oxidises this hydrogen to water.

(b) Magnesium and manganese.

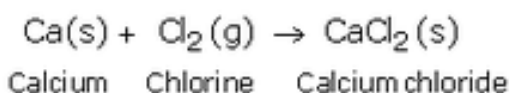
Solution 43

(a) Most of the metals do not react with hydrogen. Only a few reactive metals react with hydrogen to form metal hydrides. For example: When hydrogen gas is passed over heated sodium, then sodium hydride is formed.

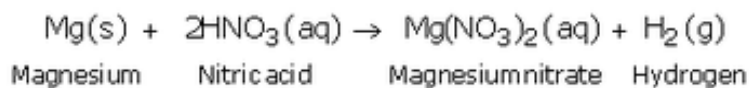
(b) Non-metals react with hydrogen to form covalent hydrides. For example: Sulphur combines with hydrogen to form hydrogen sulphide.

Solution 44

(a) Calcium reacts vigorously with chlorine to form an ionic chloride called calcium chloride.



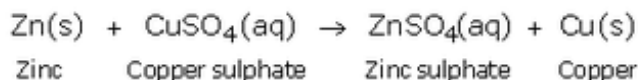
(b) Magnesium reacts with very dilute nitric acid to form magnesium nitrate and hydrogen gas.



Solution 45

(a) Sodium > Calcium > Magnesium > Zinc > Iron > Lead > Copper

(b) When a strip of zinc metal is put in copper sulphate solution, then the blue colour of copper sulphate solution fades gradually and red brown coating of copper is deposited on the zinc strip.

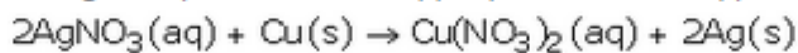


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Page No 134:

Solution 46

Silver gets deposited on the copper plate because copper is more reactive than silver and hence displaces silver from silver nitrate solution.



Solution 47

Uses of metals:

- (i) Lead metal is used in making car batteries.
- (ii) Zinc is used for galvanizing iron to protect it from rusting.
- (iii) Iron, copper and aluminium are used to make utensils.
- (iv) Copper and aluminium metals are used to make electrical wires.
- (v) Aluminium is used to make aluminium foil for packaging materials.

Uses of non-metals:

- (i) Hydrogen is used in the hydrogenation of vegetable oils.
- (ii) Carbon is used to make electrodes of electrolytic cells and dry cells.
- (iii) Nitrogen is used in the manufacture of ammonia, nitric acid and fertilizers.
- (iv) Sulphur is used for producing sulphuric acid.
- (v) Liquid hydrogen is used as rocket fuel.

Solution 48

- (i) Copper - Copper is used to make wires to carry electric current.
- (ii) Aluminium - Aluminium foils are used in packaging of food materials.
- (iii) Iron - Iron is used to make utensils.
- (iv) Silver - Silver is used to make jewellery.
- (v) Gold - Gold is used to make jewellery.
- (vi) Mercury - Mercury is used in thermometers.

Solution 49

- (a) (i) Hydrogen - Hydrogen is used in the hydrogenation of vegetable oils.
- (ii) Carbon is used to make electrodes of electrolytic cells and dry cells.
- (iii) Nitrogen is used in the manufacture of ammonia, nitric acid and fertilizers.
- (iv) Sulphur is used in making sulphuric acid.

(b) Mercury

Solution 50

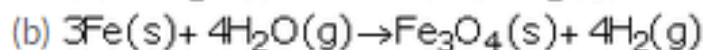
- (a) Aluminium metal does not react with water under ordinary conditions because of the presence of a thin layer of aluminium oxide on its surface.
- (b) Sodium and magnesium.
- (c) Copper and silver.

Solution 51

- (a) Sodium is a very reactive metal so it reacts vigorously with the oxygen of air and catches fire. It is kept immersed in kerosene oil to protect it from the action of oxygen, moisture and carbon dioxide of air and to prevent accidental fires.
- (b) White phosphorus is kept immersed in water because it reacts spontaneously with oxygen of air to form phosphorus pentoxide but does not react with water.
- (c) No, because sodium reacts vigorously with water to form sodium hydroxide and hydrogen.

Solution 52

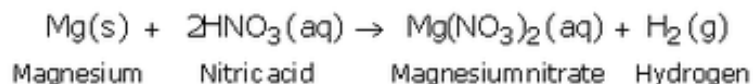
- (a) Potassium reacts violently with cold water to form potassium hydroxide and hydrogen gas.



(c) Hydrogen.

Solution 53

- (a) Magnesium reacts with very dilute nitric acid to form magnesium nitrate and hydrogen gas.



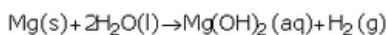
(b) Magnesium and aluminium.

Solution 54

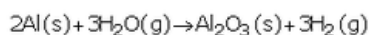
(a) Sodium reacts vigorously with cold water forming sodium hydroxide and hydrogen gas.



(b) Magnesium reacts with hot water to form magnesium hydroxide and hydrogen.



(c) Aluminium reacts with steam to form aluminium oxide and hydrogen gas.

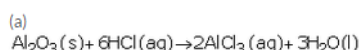


Solution 55

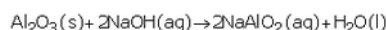
(i) When sodium, magnesium and copper are left in air, sodium reacts vigorously with oxygen to form sodium oxide, magnesium reacts with oxygen to form magnesium oxide only on heating, whereas copper does not burn in air even on strong heating. It reacts only on prolonged heating. This shows that sodium is most reactive, then magnesium and copper is the least reactive among the three.

(ii) Sodium reacts vigorously with cold water to form sodium hydroxide and hydrogen, magnesium does not react with cold water but reacts with hot water to form magnesium hydroxide and hydrogen but copper does not react even with steam. This shows that sodium is highly reactive; magnesium is less reactive than sodium and copper is the least reactive among the three.

Solution 56



In this reaction, aluminium oxide behaves as a basic oxide because it reacts with an acid to form salt and water.



In this reaction, aluminium oxide behaves as an acidic oxide because it reacts with a base to form salt and water.

(b) Amphoteric oxides.

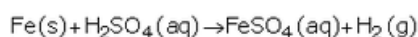
(c) Zinc oxide.

Solution 57

(a) Calcium reacts with cold water to form calcium hydroxide and hydrogen gas.



(b) When iron reacts with dilute sulphuric acid, it forms iron sulphate and hydrogen gas.



When hydrogen gas is ignited with a burning matchstick, it produces a 'pop' sound.

Solution 58

We would create an apparatus using dry cell, a torch bulb fitted in a holder and some connecting wires with crocodile clips and connect them to make an electric circuit. Then insert a piece of sulphur between the crocodile clips and the bulb does not light up at all. This means that sulphur does not allow the electric current to pass through it. Now insert a piece of copper between the crocodile clips and the bulb will light up. This observation shows that non metals (ex- sulphur) do not conduct electricity and metals (ex- copper) conduct electricity.

Solution 59

Properties of metals:

(i) Metals are malleable i.e. they can be beaten into thin sheets with a hammer.

(ii) Metals are ductile i.e. they can be drawn into thin wires.

(iii) Metals are good conductors of heat and electricity.

(iv) Metals are lustrous.

(v) Metals are generally hard.

Properties of non-metals:

(i) Non-metals are non-malleable i.e. they cannot be beaten into thin sheets with a hammer.

(ii) Non-metals are non-ductile i.e. they cannot be drawn into thin

wires.

(iii) Non-metals are bad conductors of heat and electricity.

(iv) Non-metals are non-lustrous.

(v) Non-metals are generally soft.

Solution 60

(a) Sodium metal: Soft, low melting point

Carbon non-metal: graphite conducts electricity; diamond has a very high melting point.

(b) Gallium and cesium.

Solution 61

Metals lose their shine or brightness on keeping in air for a long time and acquire a dull appearance due to the formation of a thin layer of oxide, carbonate or sulphide on their surface by the slow action of various gases present in air. Brightness of metals can be restored by rubbing the dull surface of the metal object with a sand paper, then the outer corroded layer is removed and the metal object becomes shiny and bright once again.

Solution 62

(a) Metals are the elements that conduct heat and electricity, and are malleable and ductile.

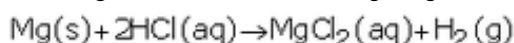
Example: Iron, aluminium, copper, gold and silver.

(b) Sodium

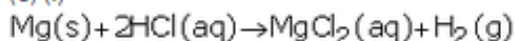
(c) Silver

(d) When a metal reacts with dilute hydrochloric acid, it forms metal chloride and hydrogen gas.

Example: Magnesium reacts rapidly with dilute hydrochloric acid to form magnesium chloride and hydrogen.

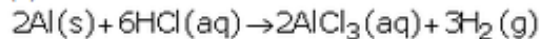


(e) (i)



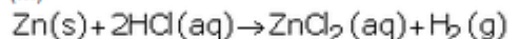
The products formed are magnesium chloride and hydrogen.

(ii)



The products formed are aluminium chloride and hydrogen.

(iii)



The products formed are zinc chloride and hydrogen.

(iv)



The products formed are iron chloride and hydrogen.

Page No 135:

Solution 63

(a) Non-metals are the elements that do not conduct heat and electricity and are neither malleable nor ductile.

Example: Carbon, sulphur, phosphorus, silicon and oxygen.

(b) Carbon.

(c) Iodine.

(d) Carbon (Diamond).

(e) Non-metals react with oxygen to form acidic oxides or neutral oxides. Carbon burns in air to form carbon dioxide.



The nature of the product formed is acidic. When carbon dioxide dissolves in water, it forms carbonic acid. It turns blue litmus to red which shows it is acidic in nature.

Solution 64

(a) The arrangement of metals in a vertical column in the order of decreasing reactivities is called reactivity series.

Increasing order of reactivity: Iron < zinc < magnesium < sodium

(b) Though hydrogen is not a metal but it has been placed in the

reactivity series of metals due to the fact that like metals, hydrogen also loses electrons and forms positive ions.

(c) Lead is more reactive than hydrogen and copper is less reactive than hydrogen.

(d) Zinc displaces copper from copper sulphate solution and mercury does not displace copper from copper sulphate solution.

(e) Copper displaces silver from silver nitrate solution and gold does not.

Solution 65

(a) Difference between metals and non-metals:

Metals

(i) Metals are malleable i.e. they can be beaten into thin sheets with a hammer.

(ii) Metals are ductile i.e. they can be drawn into thin wires.

(iii) Metals are good conductors of heat and electricity.

Non-metals

(i) Non-metals are non-malleable i.e. they cannot be beaten into thin sheets with a hammer.

(ii) Non-metals are non-ductile i.e. they cannot be drawn into thin wires.

(iii) Non-metals are bad conductors of heat and electricity.

(b) Difference between metals and non-metals:

Metals

(i) Metals form basic oxides.

(ii) Metals displace hydrogen from water

(iii) Metals displace hydrogen from dilute acids.

Non-metals

(i) Non-metals form acidic or neutral oxides.

(ii) Non-metals do not react with water.

(iii) Non-metals do not react with dilute acids.

(c) Sodium is a solid, it conducts electricity and forms basic oxides.

(d) Sulphur is a non-metal as it is brittle, non-ductile, non-conductor of electricity and forms acidic oxides.

(e) Hydrogen.

\*\*\*\*\* END \*\*\*\*\*