

Chapter 8

CHEMICAL REACTIVITY



Time Allocation

Teaching periods	= 12
Assessment period	= 2
Weightage	= 12

Major Concepts

- 8.1 Metals
- 8.2 Non-Metals

STUDENTS LEARNING OUT COMES (SLO'S)

Students will be able to:

- Classifying the type of elements into metals, non-metals and metalloids.
- Draw flow chart diagram of classification of metals, non-metals and metalloids.
- Show how cations and anions are related to the terms metals and non-metals.
- Identify elements as an alkali metal or an alkaline earth metal.
- Analyze why alkali metals are not found in the free state in nature.
- Explain the differences in ionization energies of alkali and alkaline earth metals. .
- Describe the position of sodium in Periodic Table, its simple properties and uses. .
- Describe the position of calcium and magnesium in Periodic Table, their simple properties and uses.
- Differentiate between soft and hard metals (Iron and Sodium).
- Describe the inertness of noble metal.
- Identify the commercial value silver, Gold and Platinum.
- Compile some important reactions of halogens.
- Name some elements, which are found in uncombined state in nature.



Introduction

Medicines, plastics, glass, detergents etc are the products of chemical reactivity.

The property of substance to undergo chemical reaction with any material is called chemical reactivity.

Reactivity of metals depends upon its tendency to lose electron and that of non metals depends upon its tendency to accept electron.

Matter which undergoes chemical reactivity may be element, compound or mixture.

An element is always composed of similar atoms. Elements are further divided into metals, non-metals and metalloids.

Table 8.1

Metals	Non-Metals	Metalloids
<ul style="list-style-type: none">❖ Tend to lose electrons in reactions❖ Good conductors of heat and electricity❖ Ductile❖ Lustrous❖ Strong❖ Malleable❖ Sonorous❖ Oxides are basic in nature e.g. (Li_2O, Na_2O, K_2O, MgO).	<ul style="list-style-type: none">❖ Tend to gain electrons in reactions with metals.❖ Poor-conductors of heat and electricity❖ Not ductile❖ Often have dull appearance ❖ Oxides are acidic in nature (CO_2, SO_3, NO_2).	<ul style="list-style-type: none">❖ Intermediate properties of metals and non-metals❖ Boron (B), Silicon (Si), Germanium (Ge), Arsenic (As), Antimony (Sb), Tellurium (Te), Polonium (Po) and Astatine (At) are metalloids.❖ Oxides may be acidic (B_2O_3, SiO_2) or amphoteric (As_2O_3).



Do you know?

Most abundant elements found in air are
(1) nitrogen (2) Oxygen (3) Argon

Most abundant elements found in earth's crust are

(1) Oxygen (2) Silicon (3) Aluminum

Most abundant elements found in Universe are

(1) Hydrogen (2) Helium (3) Oxygen

Most abundant elements found in Human Body are

(1) Oxygen (2) Carbon (3) Hydrogen



8.1 METAL

The element which readily loses electron and easily form cation is termed as metal.

A metal structure consists of metal ions joined by metallic bonds. All B group elements are metals and known as Transition Metals.

Some elements of A group are also metals.

Elements of group IA are called Alkali metals.

Elements of group IIA are called Alkaline earth metals.

Metals of A - Group family are shown in table 8.2

Table 8.2

IA	IIA	IIIA	IVA	VA
Li	Be			
Na	Mg	Al		
K	Ca	Ga		
Rb	Sr	In	Sn	
Cs	Ba	Tl	Pb	Bi
Fr	Ra			

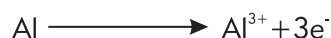


Do you know?

- ◆ Beryllium (Be) is a light strong and highly toxic metal. Its small grain of 0.25 mg may kill a rat.
- ◆ Most abundant metal is aluminum (Al).
- ◆ Most useable metal is iron (Fe).
- ◆ Most reactive metal is cesium (Cs).
- ◆ The lightest metal is lithium (Li).
- ◆ The heaviest metal is osmium (Os).
- ◆ Most malleable, ductile metals are gold(Au) and silver (Ag).

8.1.1 Electropositive Character (Cation formation)

Metals are highly electro positive, due to this property they easily lose their valance shell electrons. When an atom or a molecule loses electron then it changes into positively charged ion known as Cation.



Electro positive character of metals increases down the group with increasing atomic size. Alkali metals have large atomic size and low ionization potential values. The nucleus force on valence shell is very weak so they can lose their valence electron easily. Hence they are highly reactive, highly electro positive, powerful reducing agents and cannot exist free in nature.



The valence shell electronic configuration of alkali metals is ns^1 .

Alkali metals lose one electron and form monovalent cation.

Example Li^+ , Na^+ , Rb^+ , Cs^+

The valence shell electronic configuration of alkaline earth metals is ns^2 .



Do you know?

Alkali and Alkaline earth metals can be identified by the flame test.

Name	Symbol	Colour of Flame
Lithium	Li	Bright Crimson (Bright Red)
Sodium	Na	Golden Yellow
Potassium	K	Violet
Rubidium	Rb	Lilac (Dark Red)
Cesium	Cs	Bright Blue
Beryllium	Be	White
Magnesium	Mg	Bright White
Calcium	Ca	Brick Red
Strontium	Sr	Crimson Red
Barium	Ba	Green



Test Yourself

- Which metal is found in liquid state?
- Identify the alkaline earth metals from the following elements.
Bi, Br, Ba, B, Se, Si, Sb, Sr
- Write few properties of metals.
- Write some properties of non-metals.



Ionization Energy of Alkali and Alkaline Earth Metal

The removal of electron from an element requires energy which is known as Ionization Energy

$$\text{Atom} + \text{Energy} \rightarrow \text{Cation} + e^{-}$$

Table 8.3

Ionization Potential in KJ / mole

I-A	II-A
Li = 520	Be = 899
Na = 495	Mg = 738
K = 419	Ca = 520
Rb = 403	Sr = 549
Cs = 376	Ba = 309

Reactivity Increases ↓

Reactivity Increases ↓

Ionization energies values decreases with increasing atomic size and vice versa.

The Alkali metals and Alkaline earth metals show increasing trend of reactivity down the group because their atomic size increases down the group.

Since Alkali metals have low Ionization Energy values than Alkaline earth metals, Alkali metals are highly reactive than Alkaline earth metals.

Alkali Metals and Alkaline earth metals have low values of Ionization Energies due to which they easily lose their valence electron and form Cation. Thus they are highly reactive.



8.1.2 Comparison of reactivity of Alkali and Alkaline Earth Metals:

The general comparison of reactivities of IA and IIA group elements is shown below:

Alkali Metals (IA)	Alkaline Earth Metals (IIA)
They are highly reactive than (IIA) group elements due to low ionization energy.	They are less reactive than (IA) group elements due to high ionization energy.
They form monovalent cation(M^+)	They form divalent cation(M^{2+})
They immediately tarnish in air and form metal oxide. $K + O_2 \rightarrow K_2O$	They react with oxygen on heating. $2Mg + O_2 \rightarrow 2MgO$
They react violently with halogens $2Na + Cl_2 \rightarrow 2NaCl$	They react slowly with halogens $Ca + Cl_2 \rightarrow CaCl_2$
They react with water vigorously at room temperature and form strong alkaline solution $2K + 2H_2O \rightarrow 2KOH + H_2$	They react with water less vigorously and form alkaline solution $Mg + H_2O \rightarrow MgO + H_2$ $MgO + H_2O \rightarrow Mg(OH)_2$
Their oxides and hydroxides are more basic than those of IIA group elements.	Their oxides and hydroxides are less basic than those of IA group elements.
They do not form metal carbides.	They form metal carbides on heating. $Ca + 2C \rightarrow CaC_2$

Position of Alkali metals and Alkaline earth metals in periodic table is also useful to explain their reactivity. Detailed discussion about reactivity of sodium, magnesium and calcium is given below:



Position, Properties & Uses of Some Metals

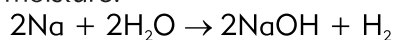
Sodium (Na)

Position:

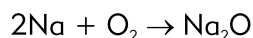
It is sixth most abundant element and constitutes 2.87% of earth's crust. It belongs to IA group, 3rd period of periodic table.

Properties:

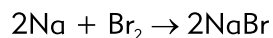
Sodium is silvery white alkali metal. It melts at 97.8°C and boils at 882.8°C. It is soft and can be cut with Knife due to weak metallic bonding between their atoms. It violently reacts with H₂O water and form Sodium Hydroxide and Hydrogen gas, so it is kept in Kerosene oil to prevent its reaction with moisture.



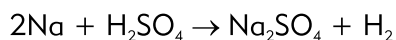
Sodium metal has shining surface but its appearance becomes dull due to action of air.



Sodium reacts with halogens to form sodium halide.



Sodium reacts with sulphuric acid to form H₂ gas



Uses:

It is an excellent heat transfer fluid so it is used as coolant in nuclear reactors.

It is used in Detergent preparation.

It is used in Street lights and gives yellow colour.

It is used as Reducing agent in the extraction of Calcium, Zirconium and Titanium.

Some common compounds of Sodium and their uses are mentioned below:

Table 8.4

Compound	Formula	Uses
Soda Ash	Na ₂ CO ₃	Used as water softener
Baking Soda	NaHCO ₃	Used in Baking Powder, Health Salt, Beverages
Table Salt	NaCl	Food Items
Sodium Nitrate	NaNO ₃	Used as fertilizer and in Dynamite



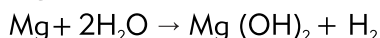
Magnesium (Mg)

Position:

It is 8th most abundant element found in earth's crust. Magnesium belongs to II-A group and 3rd period of periodic table.

Properties:

It is a grey-white metal. Its name is derived from Magnesia, a district in Greece. It melts at 650°C and boils at 1090°C. Magnesium reacts with water and releases Hydrogen gas



Magnesium fire cannot be extinguished with water because H₂ gas is highly flammable and intensifies the fire. Magnesium fire can be extinguished by using dry sand.

Uses:

It is used in flares and photographic flash bulbs because it burns to produce brilliant white light. Magnesium hydroxide are used as an Antacid. It is used for manufacturing of Mobile Phones, Laptop and Tablet Computers because of light weight and electrical properties.

The use of Magnesium reduces the weight of vehicle by replacing steel components of a vehicle.

Magnesium alloys are used in aviation industry, space crafts and missile because they are light weight and remain stable at high temperature.

Magnesium can be changed into intricate (twisters, knotty) shapes, so it is used in tennis rackets and handles of archery bows.

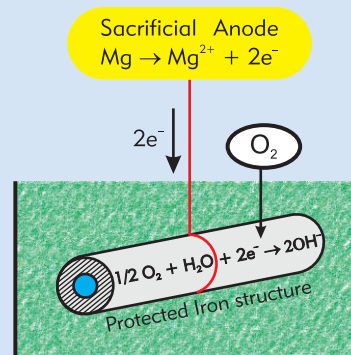
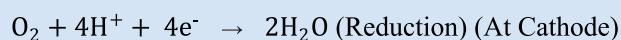
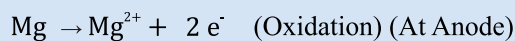


Do you know?

Magnesium is used in **cathodic protection (CP)**

Magnesium is easily oxidized as compared to iron so magnesium is used as anode and underground metallic pipelines become cathode to protect from corrosion.

Following reaction take place





Calcium (ca)

Position:

It is 5th abundant metal in earth's crust. It belongs to IIA group and 4th period.

Properties:

It is silvery white soft metal. It melts at 851°C and boils at 1484°C.

Uses:

Calcium is essential for healthy teeth and bones.

Calcium forms useful compounds which are mentioned below:

Table 8.5

Compound	Formula	Uses
Slaked lime	Ca (OH) ₂	As soil conditioner, used in water treatment to reduce acidity. Used in steel industry to remove impurities from Iron ore
Gypsum	2CaSO ₄ .H ₂ O	It is used as component in construction of buildings. It is used medically in plaster for setting broken bones.
Calcium hypochlorite	CaOCl ₂	It is used for sterilization of water in swimming pool.
Calcium tungstate	CaWO ₄	It is used in Luminous paints.
Limestone	CaCO ₃	As source of CO ₂ , In Cement industry.



Do you know?

"Calcium Light"

When a popular personality becomes the center of public attention then it is said to be in the Limelight. Previously musical halls, theaters stages, were lit by chemical called lime (CaO), using Oxy-Hydrogen flame. As a result bright light was produced which is known as Calcium light.

This light increases the visibility of audience to enjoy the performance of Actor on stage.



Test Yourself

- Write uses of baking soda, bleach and sodium nitrate.
- Enlist the uses of magnesium.
- Write uses of Slaked lime , Gypsum and calcium tungstate.

Soft and Hard Metals

Metals may be soft or hard. The hardness of metal is the resistance of metal to be scratched. It is measured in moh scale.

The metals which are scratched easily are called soft metals.

Alkali metals like; Sodium(Na), Potassium (K) and Rubidium (Rb) are soft metals.

Metals which show strong resistance towards scratching are called hard metals.

Nickle (Ni), Iron (Fe), Tungsten(W) are hard metals.

soft and hard metals can be differentiated with reference to sodium (Na) and iron (Fe) as follows.



Table 8.6

Sodium	Iron
It is a soft metal of group IA	It is a hard metal VIII B
It has large atomic size	It has smaller ionic radii
It has low value (0.5) on moh scale	It has high value (4.5) on moh scale
It has weak metallic bonding so it is a soft metal	It has strong metallic bonding so it is hard metal.
It can be cut easily with knife.	It is hammered to form sheets and wires.
It is light due to its low density (0.971 g/cm ³).	It is heavier metal due to its high density (7.87 g/cm ³).
It has low melting and boiling point values (melting point = 98°C, boiling point = 882.8°C)	It has high melting and boiling point values (melting point = 1535°C, boiling point = 2450°C)

**Test Yourself**

- Define Soft metals with examples.
- Define hard metals with examples.
- Write melting point, boiling point, density and moh values of sodium and iron.

**Do you know?**

Hardness of metals and other material is measured by Moh scale. It is devised by Frederick Mohs in 1812. It is based on scratch resistance of different metals and other materials. Hardness of plastic, Lead pencil is 1, and that of Diamond is 10 on Moh scale.

Values of Hardness of few metals on Moh scale

Li	Na	K	Rb	Cs	Ni	Fe	W
0.8	0.5	0.4	0.3	0.2	4	4.5	7.5

8.1.3 Inertness of Noble Metal

Noble metals include Gold (Au), Silver (Ag), Platinum (Pt), Iridium (Ir), Osmium (Os), Rhodium (Rh), Ruthenium (Ru), Palladium (Pd).



Nobel metals are less electro positive so they are difficult to oxidize. Therefore they show no reaction with atmospheric gases and resist corrosion. This helps noble metals to maintain their appearance so noble metals like Ag, Au, Pt are used to make ornaments.



Do you know?

Two pieces of pure un-coated metals permanently stuck together in space because there is no oxygen in space and hence no oxidation reaction occurs. The oxidized layer on metals serves as a barrier and prevent adherence of metals.

Commercial Value of Silver (Ag), Gold (Au), Platinum (Pt)

SILVER (Ag): - It is widely used in society. It is used in Jewelry, decorative items and Silver tableware because it does not tarnish and maintain its silvery shiny appearance. It is used to make mirror because it is best reflector of visible light. Silver forms compounds of significant importance.

Silver Nitrate (AgNO_3) or Lunar caustic is used in detection of Halogen. Light sensitive material AgBr and AgI are used in Photographic films.

GOLD (Au): - Gold has importance in our society. It is used in Jewellery because it has very high luster, yellow colour and tarnish resistance.

Gold is used in Electronic components because it is highly efficient conductor of current and cannot be corrode.

Gold is used in connecting wires, connection strips, switches and relay contacts to make electronic devices highly reliable. Therefore, Gold is used in cellphones, global positioning systems, Calculators etc. Gold is used in Laptop Computers for rapid and accurate transmission of digital information. It is used in dentistry because it is chemically inert, non-allergic and easy for dentist to work. Gold coated polyester films are used in space vehicles to reflect infrared radiation and stabilize the temperature of space vehicle. The helmet of Astronaut is coated with thin film of gold which reflect intense Solar radiation and protect eyes, skin of astronaut. Glass surface coated with gold will reflect solar radiations outward and keep the Buildings cool in summer. It also reflects internal heat inward and keeps the Building warm in winter.

Gold symbolizes purity, beauty and stability so it is used in making medals, trophies awards etc.



PLATINUM (Pt): - It is a silvery white corrosion resistance metal. It is paramagnetic transition metal.

It is used in chemical reactions as catalyst.

Reaction: -

It is used as catalytic converter in vehicles. It helps the complete combustion of Hydrocarbons and reduces the emission of air pollutants. Price of precious metal is fixed according to its weight. Its density is more than Gold. So it is more expensive than Gold.



Test Yourself

- Write names and symbols of few noble metals?
- Why helmets of astronauts are coated with thin film of gold?
- Why glass surface are coated with gold?
- Why gold is used in jewelry?
- Why platinum is used as catalytic converter in vehicles?



Do you know?

Liquid Metal

Mercury is the only metal found in liquid state. It belongs to sixth period and II B group of modern periodic table.

It has lowest melting point among all metals

It forms alloys with other metals which are known as amalgam.

For example, tin amalgam is an alloy of tin and mercury.

Its alloy with silver and tin is used as dental filling.

Mercury is used in thermometer and barometer.

Gaseous mercury is used in street light and fluorescence lamps.



8.2 NON - METALS:

Non-metals are the elements which have greater tendency to accept electron.

Non-metals are placed at upper right portion of periodic table as shown in table 8.7.

Table 8.7
Non-Metal of Periodic Table

IA	IVA	VA	VIA	VIIA	VIIIA
1 H Hydrogen 1.00797					2 He Helium 4.0026
	6 C Carbon 12.01115	7 N Nitrogen 14.067	8 O Oxygen 15.9094	9 F Fluorine 18.9094	10 Ne Neon 20.180
		15 P Phosphorus 30.9738	16 S Sulphur 32.064	17 Cl Chlorine 35.453	18 Ar Argon 39.948
			34 Se Selenium 78.98	35 Br Bromine 79.904	36 Kr Kryptos 53.80
				53 I Iodine 126.9044	54 Xe Xenon 131.30
					86 Rn Radon (222)



Non-metals are non malleable; non ductile, dull in appearance, non-sonorous, poor or nonconductors of heat and electricity.

Most of the non-metals are gases

For example: H, N, O, F, Cl and VIIIA group non-metals are gases.

Bromine (Br) is the only non-metal found in liquid state.

Some non metals like S, P, Se, I are solids.



Test Yourself

- Describe the properties of non-metals.
- Identify the VIIIA group elements from the following
N, Na, Ni, Ne, Ar, At, He.
- Write names and symbols of Non metals of VA group elements.
- Which group contain non metals in gaseous state only?



Do you know?

Fluorine gas is a yellow color non-metal.

Chlorine gas is a green non-metal.

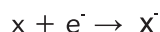
Iodine is a lustrous purple color non-metal.

Diamond is hardest non-metal.



8.2.1 Electronegative Characteristics:

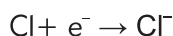
A Non-metal has property to accept electron easily and form Anion. It is called electronegative character.



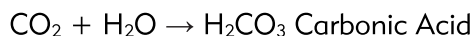
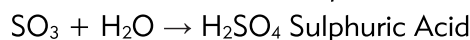
Negative ions move towards anode during electrolysis so they are termed as anions. The number of negative charges on anion shows the excess number of electrons as compared to number of protons.

Electronegative character increases across the period because Atomic size decreases and nuclear charge density increases. It decreases down the group due to increasing Atomic size.

Halogens accept electrons easily due to their high electronegative character.



Non-metals form acidic oxides which react with water vapors of atmosphere and cause acid rain.

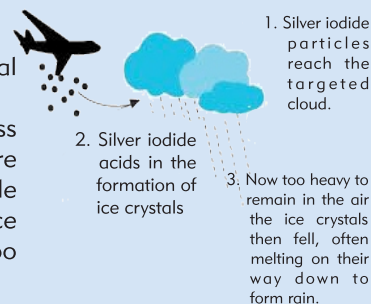


Do you know?

Artificial Rain

Dr. Vincent J. Schaefer in 1946 successfully created artificial clouds in a chilled chamber.

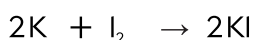
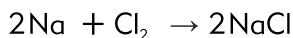
Artificial Rain can occur through cloud seeding. In this process chemicals like Silver Iodide (AgI) or Dry ice (Solid CO_2) are spread over clouds. As a result a super cooled water molecule condenses rapidly around these chemicals and forms ice crystals. When these ice crystals grow big and become too heavy then they fell downward and change into rain.



8.2.2 Comparison of Reactivity of the Halogen

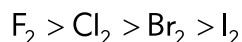
Halogen belongs to VII-A group and consists of Fluorine (F), Chlorine (Cl), Bromine (Br), Iodine (I) and Astatine (At). Halogens exist in Molecular form. The reactivity of halogens decreases down the group because atomic size increases and electro negativity decreases down the group.

1. Halogens act as oxidizing agent, because they easily accept electron.





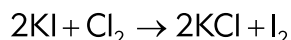
Power of Halogens as oxidizing agent decreases in the following order



It means Fluorine can displace other Halogens due to its highest oxidizing power.

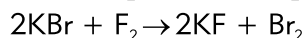
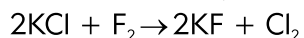
2. More reactive Halogen can displace less reactive Halogen from a solution of its salt.

Example

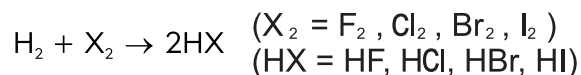


Chlorine is more reactive Halogen than Iodine so Chlorine displaces Iodine. The mixture turns reddish brown due to liberation of Iodine.

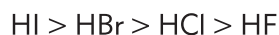
3. Fluorine is more reactive, therefore it can replace other halogens.



4. Reaction of Hydrogen with Halogen form Halogen acid.



The Acidic strength of Halogen Acid decreases in the following order



HI is very strong acid because HI easily breaks up and forms H^+ Ion in water due to weak Covalent Bonding.

HF is very weak acid because it has strong Covalent Bonding so it does not break up easily to form H^+ Ion in water. H^+ Ions reacts with water molecule to forms Hydronium (H_3O^+) Ion.



Do you know?

Enamel is the outer layer of our teeth it is mainly composed of calcium carbonate ($CaCO_3$) and hydroxy apatite [$Ca_3(PO_4)_2 \cdot Ca(OH)_2$]. Fluoride (F^-) ions of toothpaste replaces hydroxide (OH^-) ions of hydroxy apatite and form fluoro apatite. This replacement makes it more resistant against tooth decay.



Skills:

Qualitative analysis of Cations like Zn^{+2} , Mg^{+2} , NH_4^{+1} , Ca^{+2} and Ba^{+2} can be identified by following test.

EXPERIMENT

Table 8.8

Test for Zn^{2+}

Experiment	Observation	Result
Salt Solution + NH_4OH solution.	White ppt	Zn^{2+} may be present
White ppt + excess NH_4OH or NaOH solution.	White ppt is dissolved and form clear solution	Zn^{2+} ion is present

Test for Mg^{2+}

Experiment	Observation	Result
Salt Solution + NaOH or NH_4OH solution.	White ppt	Mg^{2+} ion may be
White ppt + $\text{NaOH}/\text{NH}_4\text{OH}$ solution.	White ppt insoluble in excess of NaOH or NH_4OH	Mg^{2+} is present

Test for NH_4^+

Experiment	Observation	Result
Portion of Aqueous solution of salt + NaOH solution warm	Pungent of NH_3 Gas release	NH_4^+ Ion is present

Test for Ca^{2+} & Ba^{2+}

Experiment	Observation	Result
Heat Nichrome wire until flame is no longer coloured.	Apple Green colour flame	Ba^{2+} is present
Dip the loop of wire into water and then in unknown salt. Heat the wire on flame.	Brick Red colour flame	Ca^{2+} is present



Qualitative analysis of Anions like CO_3^{2-} , Cl^- , I^- , SO_4^{2-} and NO_2^- can be identified by following test.

Test for CO_3^{2-}

Experiment	Observation	Result
Sample of Solid + Dilute Mineral Acid	Bubbles comes out which turns lime water milky	CO_3^{2-} is present

Test for Cl^-

Experiment	Observation	Result
Few ml of salt solution + dilute HNO_3 + AgNO_3	White ppt	Cl^- may be present
White ppt + NH_4OH solution	White ppt soluble in NH_4OH	Cl^- Ion is present

Test for I^-

Experiment	Observation	Result
Few ml of salt solution + few drops of dilute HNO_3 + few drops of AgNO_3	Yellow ppt	I^- ion may be present
Yellow ppt + NH_4OH solution	Yellow ppt insoluble in excess NH_4OH	I^- ion is present

Test for SO_4^{2-}

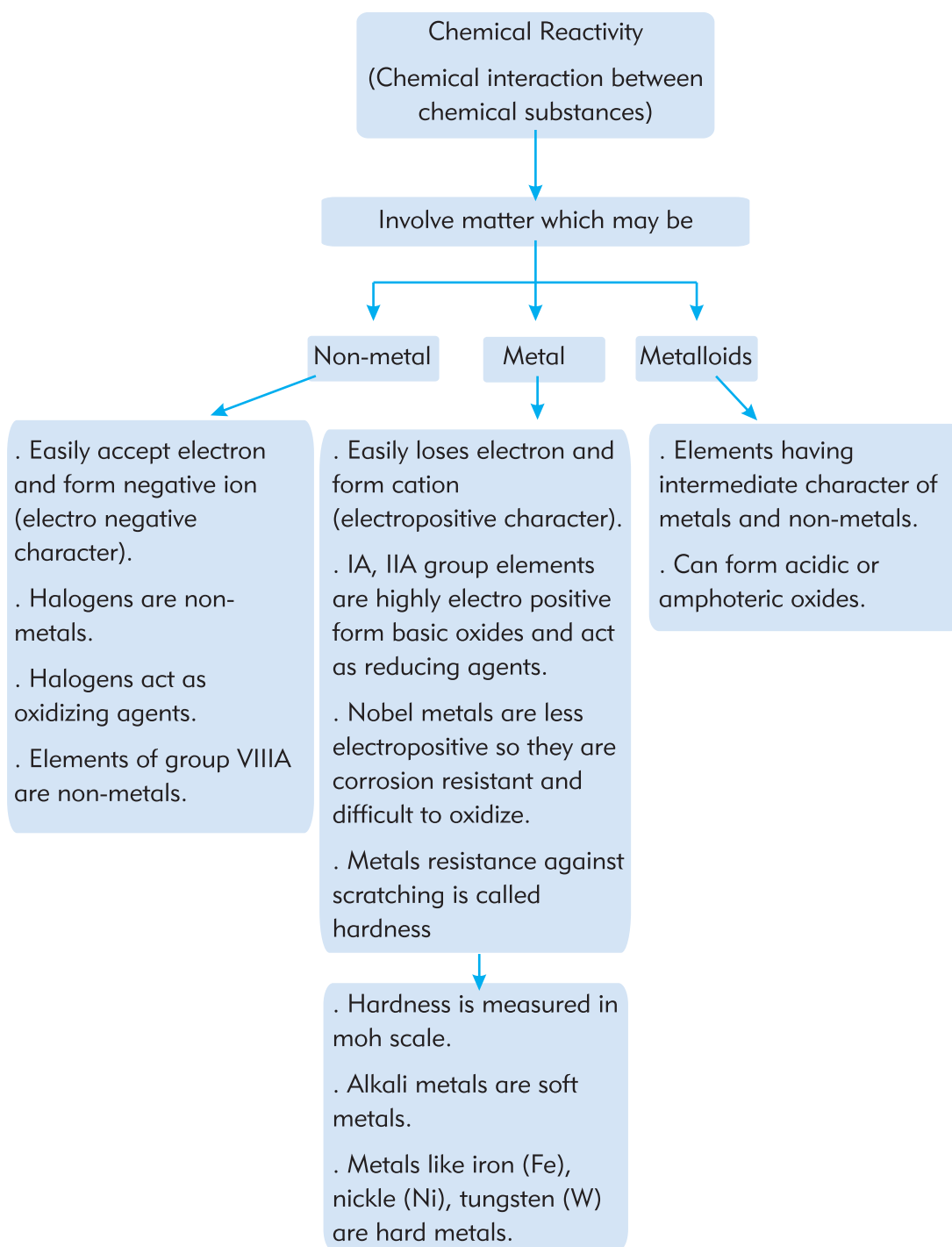
Experiment	Observation	Result
Few ml of Sample + dilute HCl + few drops of BaCl_2 or Few drops of Sample of dilute HCl + few drops of lead nitrate $\text{Pb}(\text{NO}_3)_2$ solution	White ppt	SO_4^{2-} Ion may be present
White ppt + dilute HCl	White ppt insoluble in excess HCl	SO_4^{2-} Ion is present

Test for NO_2^-

Experiment	Observation	Result
Small amount of salt + few drops of dilute H_2SO_4 solution	Reddish Brown vapours evolve	NO_2^- Ion is present



Concept Map





Summary

- ◆ Metals have greater tendency to lose electron.
- ◆ Non-metals have greater tendency to accept electron.
- ◆ Oxides of metals are basic because they produce basic solution with water.
- ◆ Oxides of Non-metals are Acidic because they form Acidic solution with water.
- ◆ Ionization Energy decreases and Electro positivity increases down the group.
- ◆ Group I-A elements are called Alkali Metals.
- ◆ Group II-A elements are called Alkaline earth metals.
- ◆ Metals of Group I-A, II-A are powerful reducing agents.
- ◆ Noble metals like Platinum, Silver, Gold etc are difficult to oxidize.
- ◆ VII-A group elements are Non-metals and act as oxidizing agents.
- ◆ VII-A group elements are known as Halogens.
- ◆ Halogen reacts with metals and form salt.
- ◆ Elements of group VIIIA are non-metals and consist of gases.
- ◆ Metalloids are elements which have properties intermediate between metals and Non-Metal elements.
For example B, Si, Ge, As, Sb, Te are metalloids.



Exercise Questions

SECTION- A: MULTIPLE CHOICE QUESTIONS

Tick Mark (✓) the correct answer

- Which one metal belongs to Alkaline earth metal?
(a) B (b) Bi (c) Br (d) Ba
- Which one is Barium
(a) Bi (b) Be (c) Ba (d) Br
- Chlorine can be displaced by _____.
(a) F (b) Br (c) I (d) At
- Which one is strong acid?
(a) HF (b) HCl (c) HBr (d) HI
- Which Halogen exists in liquid state?
(a) F₂ (b) Cl₂ (c) Br₂ (d) I₂
- Non-metals of _____ group are gases
(a) VI-A (b) VII-A (c) VIII-A (d) VIII-B
- Which one is Metalloid?
(a) Br (b) Se (c) S (d) Sr
- Which one of the following act as oxidizing agent ?
(a) Be (b) Mg (c) Na (d) Cl
- Which gas can turn lime water milky?
(a) O₂ (b) NO₂ (c) CO₂ (d) N₂
- Which compound is known as lunar caustic?
(a) KNO₃ (b) AgNO₃ (c) NaOH (d) NaNO₃

