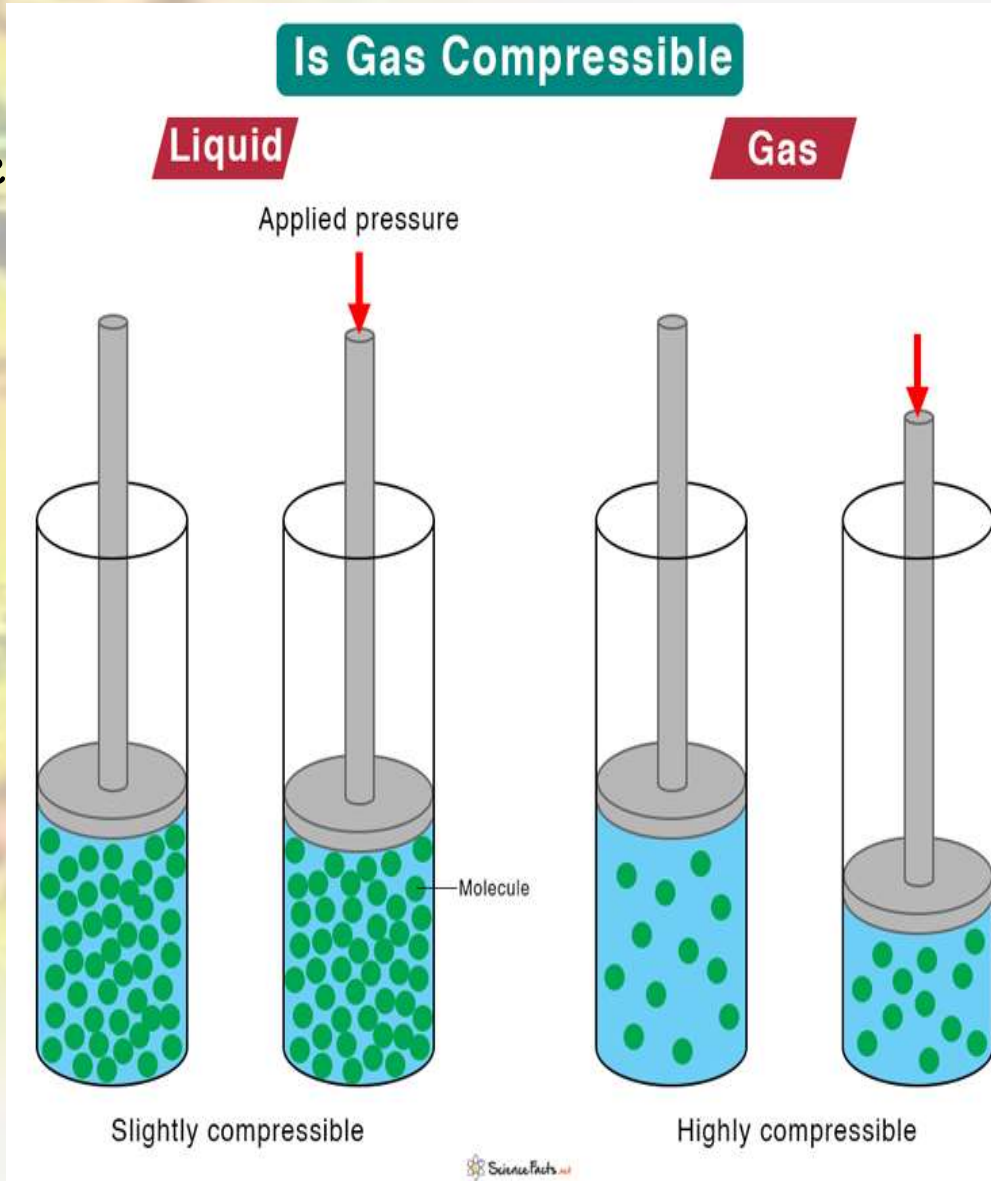


Elements, compounds and molecules and their behaviour



EFFECT OF CHANGE OF PRESSURE

We have learnt that the difference in various states of matter is due to the difference in the distances between the constituent particles. What will happen when we start putting pressure and compress a gas enclosed in a cylinder? Will the particles come closer? Do you think that increasing or decreasing the pressure can change the state of matter? Applying pressure and reducing temperature can liquefy gases. Have you heard of solid carbon dioxide (CO_2)? It is stored under high pressure. Solid CO_2 gets converted directly into gaseous state on decrease of pressure to 1 atmosphere* without coming into liquid state. This is the reason that solid carbon dioxide is also known as dry ice. Thus, we can say that pressure and temperature determine the state of a substance, whether it will be solid, liquid or gas.



Compressibility of Gases

When an airbag triggers due to a sudden stop, a chemical reaction inside the airbag occurs.



One product of the reaction is nitrogen gas, which causes the bag to inflate.

When a person collides with an inflated air bag, the impact forces the molecules of gas in the bag closer together

The compression of the gas absorbs the energy of the impact.

Evaporation

This phenomenon of change of liquid into vapour at any temperature below its boiling point is called evaporation.

FACTORS AFFECTING EVAPORATION

- An increase of surface area: We know that evaporation is a surface phenomenon. If the surface area is increased, the rate of evaporation increases. For example, while putting clothes for drying up we spread them out.
- An increase of temperature: With the increase of temperature, more number of particles get enough kinetic energy to go into the vapour state.
- A decrease in humidity: Humidity is the amount of water vapour present in air. The air around us cannot hold more than a definite amount of water vapour at a given temperature. If the amount of water in air is already high, the rate of evaporation decreases.
- An increase in wind speed: It is a common observation that clothes dry faster on a windy day. With the increase in wind speed, the particles of water vapour move away with the wind, decreasing the amount of water vapour in the surrounding.

HOW DOES EVAPORATION CAUSE COOLING?

In an open vessel, the liquid keeps on evaporating. The particles of liquid absorb energy from the surrounding to regain the energy lost during evaporation. This absorption of energy from the surroundings make the surroundings cold.

Why do we see water droplets on the outer surface of a glass containing ice-cold water?

Let us take some ice-cold water in a tumbler. Soon we will see water droplets on the outer surface of the tumbler. The water vapour present in air, on coming in contact with the cold glass of water, loses energy and gets converted to liquid state, which we see as water droplets.

What are the Types of Pure Substances?

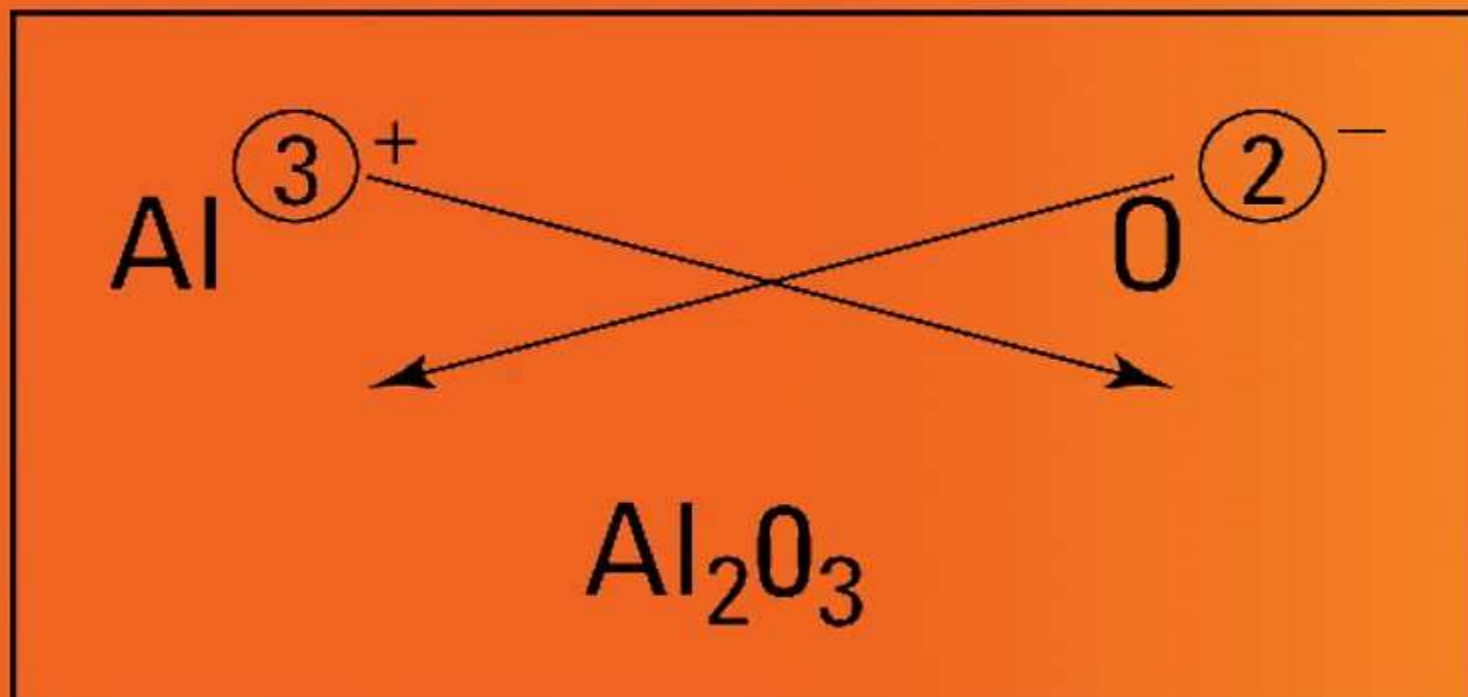
On the basis of their chemical composition, substances can be classified either as **elements** or **compounds**.

Elements can be normally divided into metals, non-metals and metalloids.

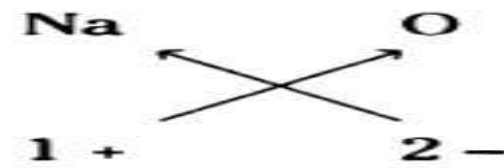
COMPOUNDS : A compound is a substance composed of two or more elements, chemically combined with one another in a fixed proportion.

WRITING CHEMICAL FORMULAE OF COMPOUND

CRISS-CROSS METHOD



i) Symbol / Formula

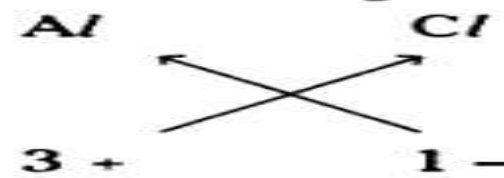


Charge

Formula : Na_2O

The formula of sodium oxide is Na_2O .

ii) Symbol / Formula

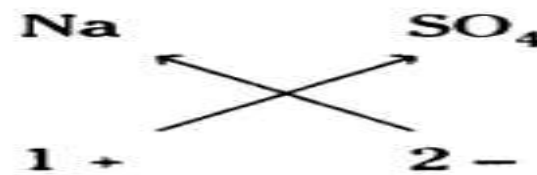


Charge

Formula : AlCl_3

The formula of aluminium chloride is AlCl_3 .

iii) Symbol / Formula

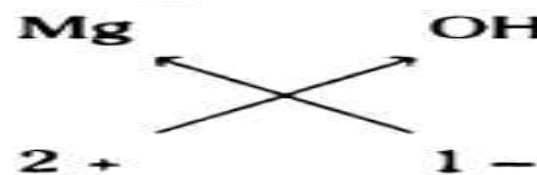


Charge

Formula : Na_2SO_4

The formula of sodium sulphate is Na_2SO_4 .

iv) Symbol / Formula



Charge

Formula : Mg(OH)_2

q. Write down the chemical formula of following compounds

1. sodium chloride
2. sodium sulphate
3. sodium carbonate
4. magnesium carbonate
5. calcium chloride
6. calcium carbonate
7. potassium chloride
8. potassium hydroxide
9. lithium hydroxide
10. barium hydroxide
11. aluminium sulphate
12. MAGNESIUM SULPHATE
13. aluminium oxide
14. sodium sulphide
15. silver nitrate

