

Real Gases

Defⁿ:-

- A real gases is defined as a gas that does not obey the gas laws at all standard pressures and temperature conditions.
- Real gases have velocity, mass, and volume.

Ideal and Real Gas :-

- Those gases that obey the ideal equation of $PV = nRT$ with references to all amounts of pressure and temperature are called Ideal gases.
- In reality, there is no ideal gas that behaves the same at every pressure and temperature.

- If the pressure is low or the temperature is high then those gases which follow the gas law are known as real gases. Hence all gases are real gases.

Real gas law

- By explicitly incorporating the effects of molecular shape and intermolecular forces, Dutch Physicist Johannes van der Waals modified the ideal gas law to explain the behaviour of real gases. The Van der Waals real gas equation is given below:-

$$= \frac{(P + \frac{a n^2}{V^2})}{V} = (V - nb) n R T$$

where a and b = Empirical constant which is unique for each gas.

$$\frac{n^2}{V^2} = \text{Concentration of gas.}$$

P = Pressure

R = Universal gas constant and

T = Temperature.

Behaviour of Real gases

- Real gases attain ideal gas behaviour at high temperatures and low pressure because at high pressures and low temperatures, the molecules of gases are very close to each other.
- Molecular interactions begin to operate.
- Repulsive force also become important.
- Real gases show ideal behaviour

when the temperature and pressure conditions are such that intermolecular forces are practically negligible.

- This can happen only at very low pressure and very high temperature.

