



Gas Laws Review: Brett Anderson



Terms

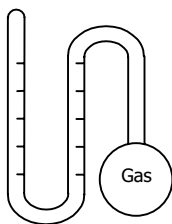
Ideal (Perfect) Gas: A gas that obeys the following gas laws.

Diffusion: The intermingling of substances: the random movement of atoms, molecules, or ions from one site in a medium to another, resulting in complete mixing

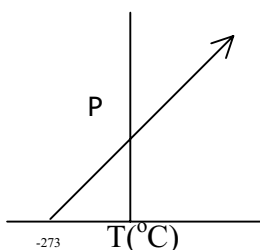
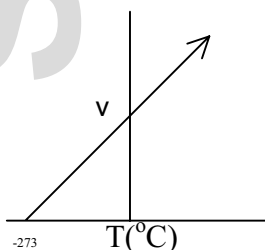
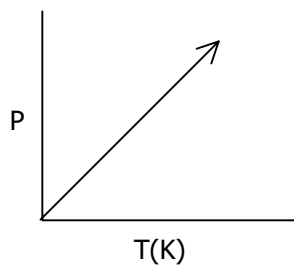
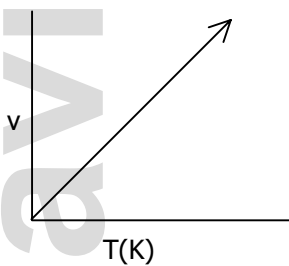
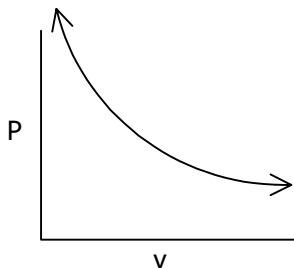
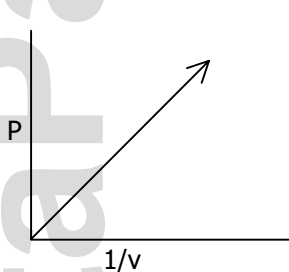
Effusion: The flow of gas through a small aperture.

Barometer: Device used to measure Earth's atmospheric pressure.

Manometer: Measures the pressure of gases.



Pressure-Temperature-Volume Relationships



Equations

$$1\text{Pa} = \frac{\text{N}}{\text{m}^2} = \text{kg m}^{-1} \text{s}^{-1}$$

Standard Atmospheric Pressure (STA) = 101.325kPa = 760mm Hg

Boyles Law : $P_1V_1 = P_2V_2$

Charles' Law : $\frac{V_1}{T_1} = \frac{V_2}{T_2}$

Gay -Lussac's Law : $\frac{P_1}{T_1} = \frac{P_2}{T_2}$

Gay -Lussac's Law : $\frac{V_1}{n_1} = \frac{V_2}{n_2}$

General Gas Equation : $\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$

Ideal Gas Equation : $Pv = nRT$

Variations :

$$n = \frac{m}{m_R} \Rightarrow Pv = \frac{m}{m_R} RT$$

$$\rho = \frac{m}{v} \Rightarrow P = \frac{\rho RT}{m_R}$$

Van -der -Waal's Equation : $\left(P + \frac{a}{V^2}\right)(V - b) = nRT$

Kinetic Energy : $E_k = \frac{1}{2}mv^2$

$$\frac{\text{volume}}{\text{molar volume}} = \frac{\text{mass}}{\text{molar mass}} = \frac{\text{\# molecules}}{\text{Avogadro's Number}} = \text{moles}$$

Molar volume at STP = 22.4L/mol

Partial Pressures : $P_{\text{Total}} = P_1 + P_2 + P_3 + \dots$

Partial Pressures : $\frac{n_1}{n_{\text{TOT}}} = \frac{P_{g1}}{P_{\text{TOT}}}$

Collecting Water of a Gas : $P_T = P_{(\text{H}_2\text{O})} + P_{\text{Gas}}$

Graham's Law of Diffusion : $\frac{v_1}{v_2} = \sqrt{\frac{m_{R_2}}{m_{R_1}}}$

