

10.4-6

The Gas Laws

- all gases have same properties, obey same laws

Ideal Gas Law:

$$PV = nRT$$

- memorize formula, units, constant
- always convert to required units!!

P = pressure

V = volume

n = moles

T = temp

R = constant

Required
Units

atm

L

mol

Kelvin

0.0821 $\frac{\text{atm} \cdot \text{L}}{\text{mol} \cdot \text{K}}$ Conversions

$$K = 273 + ^\circ C$$

$$1 \text{ atm} = 760 \text{ mm Hg}$$

$$\text{moles} = \frac{\text{grams given}}{\text{molar mass}}$$

$$\star \star 1 \text{ mol} = 22.4 \text{ L at STP}$$

- be able to rearrange formula, solve for any of 4 variables!!

Gas Laws

$$V \propto 1/P \quad \text{or} \quad PV = \text{constant} \quad \text{Boyle's Law}$$

$$V \propto T \quad \text{or} \quad \frac{V}{T} = \text{constant} \quad \text{Charles' Law}$$

$$V \propto n \quad \text{or} \quad \frac{V}{n} = \text{constant} \quad \text{Avogadro's Law}$$

$$V \propto \frac{T}{P} \quad \text{or} \quad \frac{PV}{T} = \text{constant} \quad \text{Combined Law}$$