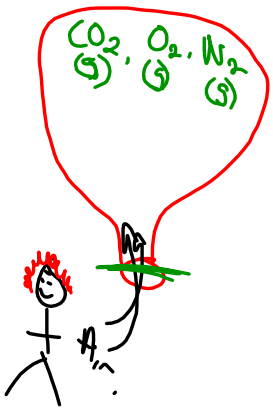
Dalton's Law of Partial Pressures

2 legs, 2 Thighs, 2 Breasts, 2 wings ⇒ 1 Chicken

Parts — Whole Thing

Add up all the Parts = Whole Thing.



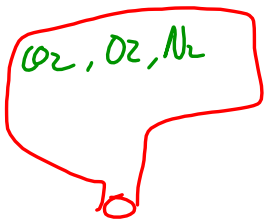
P_T (Total Pressure)

Sub script.

$$P_T = P_{CO_2} + P_{O_2} + P_{N_2}$$

Jan 4-8:16 AM

$$PV = nRT$$



$$P = \frac{nRT}{V}$$

Part — Mole Fraction

$$\frac{P_{O_2}}{P_T} = \frac{\frac{n_{O_2} RT}{V}}{\frac{n_T RT}{V}} = \frac{n_{O_2}}{n_T} = X_{O_2}$$

n_T: whole

Jan 4-8:30 AM

$$P_{O_2} = X_{O_2} P_T$$

Pressure of just $O_2(g)$

Mole Fraction of $O_2(g)$

Total Pressure

$$\frac{\text{Moles } O_2}{\text{Total Moles}} = \frac{n_{O_2}}{n_T}$$

Jan 4-8:34 AM

Ex $6g\ O_2 + 9g\ CH_4$ in 15 L, 0°C

Find P_{O_2}, P_{CH_4}, P_T

When in Doubt.... convert to MOLES

$$\frac{6g\ O_2}{} \left| \frac{1\ mole\ O_2}{32g\ O_2} \right. = 0.188\ mole\ O_2$$

$$\frac{9g\ CH_4}{} \left| \frac{1\ mole\ CH_4}{16g\ CH_4} \right. = 0.563\ mole\ CH_4$$

$PV = nRT$

$P(15) = (0.188)(0.08206)(273)$

$0.281\ atm\ O_2$

$PV = nRT$

$P(15) = 0.563(0.08206)(273)$

$0.841\ atm\ CH_4$

Pt $1.122\ atm$

Jan 4-8:36 AM

1.5 mole CO_2, 18 mole O_2, 80.5 mole Ar.

(a) Calc. P_{O_2} P_T 745 torr

$$P_{O_2} = X_{O_2} P_T$$

$$P_{O_2} = \frac{18}{100}(745 \text{ torr}) = 134.1 \text{ atm } O_2$$

(b) 12.1 L, 295 K moles O_2 = ?

$$PV = nRT$$

$$n = \frac{PV}{RT} = \frac{(134.1)(12.1)}{(0.0826)(295)}$$

Jan 4-8:42 AM

10 / 61 + 68

Jan 4-8:47 AM