

Partial Pressure Calculations

1. (last updated 5-18-04)

(brown370) A mixture made from 6.00g O₂ and 9.00g CH₄ is placed in a 15.0L vessel at 0°C. What is the partial pressure of each gas, and what is the total pressure in the vessel?

$$6g \cdot \frac{1 \text{ mol}}{32g} = 0.187 \text{ mol} \quad 9g \cdot \frac{1 \text{ mol}}{16g} = 0.562 \text{ mol}$$

$$\frac{0.562 \cdot 0.0821 \cdot 273}{15}$$

0.839

4. (last updated 5-18-04)

(brady446) What are the mole fractions and mole percents of nitrogen and oxygen in air when their partial pressures are 160 torr O₂ and 600 Torr for nitrogen? Assume no other gasses.

$$\text{total} = P = \frac{nRT}{V} \quad \frac{0.187 \cdot 0.0821 \cdot 273}{15L} = 0.279 \text{ atm}$$

1.11 atm

$$O_2 \quad \frac{160}{760} = 0.21$$

21%

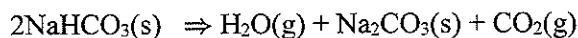
$$N_2 \quad \frac{600}{760} = 0.78$$

78%

← mole fraction

← mole percent

5. Baking soda decomposes producing gases. These gases are used as leavening agents in baked goods. (makes them rise and get fluffy).



a. Student hypothesis: The products of the reaction will contain equal moles, mass and the partial pressures will also be equal. Justify or nullify this statement.

Moles + Partial Pressures are equal - mass is not

b. A 25 gram sample of baking soda is decomposed in a 1L container at 0° determine the partial pressure of water

$$25g \cdot \frac{1 \text{ mol}}{84g} \cdot \frac{1 \text{ H}_2O}{2} = 0.148 \text{ mol H}_2O$$

due to different molar masses

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

$$\frac{0.148 \cdot 0.0821 \cdot 273}{1L}$$

3.3 ATM