Answer on Question #68470 - Chemistry – General Chemistry

Task:

What is the total in atm in a sealed flask that contains hydrogen at a partial pressure of 32 atm and oxygen at a partial pressure of 720mm Hg.

Solution:

Mathematically, the pressure of a mixture of non-reactive gases can be defined as the summation:

$$P_{total} = \sum_{i=1}^{n} P_i; \quad \text{or} \quad P_{total} = P_1 + P_2 + P_3 + ... + P_n.$$

where P_1, P_2, ... , P_n represent the partial pressures of each component.

$$1 atm = 760 \, mm \, Hg;$$

$$P(oxygen) = P(O_2) = 720 \, mm \, Hg \cdot \frac{1 atm}{760 \, mm \, Hg} = 0.947 \, atm;$$

$$P(hydrogen) = P(H_2) = 32 \, atm.$$

Then,

$$P_{total} = P(O_2) + P(H_2) = 0.947 \, atm + 32 \, atm = 32.947 \, atm$$

Answer: P (total) = 32.947 atm.