Answer on Question #76979, Chemistry / General Chemistry

The partial pressure of oxygen in the atmosphere is 159. Calculate the partial pressure in mm Hg and atm . Round each of your answers to significant digits.

Solution

To find the partial pressure of oxyqen we should use formula for mole fraction:

$$X_i = \frac{P_i}{P_{total}} = \frac{n_i}{n_{total}} = \frac{V_i}{V_{total}}$$

Where X_i - is a mole fraction of gas *i*

P_i – is partial pressure of gas i

P_{total} – total pressure of a mixture of gases

n_i – amount of chemical substance of gas i

n_i – total amount of chemical substance of gases in a mixture

V_i – volume of gas i

V_{total} – total volume of a mixture of gases.

Air consists of 78.084% of N_2 by volume, 20.946% of O_2 and the other gases.

The percent by volume is equal to the mole fraction: $X(O_2)=0.21$.

As $X_i = \frac{P_i}{P_{total}} \Rightarrow P_i = X_i P_{total}$

P_{total} = 1atm = 760 mm Hg at STP (standard temperature and pressure).

So $P(O_2)$ in atm = 0.20946 ·1atm = 0.209 atm

$P(O_2)$ in mm Hg =0.20946·760 mm Hg = 159.2 mm Hg ≅ 159 mm Hg.

Answer: 0.209 atm, 159 mm Hg