Homework - Reactions Worksheet

Determine the number of atoms found in <u>12.6 moles of H$_2$O.</u>

$12.6 \, mol \, H_2O \times \dfrac{6.02 \times 10^{23} \, molecules \, H_2O}{1 \, mol \, H_2O} \times \dfrac{3 \quad atoms}{1 \quad molecules}$

$= \boxed{2.28 \times 10^{25} \, atoms}$

Determine the number of atoms found in 2.78 moles of carbon.

Calculate the number of moles contained in 45.0g of LiNO₃.

$$45.0g\ LiNO_3 \times \frac{1\ mol\ LiNO_3}{68.95\ g\ LiNO_3} = \boxed{0.653\ mol\ LiNO_3}$$

$$LiNO_3 \longrightarrow (1 \times 6.94) + (1 \times 14.01) + (3 \times 16.00) = 68.95\ g/mol$$

Li   N   O
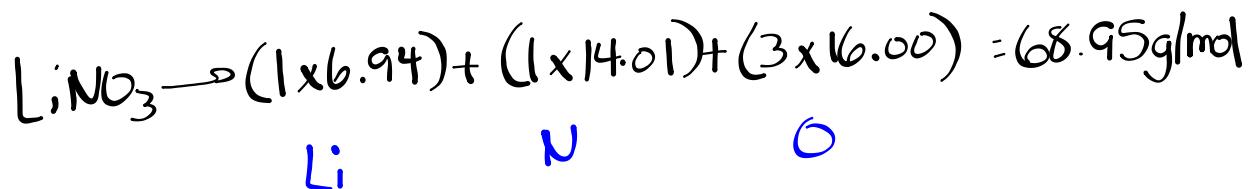
Calculate the volume of 4.58 moles of oxygen gas at STP conditions.

$$4.58 \, mol \, O_2 \times \frac{22.4 \, L \, O_2}{1 \, mol \, O_2} = \boxed{103 \, L \, O_2}$$

Determine the percent composition of CaSO₄.

$CaSO_4 \rightarrow (1 \times 40.08) + (1 \times 32.06) + (4 \times 16.00)$
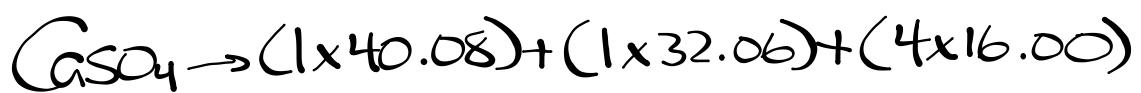
$$= 136.14 \, g/mol$$

$\%Ca = \dfrac{(1 \times 40.08) g/mol}{136.14 \, g/mol} \times 100\%$

$\boxed{\%Ca = 29.4\%}$

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A compound is composed of 31.0% Al, 13.8% C, and 55.2% O. Determine the empirical and molecular formula of the compound. The molar mass of the compound is 260.93 g/mol.

$$31.0g\ Al \times \frac{1\ mol\ Al}{26.98g\ Al} = \frac{1.149\ mol}{1.149\ mol} = 1$$

$$13.8g\ C \times \frac{1\ mol\ C}{12.01g\ C} = \frac{1.149\ mol}{1.149\ mol} = 1$$

$$55.2g\ O \times \frac{1\ mol\ O}{16.00g\ O} = \frac{3.450\ mol}{1.149\ mol} = 3$$

EMPIRICAL   MOLECULAR

$$\boxed{Al\ CO_3}$$ $\xrightarrow{\times 3}$ $$\boxed{Al_3C_3O_9}$$

                                                    260.93 g/mol

86.99 g/mol $\xrightarrow{\times 3}$

$$Al\ CO_3 \rightarrow (1 \times 26.98) + (1 \times 12.01) + (3 \times 16.00)$$
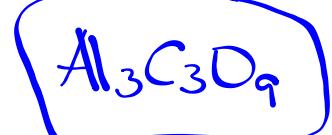
Determine the number of atoms found in 2.78 moles of carbon.

Determine the number of molecules found in 6.09 moles of NH_3.

Worksheet
p. 315 #47-69

p. 347 #43,45,48,49,51,52