Homework - Reactions Worksheet

Pb^{2+} NO_3^{-} K^{+} CrO_4^{2-}

② $Pb(NO_3)_{2(aq)} + K_2CrO_{4(aq)} \longrightarrow PbCrO_{4(s)} + 2KNO_{3(aq)}$

D.R.

Mg^{2+} O^{2-}

⑪ $3Mg_{(s)} + Fe_2O_{3(aq)} \longrightarrow 2Fe_{(s)} + 3MgO_{(aq)}$

S.R.

58

4   54

⑦4 $C_5H_{12}O_{(e)} + 27O_{2(g)} \longrightarrow 20CO_{2(g)} + 18H_2O_{(g)}$
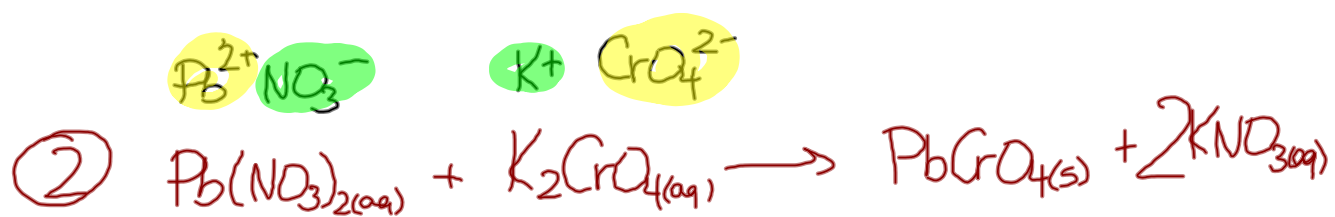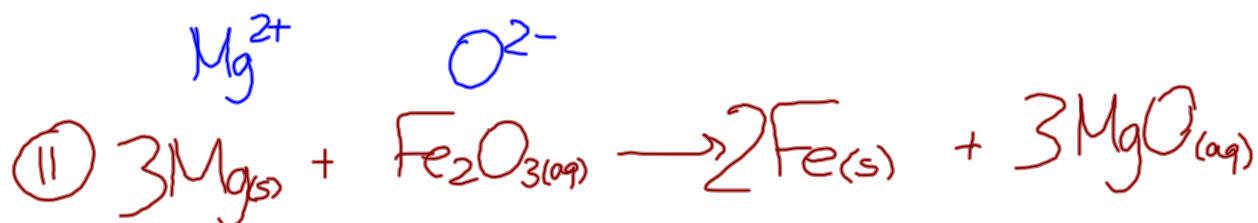
COMBUSTION

Determine the number of <u>atoms</u> found in 2.78 moles of carbon.

$$2.78 \text{ mol } C \times \frac{6.02 \times 10^{23} \text{ atoms } C}{1 \text{ mole } C} = \boxed{1.67 \times 10^{24} \text{ atoms } C}$$

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

Determine the number of atoms found in 12.6 moles of H_2O.

$$12.6 \; \text{mol } H_2O \times \frac{6.02 \times 10^{23} \; \text{molecules } H_2O}{1 \; \text{mol } H_2O} \times \frac{3 \; \text{atoms}}{1 \; \text{molecules } H_2O} =$$

$$\boxed{2.28 \times 10^{25} \; \text{atoms}}$$

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

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

$$45.0 \text{ g LiNO}_3 \times \frac{1 \text{ mol LiNO}_3}{68.95 \text{ g LiNO}_3} = \boxed{0.653 \text{ mol LiNO}_3}$$

$$\text{LiNO}_3 \longrightarrow (1 \times 6.94) + (1 \times 14.01) + (3 \times 16.00)$$
$$= 68.95 \text{ g/mol}$$

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

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

Determine the percent composition of CaSO₄.

$$CaSO_4 \longrightarrow (1 \times 40.08) + (1 \times 32.06) + (4 \times 16.00)$$
$$= 136.14 \text{ g/mol}$$

$$\% \ Ca - \frac{(1 \times 40.08) \text{ g/mol}}{136.14 \text{ g/mol}} \times 100\%$$

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

$$\% \ S = \frac{(1 \times 32.06) \text{ g/mol}}{136.14 \text{ g/mol}} \times 100\%$$

$$\boxed{\% \ S = 23.5\%}$$

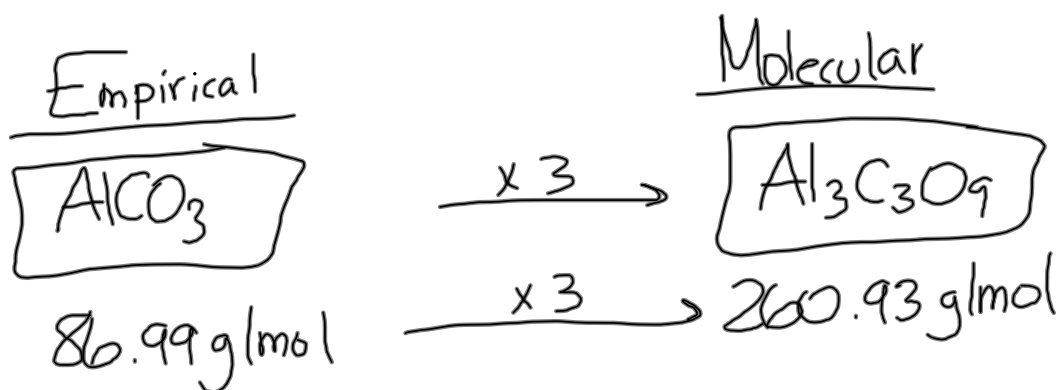$$\% \ O = \frac{(4 \times 16.00) \text{ g/mol}}{136.14 \text{ g/mol}} \times 100\%$$

$$\boxed{\% \ O = 47.0\%}$$

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.

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

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

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

Empirical

$$\boxed{AlCO_3}$$

86.99 g/mol

$$\xrightarrow{\times 3}$$

Molecular

$$\boxed{Al_3C_3O_9}$$

$$\xrightarrow{\times 3}$$ 260.93 g/mol

$$AlCO_3 \longrightarrow (1 \times 26.98) + (1 \times 12.01) + (3 \times 16.00) = 86.99 \; g/mol$$

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