45.2 g of magnesium bromide reacts with 32.7 g of chlorine in a single replacement reaction. Determine the mass of the products.

$MgBr_2 + Cl_2 \rightarrow MgCl_2 + Br_2$

$\frac{45.2\text{ g } MgBr_2}{184.1\text{ g/mol}} = 0.246\text{ mol } MgBr_2$

$\frac{32.7\text{ g } Cl_2}{71.0\text{ g/mol}} = 0.461\text{ mol } Cl_2$

$\frac{MgBr_2}{Cl_2} = \frac{1}{1} = \frac{0.246\text{ mol}}{x}$

$x = .246\text{ mol } Cl_2$ needed

$MgBr_2$ is LR

$\frac{MgBr_2}{MgCl_2} = \frac{1}{1} = \frac{.246\text{ mol}}{x}$

$.246\text{ mol } MgCl_2$

$(.246\text{ mol } MgCl_2)(95.3\text{ g/mol})$

$23.4\text{ g } MgCl_2$

$Br_2 = .246\text{ mol}$

$(.246\text{ mol } Br_2)(159.8\text{ g/mol})$

$39.3\text{ g } Br_2$

40.0 g of ammonia burns in excess oxygen to form nitrogen monoxide and water. Determine the mass of the products.

$$4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$$

$$\frac{40.0\,g\,NH_3}{17.0\,g/mol} = 2.35\,mol\,NH_3$$

$$\frac{NH_3}{NO} = \frac{4}{4} = \frac{1}{1} = \frac{2.35\,mol}{x}$$

$$x = 2.35\,mol\,NO$$

$$(2.35\,mol\,NO)(30.0\,g/mol)$$

$$70.5\,g\,NO$$

$$\frac{NH_3}{H_2O} = \frac{4}{6} = \frac{2}{3} = \frac{2.35\,mol}{x}$$

$$x = 3.53\,mol\,H_2O$$

$$(3.53\,mol\,H_2O)(18.0\,g/mol)$$

$$63.5\,g\,H_2O$$

How many grams of zinc sulfide is needed to form 50.0 g of ZnO

$2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

$$\frac{50.0\,g\,ZnO}{81.4\,g/mol} = 0.614\,mol\,ZnO$$

$$\frac{ZnO}{ZnS} = \frac{2}{2} = \frac{1}{1} = \frac{0.614\,mol}{X}$$

$$0.614\,mol\,ZnS$$

$$(0.614\,mol\,ZnS)(97.5\,g/mol)$$

$$59.9\,g\,ZnS$$

How much hydrochloric acid would it take to completely dissolve 212 grams of zinc? How much zinc chloride and how much hydrogen gas would be formed (in mass)?