Wkst 11.C
Ch 11

Mass to Mass Stoichiometry Problems

In the following problems, calculate how much of the indicated product is made. Show all your work.

1. If you start with 10.0g of lithium hydroxide and react it with hydrogen bromide, how many grams of lithium bromide will be produced?

$$\underset{10.0g}{LiOH} + HBr \rightarrow \underset{?g}{LiBr} + H_2O$$

$$\left(\frac{10.0\,g\ LiOH}{1}\right)\left(\frac{1\ mole\ LiOH}{23.9\,g\ LiOH}\right)\left(\frac{1\ mole\ LiBr}{1\ mole\ LiOH}\right)\left(\frac{86.8\,g\ LiBr}{1\ mole\ LiBr}\right) = \boxed{36.3\,g\ LiBr}$$

2. If you combust with 45.0 grams of ethylene (C_2H_4), how many grams of carbon dioxide and water will be produced?

$$\underset{45.0g}{C_2H_4} + 3O_2 \rightarrow \underset{?g}{2CO_2} + \underset{?g}{2H_2O}$$

$$\left(\frac{45.0\,g\ C_2H_4}{1}\right)\left(\frac{1\ mole\ C_2H_4}{28.0\,g\ C_2H_4}\right)\left(\frac{2\ mole\ CO_2}{1\ mole\ C_2H_4}\right)\left(\frac{44.0\,g\ CO_2}{1\ mole\ CO_2}\right) = \boxed{141\,g\ CO_2}$$

$$\left(\frac{45.0\,g\ C_2H_4}{1}\right)\left(\frac{1\ mole\ C_2H_4}{28.0\,g\ C_2H_4}\right)\left(\frac{2\ mole\ H_2O}{1\ mole\ C_2H_4}\right)\left(\frac{18.0\,g\ H_2O}{1\ mole\ H_2O}\right) = \boxed{57.9\,g\ H_2O}$$

3. Starting with 5.5 grams of magnesium and sodium fluoride, how many grams of sodium be produced? How many formula units of magnesium fluoride?

$$\underset{5.5g}{Mg} + 2NaF \rightarrow \underset{?\ F.U.}{MgF_2} + \underset{?g}{2Na}$$

$$\left(\frac{5.5\,g\ Mg}{1}\right)\left(\frac{1\ mole\ Mg}{24.3\,g\ Mg}\right)\left(\frac{2\ mole\ Na}{1\ mole\ Mg}\right)\left(\frac{23.0\,g\ Na}{1\ mole\ Na}\right) = \boxed{10.1\,g\ Na}$$

$$\left(\frac{5.5\,g\ Mg}{1}\right)\left(\frac{1\ mole\ Mg}{24.3\,g\ Mg}\right)\left(\frac{1\ mole\ MgF_2}{1\ mole\ Mg}\right)\left(\frac{6.02\times10^{23}\ F.U.\ MgF_2}{1\ mole\ MgF_2}\right) = \boxed{1.4\times10^{23}\ F.U.\ MgF_2}$$

4. How many grams of hydrogen sulfate will be produced if you combine 20.0 grams of hydrochloric acid with sodium sulfate?

$$\underset{20.0g}{2HCl} + Na_2SO_4 \rightarrow 2NaCl + \underset{?g}{H_2SO_4}$$

$$\left(\frac{20.0\,g\ HCl}{1}\right)\left(\frac{1\ mole\ HCl}{36.5\,g\ HCl}\right)\left(\frac{1\ mole\ H_2SO_4}{2\ mole\ HCl}\right)\left(\frac{98.1\,g\ H_2SO_4}{1\ mole\ H_2SO_4}\right) = \boxed{26.9\,g\ H_2SO_4}$$