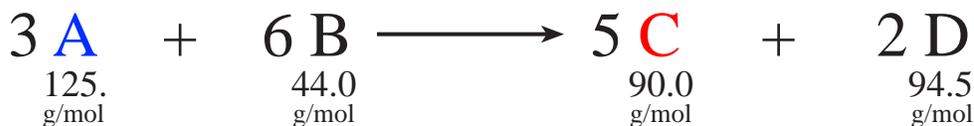


Working Reaction Stoichiometry Problems

QUESTION



570. grams of compound **A** reacted with excess **B** to form **C** and **D**. How many grams of compound **C** were formed? The molecular weights are given below each reactant and product.

Read the question and determine what the overall chemical reaction is. Make sure that the reaction is balanced properly. Here, the equation IS already balanced.

Now find what amount(s) of reactant(s) are given in the problem. Most problems will give the amount of reactants in grams rather than moles because grams are easily measured on a scale in the laboratory without having to know what the molecular weight is.

You must convert the reactant amounts given into moles. The balanced equation is set up for moles, not grams. Remember that moles are easily calculated by

$$\text{moles of A} = \frac{\text{grams}}{\text{MWt}} = \frac{570. \text{ g A}}{125 \text{ g/mol}} = 4.56 \text{ mol A}$$

Once you have the number of moles of reactant, you can calculate the number of moles of product that can be formed when all of the reactant reacts. The mole-to-mole ratio is given in the balanced chemical equation.

$$4.56 \text{ mol A} \cdot \frac{5 \text{ mol C}}{3 \text{ mol A}} = 7.60 \text{ mol C}$$

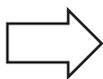
Now all that is left to do is to convert the moles of product into grams of product. This is easily accomplished also:

$$\text{grams of C} = \text{mol} \cdot \text{MWt} = 7.60 \text{ mol C} \cdot 90.0 \text{ g/mol} = \boxed{684. \text{ grams of C}}$$

The whole process follows a three step (conversion) procedure:

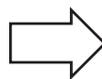
Step 1

Convert given amounts into moles (divide grams given by molecular weight)



Step 2

Convert the moles of reactant to moles of product. The ratios are given in the balanced chemical equation.



Step 3

Convert the moles of product into grams of product (multiply moles by molecular weight).

Limiting Reactant

is the reactant that is present in short supply when compared to the other reactant(s). It is the reactant that will ultimately determine the amount of product(s) you can make. The reactant(s) that are not limiting are said to be in excess.



If more than one reactant amount is given in a problem, the problem is most likely a limiting reactant problem. One of the reactants is the limiting reactant and the other is the reactant in excess. Do the above procedure TWICE, once for each reactant. The SMALLEST answer will be the correct answer and will also tell you which reactant was the limiting reactant.