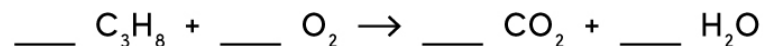


Limiting Reagent Worksheet

1) Given the following reaction:

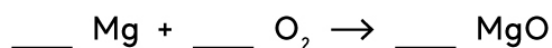


Balance the reaction.

(a) Suppose 14.8 g of C_3H_8 reacts with 3.44 g of O_2 . Determine the limiting reagent.

(b) Determine the amount of CO_2 produced.

2) Given the following reaction:



Balance the reaction.

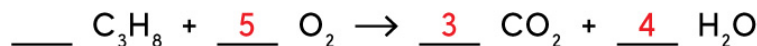
(a) What is the limiting reagent if 2.2 g of Mg reacts with 4.5 L of O_2 at STP?

(b) Determine the amount of MgO produced in grams.

Limiting Reagent Worksheet

Answers

- 1) Given the following reaction:



Balance the reaction.

- a) Suppose 14.8 g of C_3H_8 reacts with 3.44 g of O_2 . Determine the limiting reagent.

$$14.8 \text{ g C}_3\text{H}_8 \times \frac{1 \text{ mol C}_3\text{H}_8}{44.09 \text{ g C}_3\text{H}_8} \times \frac{4 \text{ mol H}_2\text{O}}{1 \text{ mol C}_3\text{H}_8} \times \frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 24.2 \text{ g H}_2\text{O}$$

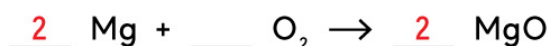
$$3.44 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32 \text{ g O}_2} \times \frac{4 \text{ mol H}_2\text{O}}{5 \text{ mol O}_2} \times \frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} = 1.55 \text{ g H}_2\text{O}$$

Since O_2 produces less quantity of H_2O than C_3H_8 does, it is the limiting reagent.

- b) Determine the amount of CO_2 produced.

$$3.44 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32 \text{ g O}_2} \times \frac{3 \text{ mol CO}_2}{5 \text{ mol O}_2} \times \frac{44.01 \text{ g CO}_2}{1 \text{ mol H}_2\text{O}} = 2.84 \text{ g CO}_2$$

- 2) Given the following reaction:



Balance the reaction.

- a) What is the limiting reagent if 2.2 g of Mg reacts with 4.5 L of O_2 at STP?

$$2.2 \text{ g Mg} \times \frac{1 \text{ mol Mg}}{24.3 \text{ g Mg}} \times \frac{2 \text{ mol MgO}}{2 \text{ mol Mg}} = 0.0905 \text{ mol MgO}$$

$$4.5 \text{ L O}_2 \times \frac{1 \text{ mol O}_2}{22.4 \text{ L O}_2} \times \frac{2 \text{ mol MgO}}{1 \text{ mol O}_2} = 0.401 \text{ mol MgO}$$

Since Mg produces less MgO than O_2 , Mg is the limiting reagent.

- b) Determine the amount of MgO produced in grams.

$$0.095 \text{ mol MgO} \times \frac{40.31 \text{ g MgO}}{1 \text{ mol MgO}} = 3.83 \text{ g MgO}$$