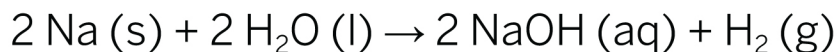
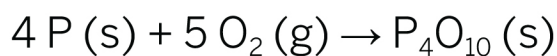


## ■ STOICHIOMETRY CALCULATION ■

1. How many moles of sodium will react with water to produce 4.0 mol of hydrogen in the following reaction?



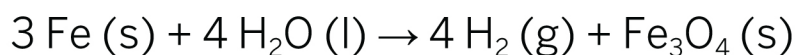
2. Phosphorous burns in oxygen to produce phosphorous oxide in the following reaction:



a. What mass of phosphorous will be needed to produce 3.25 mol of  $\text{P}_4\text{O}_{10}$ ?

b. If 0.489 mol of phosphorous burns, what mass of oxygen is used? What mass of  $\text{P}_4\text{O}_{10}$  is produced?

3. Hydrogen is generated by passing pot steam over iron, which oxidizes to form  $\text{Fe}_3\text{O}_4$ , in the following equation.



a. If 625 g of  $\text{Fe}_3\text{O}_4$  is produced in the reaction, how many moles of hydrogen are produced simultaneously?

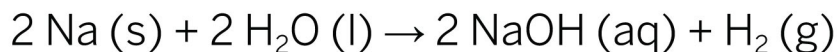
b. How many moles of iron would be needed to generate 27 g of  $\text{H}_2$ ?

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# ■ STOICHIOMETRY CALCULATION ■

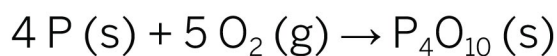
## Answers

1. How many moles of sodium will react with water to produce 4.0 mol of hydrogen in the following reaction?



$$4 \text{ mol H}_2 \times (2 \text{ mol Na}/1 \text{ mol H}_2) = 8 \text{ mol Na}$$

2. Phosphorous burns in oxygen to produce phosphorous oxide in the following reaction:



a. What mass of phosphorous will be needed to produce 3.25 mol of  $\text{P}_4\text{O}_{10}$ ?

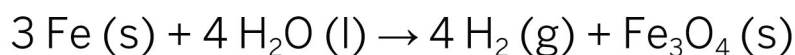
$$3.25 \text{ mol P}_4\text{O}_{10} \times (4 \text{ mol P}/1 \text{ mol P}_4\text{O}_{10}) \times (30.97 \text{ g P}/1 \text{ mol P}) = 403 \text{ g P}$$

b. If 0.489 mol of phosphorous burns, what mass of oxygen is used? What mass of  $\text{P}_4\text{O}_{10}$  is produced?

$$0.489 \text{ mol P} \times (5 \text{ mol O}_2/4 \text{ mol P}) \times (32 \text{ g O}_2/1 \text{ mol O}_2) = 19.6 \text{ g O}_2$$

$$0.489 \text{ mol P} \times (1 \text{ mol P}_4\text{O}_{10}/4 \text{ mol P}) \times (284 \text{ g P}_4\text{O}_{10}/1 \text{ mol P}_4\text{O}_{10}) = 34.72 \text{ g P}_4\text{O}_{10}$$

3. Hydrogen is generated by passing pot steam over iron, which oxidizes to form  $\text{Fe}_3\text{O}_4$ , in the following equation.



a. If 625 g of  $\text{Fe}_3\text{O}_4$  is produced in the reaction, how many moles of hydrogen are produced simultaneously?

$$625 \text{ g Fe}_3\text{O}_4 \times (1 \text{ mol Fe}_3\text{O}_4/232 \text{ g Fe}_3\text{O}_4) \times (4 \text{ mol H}_2/1 \text{ mol Fe}_3\text{O}_4) = 10.8 \text{ mol H}_2$$

b. How many moles of iron would be needed to generate 27 g of  $\text{H}_2$ ?

$$27 \text{ g H}_2 \times (1 \text{ mol H}_2/2 \text{ g H}_2) \times (3 \text{ mol Fe}/4 \text{ mol H}_2) = 10.1 \text{ mol Fe}$$

Name : \_\_\_\_\_ Date : \_\_\_\_\_