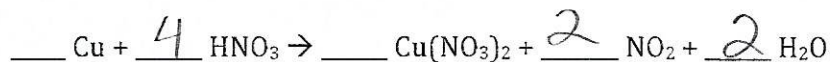


Stoich III Practice

 Name: Key
 Date:
 Block:

1. Consider the reaction below, which is the first step in the process of recycling copper. Assume a student begins this experiment with 0.020 g of copper metal.



- a. If a student began the experiment with 0.020 g of copper metal, how much copper nitrate (in grams) would be produced?

$$0.020 \text{g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{g Cu}} \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}} \times \frac{187.57 \text{ g Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}(\text{NO}_3)_2}$$

$$= 0.059 \text{g}$$

- b. How many molecules of nitric acid would be required to complete the reaction?

$$0.020 \text{g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{g}} \times \frac{4 \text{ mol HNO}_3}{1 \text{ mol Cu}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol}}$$

$$= 7.6 \times 10^{20} \text{ molecules}$$

c. How many grams of water would be produced?

$$0.020 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{ g Cu}} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol Cu}} \times \frac{18.02 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}}$$
$$= 0.011 \text{ g H}_2\text{O}$$

d. How many milliliters of nitrogen dioxide gas would be produced if the reaction was carried out at STP? NO_2

$$0.020 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{ g}} \times \frac{2 \text{ mol NO}_2}{1 \text{ mol Cu}} \times \frac{22.4 \text{ L}}{1 \text{ mol NO}_2} \times \frac{1000 \text{ mL}}{1 \text{ L}}$$
$$= 14 \text{ mL NO}_2$$

e. How many atoms of hydrogen would be produced?

$$0.020 \text{ g Cu} \times \frac{1 \text{ mol Cu}}{63.55 \text{ g}} \times \frac{2 \text{ mol H}_2\text{O}}{1 \text{ mol Cu}} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol H}_2\text{O}}$$
$$\times \frac{2 \text{ atoms H}}{1 \text{ molecule}} = 7.6 \times 10^{20} \text{ atoms of H}$$