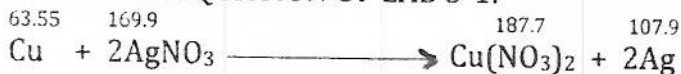


# CHEMISTRY PROBLEM SET 3-3 STOICHIOMETRY

GIVEN THE EQUATION OF LAB 3-1:



- 1. If a student reacts 1.678 g. of Cu with an excess of  $\text{AgNO}_3$ , how many grams of Ag are made?

$$\frac{1.678 \text{ g Cu}}{63.55 \text{ g Cu}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{2 \text{ mol Ag}}{1 \text{ mol Cu}} \times \frac{107.9 \text{ g Ag}}{1 \text{ mol Ag}} = 5.698 \text{ g Ag}$$

- 2. If a student's lab produced 1.986 g. of Ag, how many grams of Cu reacted?

$$\frac{1.986 \text{ g Ag}}{107.9 \text{ g Ag}} \times \frac{1 \text{ mol Ag}}{2 \text{ mol Ag}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 0.5848 \text{ g Cu}$$

- 3. If 1.65 g. of Cu reacted, how many grams of  $\text{AgNO}_3$  reacted with it?

$$\frac{1.65 \text{ g Cu}}{63.55 \text{ g Cu}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{2 \text{ mol AgNO}_3}{1 \text{ mol Cu}} \times \frac{169.9 \text{ g AgNO}_3}{1 \text{ mol AgNO}_3} = 8.823 \text{ g AgNO}_3$$

3 sig. fig. → 8.82 g  $\text{AgNO}_3$

- 4. If you reacted 2.034 g. of  $\text{AgNO}_3$ , how many grams of each product were produced?

$$\frac{2.034 \text{ g AgNO}_3}{169.9 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{2 \text{ mol AgNO}_3} \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{1 \text{ mol AgNO}_3} \times \frac{187.7 \text{ g Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}(\text{NO}_3)_2} = 1.124 \text{ g Cu}(\text{NO}_3)_2$$

$$\frac{2.034 \text{ g AgNO}_3}{169.9 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{2 \text{ mol AgNO}_3} \times \frac{2 \text{ mol Ag}}{1 \text{ mol AgNO}_3} \times \frac{107.9 \text{ g Ag}}{1 \text{ mol Ag}} = 1.292 \text{ g Ag}$$

- 5. If 1.765 g. of Ag was produced, how many grams of each reactant were used?

$$\frac{1.765 \text{ g Ag}}{107.9 \text{ g Ag}} \times \frac{1 \text{ mol Ag}}{2 \text{ mol Ag}} \times \frac{2 \text{ mol AgNO}_3}{1 \text{ mol AgNO}_3} \times \frac{169.9 \text{ g AgNO}_3}{1 \text{ mol AgNO}_3} = 2.779 \text{ g AgNO}_3$$

$$\frac{1.765 \text{ g Ag}}{107.9 \text{ g Ag}} \times \frac{1 \text{ mol Ag}}{2 \text{ mol Ag}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{63.55 \text{ g Cu}}{1 \text{ mol Cu}} = 0.51976 \text{ g Cu}$$

- 6. If 2.356 g. of  $\text{AgNO}_3$  reacted, how many molecules of  $\text{Cu}(\text{NO}_3)_2$  were made?

$$\frac{2.356 \text{ g AgNO}_3}{169.9 \text{ g AgNO}_3} \times \frac{1 \text{ mol AgNO}_3}{2 \text{ mol AgNO}_3} \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{1 \text{ mol AgNO}_3} \times \frac{6.022 \times 10^{23} \text{ molecules}}{1 \text{ mol Cu}(\text{NO}_3)_2} = 4.175 \times 10^{21} \text{ molecules Cu}(\text{NO}_3)_2$$

- 7. If you reacted 4.789 g. of Cu, how many grams of  $\text{Cu}(\text{NO}_3)_2$  were made?

$$\frac{4.789 \text{ g Cu}}{63.55 \text{ g Cu}} \times \frac{1 \text{ mol Cu}}{1 \text{ mol Cu}} \times \frac{1 \text{ mol Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}} \times \frac{187.7 \text{ g Cu}(\text{NO}_3)_2}{1 \text{ mol Cu}(\text{NO}_3)_2} = 14.14 \text{ g Cu}(\text{NO}_3)_2$$