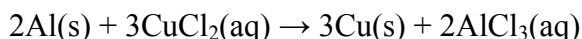


CHAPTER 8	Investigation 8.A: The Limiting Reactant	BLM 8.1.6
HANDOUT		

In this investigation, you will predict the limiting reactant in a chemical reaction and test your prediction. You will use the single-replacement reaction of aluminium with aqueous copper(II) chloride:



Question

How can observations tell you which is the limiting reactant in the reaction of aluminium with aqueous copper(II) chloride?

Prediction

Your teacher will give you a flask that contains a 0.25 g piece of aluminium foil and 0.51 g of copper(II) chloride. Use stoichiometric calculations to predict which one of these reactants will be the limiting reactant.

Safety Precautions



The reaction mixture may get hot. Do not hold the flask as the reaction proceeds. Copper(II) chloride is toxic. Inform your teacher immediately of any spills.

Materials

- 0.51 g $\text{CuCl}_2\text{(s)}$   
- 0.25 g aluminium foil 
- water
- 125 mL Erlenmeyer flask
- stirring rod

Procedure

1. To begin the reaction, add about 50 mL of water to the flask that contains the aluminium foil and copper(II) chloride.
2. Record the colour of the solution and any metal that is present at the beginning of the reaction.
3. Record any colour changes as the reaction proceeds. Stir occasionally with the stirring rod.
4. When the reaction is complete, return the flask, with its contents, to your teacher for proper disposal. Do not pour anything down the drain.

CHAPTER 8	Investigation 8.A: The Limiting Reactant (continued)	BLM 8.1.6
HANDOUT		

Analysis

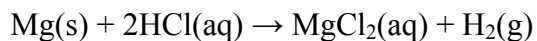
1. According to your observations, which reactant was the limiting reactant? Explain your answer.
2. According to your observations, which reactant was the excess reactant? Explain your answer.
3. Did your predictions match your observations? Explain your answer.

Conclusion

4. Summarize your findings. Are stoichiometric calculations an effective way to predict limiting and excess reactants?

Extension

5. Magnesium, Mg(s), and hydrochloric acid, HCl(aq), react according to the following equation:



- (a) Examine the equation carefully. What would you expect to observe if the magnesium were the limiting reactant? What would you expect to observe if the hydrochloric acid were the limiting reactant?

CHAPTER 8	Investigation 8.A: The Limiting Reactant (continued)	BLM 8.1.6
HANDOUT		

- (b) Suppose you have a piece of magnesium and a beaker containing some hydrochloric acid of unknown concentration. Design an experiment to determine which reactant is the limiting reactant. If your teacher approves, carry out your procedure.