

Name \_\_\_\_\_

Period \_\_\_\_\_

Partner \_\_\_\_\_

Date \_\_\_\_\_

## Moles of Iron and Copper

### Prelab

- 1) Write the balanced chemical equation for this reaction.
- 2) Define *decant*.

### Procedure

- 1) Find the mass of a clean and dry 250-mL beaker. Label with your name and period.
- 2) Add approximately 8 g of copper (II) chloride crystals to the beaker. Find the mass.
- 3) Obtain two clean, dry nails. If the nails are not clean, use a piece of sandpaper to make the surface of the nail shiny. Find the mass of the nails.
- 4) Add enough distilled water to the beaker so that the nails will be covered. Mix.
- 5) Place the nails into the copper (II) chloride solution. Leave them undisturbed for approximately 20 min.
- 6) Use tongs to carefully pick up the nails, one at a time. Use distilled water in a wash bottle to rinse off any remaining copper from the nails before removing them completely from the beaker. If necessary, use a stirring rod to scrape any excess copper from the nails. Set the nails aside to dry on a paper towel.
- 7) After the nails are completely dry, find the mass of the nails.
- 8) Carefully decant the liquid from the solid. Pour the liquid into another beaker so that in case you overpour, you can still recover the solid.
- 9) After decanting, rinse the solid again with about 25 mL of distilled water. Decant again. Repeat this step three or four times.
- 10) Next, wash the solid with about 25 mL of 1 M hydrochloric acid. Decant again; then, once more, clean the solid with 25 mL of distilled water.
- 11) After the final washing with water, place the copper in a drying oven to dry.
- 12) Allow the copper to become completely dry, then find the mass of the beaker plus the copper and record it.
- 13) Clean up.

### Data Table

Before the reaction	
Mass of empty, dry beaker	
Mass of beaker + copper (II) chloride	
Mass of two iron nails	
After the reaction	
Mass of two iron nails	
Mass of beaker + copper (dry)	

### **Postlab Questions**

1) Find the following masses. Show all of your work.

Mass of iron used in the reaction

Mass of copper(II) chloride used

Mass of copper produced

2) Find the number of moles of the following. Show all of your work.

Moles of iron used

Moles of copper produced

3) Find the number of atoms of each of the following. Show all of your work.

Atoms of iron used

Atoms of copper produced

4) Calculate the ratio of moles of copper produced to moles of iron used.

5) Was there any evidence that some of the copper (II) chloride was left in the beaker? Explain.

### **Taking it a little bit farther**

If you have an unlimited amount of copper (II) chloride and add 2.50 g of iron how many grams of copper metal can be formed?