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## Experiment 6 – Precipitation of Strontium Sulfate

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In this experiment, you will study a precipitation reaction between sodium sulfate and strontium chloride. You will collect, dry, and weigh the precipitate and compare this experimental yield to the theoretical yield.

### Procedure

Weigh a clean, dry, 100-mL beaker. Add about 0.25 g (0.350 g max!) of solid sodium sulfate to the beaker and weigh it again. Dissolve the sodium sulfate in about 20 mL of D.I. water. Add 5 mL of 0.5 M strontium chloride solution and heat for fifteen minutes. Try to keep the mixture from boiling.

After the heating period has passed for the mixture, set it aside to return to room temperature, and then cool it further by putting the beaker in a cold water bath. Your precipitate should settle to the bottom, leaving a relatively clear solution above it. Obtain a piece of filter paper and weigh it on the analytical balance.

Set up a vacuum filtration apparatus with a Büchner funnel and your weighed filter paper (your instructor will show you how). Using a stirring rod to guide the stream of liquid, pour the contents of the beaker into the Büchner funnel. Use your wash bottle (filled with D.I. water) to rinse any solid out of the beaker and into the filter. Make sure no precipitate remains in the beaker or on the stirring rod. Fill the beaker with 15 mL of D.I. water, swirl it around, and then pour it into the filter. Repeat the washing process, and then draw air through the funnel for a few minutes to help dry the crystals.

Turn off the vacuum, carefully remove the filter paper containing your precipitate with a spatula, and place it over a watch glass. Fill a 100-mL beaker half-way with water, place the watch glass with filter paper over the beaker, and heat to boil for twenty minutes to dry the precipitate (alternatively, you can place the watch glass with filter paper in a drying oven at 130 °C for twenty minutes).

Allow to cool, then determine the mass of your precipitate. Heat for another five minutes, cool, and reweigh. The two weights should agree within  $\pm 0.050$  g or a third heating should be done.

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

Section: \_\_\_\_\_

Data and Calculations for Experiment 6

1. Weight of empty beaker \_\_\_\_\_
2. Weight of beaker and sodium sulfate \_\_\_\_\_
3. Weight of sodium sulfate \_\_\_\_\_

Show Calculation \_\_\_\_\_

4. Moles of sodium sulfate  
  
Show Calculation \_\_\_\_\_

5. Moles of strontium chloride  
moles  $\text{SrCl}_2 = (5 \text{ mL})(10^{-3}/\text{m})(0.5 \text{ M})$   
  
Show Calculation \_\_\_\_\_

6. Write a balanced MOLECULAR equation for the reaction:

7. Write a balanced NET-IONIC equation for the reaction:

8. Weight of empty filter paper \_\_\_\_\_
9. Weight of filter paper and dried precipitate (first time) \_\_\_\_\_  
Weight of filter paper and dried precipitate (second time) \_\_\_\_\_  
Weight of filter paper and dried precipitate (third time) \_\_\_\_\_

10. Weight of precipitate  
  
Show Calculation \_\_\_\_\_

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

Section: \_\_\_\_\_

11. Determine the theoretical yield (in grams) of strontium sulfate. What is your limiting reactant and excess reactant?

Limiting Reactant: \_\_\_\_\_ Excess Reactant: \_\_\_\_\_

Show Calculation (theoretical product yield) \_\_\_\_\_

12. Determine the percentage yield of your reaction.

Show Calculation \_\_\_\_\_

13. What would have resulted from using half as much  $\text{SrCl}_2(\text{aq})$ ?

Show Calculation \_\_\_\_\_

14. What would have resulted from using twice as much  $\text{SrCl}_2(\text{aq})$ ?

Show Calculation \_\_\_\_\_

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

Section: \_\_\_\_\_

15. Briefly describe how you could have improved your percentage yield in this experiment.

16. In your own words, write a cohesive, well-written summary of the background material and underlying chemical principles pertinent to this experiment. If additional space is needed, please use the back of this page. (For additional guidelines on writing this introduction, please refer to the **Moorpark College Chemistry Department Laboratory Report Rubric** found in the lab manual and department website.)