Freezing Point Depression and Heat of Solution

Purpose

To demonstrate the freezing point depression of a solution, along with the concepts of heat of solution and entropy.

Materials

9 *M* sulfuric acid

ice (0°C)

ice water (0°C)

2 thermometers

2 styrofoam cup

Procedure

1. Place 100 g of water in one cup and 100 g of ice in the other. Place a thermometer in each and read the temperatures.
2. Pour 100 mL of the sulfuric acid in each cup. Read the temperatures of each.

Additional Information

1. The heat of solution should cause the acid-water to increase in temperature to ~20 C.
2. The freezing point depression of the solution should cause the temperature of the ice-acid to decrease to about -15 C. The heat generated will melt the ice.

Questions for the Students

1. Ask the students to predict the temperature change in each cup.
2. Ask the students why they believe there to be such a large difference in the temperatures of each solution.

Disposal

Acid solution should be diluted and poured down the drain with excess water.

Reference

Summerlin, L., Borgford, C., & Ealy J. Chemical Demonstrations: A Sourcebook for Teachers, Volume 2, Second Edition, 1988.