

CALORIMETRY LAB

I. Assignment

Read the Instruction Manual for Solution Calorimeter and design experiments to measure the following:

1. Determine the heat of solution of solid potassium nitrate, when dissolved in water.
2. Measure and compare the change in enthalpy for solid sodium sulfate when dissolved in aqueous solutions of the following:
 - a. barium chloride dehydrate
 - b. magnesium chloride hexahydrate
 - c. calcium chloride

When you design your experiment in this part think about the following questions:

For each of the runs (2a-2c) you will need to measure both reactants. Which one of the two reactants, sodium sulfate or one of the chlorides, will be in excess in your experiments?

To compare enthalpies for these reactions what would be more convenient to use the same number of grams of solids in a-c or the same number of moles?

II. Pre-lab

To use the calorimeter you will need to go over the whole manual.

For the summary, focus on

- pages 4-3 to 4-6 – (1) you will use calculated jacket temperature; (2) skip part on Manual Test Sequencing; you will use Automatic Test Sequencing
- Pages 6-1 to 6-3 – (1) you will start your experiment with standardization using TRIS as described in page 6-1; (2) skip the part on **Reading the Thermogram** – the calorimeter will report ΔT_c value

Before you come to class, you will also need to perform all necessary calculations and prepare the table showing amounts of salt that you plan to use in every experiment. The calorimeter holds 100 mL of water or solution. Make sure that all solutions that you are planning to make are diluted (0.1-0.05M).