

## LAB 20, HEAT OF FUSION

Name \_\_\_\_\_ Period \_\_\_\_\_

The number of calories needed to melt one gram of any substance at its normal melting point without any temperature change is called its **heat of fusion**. In this experiment the heat of fusion of ice will be determined by using the method of mixtures. The temperature drop of a given amount of hot water in a calorimeter when a certain quantity of ice is added will be measured. The heat lost by the water does two things: **(1) it melts the ice; (2) it warms the water formed by the melting ice from 0°C up to the final temperature.**

### OBJECTIVE:

After completing this experiment, you should be able to determine the heat of fusion of ice.

### PROCEDURE:

1. Find the mass of the empty calorimeter cup and record it in the data table.

**WARNING:** Thermometers break very easily! Keep them away from the edges of the table! Do not leave them unattended in a beaker or cup!

2. Fill the cup **HALF FULL** of water that has a temperature of about **35 °C**, and record the mass of the calorimeter cup and water. *Warm water may be obtained from the demo table.*

3. Now with a thermometer, stir the water in the calorimeter and record its exact temperature.

4. Take two ice cubes and put them into the calorimeter carefully so that there is no splashing.

5. **Carefully** stir until all the ice is melted and record the **lowest temperature** reached.

6. Mass the cup containing the **water** and the **melt water** and record it.

**Data Table**

Mass of Empty Cup (g)	Mass of Cup + Water (g)	Mass of Cup + water + melt water (g)	Initial temp of water °C	Final temp of water °C
.	.	.	.	.

**CALCULATIONS:**

1. Calculate the temperature change,  $\Delta t$ , of the water in the cup and record it in the calculations table below.
2. Using the following equation, calculate on the back, **SHOWING YOUR METHOD** (1,2,3,4) the heat of fusion of ice (**x**):

$$Q(g) = Q(l)$$

Melt ice + the melt water = Water in cup

$$m \quad x \quad + \quad m \quad c \quad \Delta t \quad = \quad m \quad c \quad \Delta t$$

**Note:** The mass of the ice = the mass of the melt water.

8. Calculate your percentage error.

**HINT:** Percent error = your error/accepted value X 100%. The accepted value is 80 calories/gram).

**Calculations Table**

Mass of water in cup (g)	Mass of ice (g)	$\Delta t$ for water in cup C°	Calculated Ht of Fusion (cal/g)	Accepted Value (cal/g)	Your Error (cal/g)	% Error
.	.	.	.	80 cal/g	.	.

**QUESTION:**

1. Since heat of fusion does not result in a temperature change, where does the energy go?

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**CRITIQUE:**