

**HEAT or ENTHALPY OF FUSION**

REF: *Chemistry, 7th ed.*, Zumdahl & Zumdahl, especially chapters 6 & 10

EQUIPMENT: coffee-cup calorimeter  
any other equipment in your lab drawer and/or in the laboratory

MATERIALS: ice, H<sub>2</sub>O(s)  
any other substances that are normally available in the laboratory

**INTRODUCTION**

The energy required to change a solid into a liquid is called the *heat of fusion* or *enthalpy of fusion*. Pure substances, such as water, have specific values for this property. The units for this property are typically kJ/mol.

**PROCEDURE**

- Experimentally determine the enthalpy of fusion for water in kJ/mol.
  - Record values that you measure from your experiment(s) on the page labeled DATA.
  - Show calculations that clearly connect your data to your conclusion on the page labeled CALCULATIONS.
- You may use any or all of the references, equipment and/or materials listed on this page.
- Assume that the calorimeter is a perfect insulator, and no heat is exchanged between anything contained in the calorimeter and the calorimeter itself.
- Work on small groups; 3 students per group is the optimal size.

**GRADING RUBRIC**

A **10-point** Lab Report will have the following attributes:

1. proper significant figures and units are used throughout
2. calculations are shown; calculations are correct; no math errors
3. unreasonable results are noted and discarded; an explanation is attempted
4. conclusion reasonably follows from experimental results
5. written answers are detailed and thorough; complete sentences are used; work is legible

In general, 1 point will be deducted from the 10 points for each error or omission listed above.

Other deductions specific to this experiment:

6. conclusion does not follow from experiment; conclusion is simply published value .....-10
7. report is illegible; report cannot be reasonably interpreted .....-5
8. experimental and/or math processes incorrect or insufficient .....-2
9. experimental value / conclusion is within:
  - a. ±10% of theoretical value .....-0
  - b. ±20% of theoretical value .....-1
  - c. ±30% or greater of theoretical value .....-2

**DATA**

*Record values on this page that you measured from your experiment(s). Don't forget to clearly indicate units and to identify what each value is. If you perform more than one experiment, be sure to clearly indicate which values are associated with which experiment. If you need more space, attach an additional sheet to this report; clearly label this extra page as DATA.*

**CALCULATIONS**

*Show your calculations here that clearly connect your data to your conclusion. Don't forget to use appropriate units and significant digits. If you need more space, attach an additional sheet to this report; clearly label this extra page as CALCULATIONS.*

**CONCLUSION**

*Report your experimentally-determined value here. Again, don't forget units and appropriate significant digits.*

Enthalpy of Fusion for Water = \_\_\_\_\_