**Chemistry 1A Experiment 15**

Lab Instructor: Name:

**DATA – Part 1**

|  |  |  |
| --- | --- | --- |
|  | Trial 1 | Trial 2 |
| 1. Mass of empty calorimeter |  |  |
| 2. Mass of calorimeter plus water |  |  |
| 3. Mass of water in calorimeter |  |  |
| 4. Initial temperature of water in calorimeter (± 0.1°C) |  |  |
| 5. Temperature after ice has melted (± 0.1°C) |  |  |
| 6. Mass of calorimeter and contents after ice has melted |  |  |
| 7. Mass of ice |  |  |

**DATA – Part 2**

|  |  |  |
| --- | --- | --- |
|  | NH4Cl | Na2CO3 |
| 8. Mass of empty calorimeter |  |  |
| 9. Mass of calorimeter and water |  |  |
| 10. Mass of water in calorimeter |  |  |
| 11. Mass of solid used |  |  |
| 12. Initial temperature of water in calorimeter (± 0.1°C) |  |  |
| 13. Final temperature of solution in calorimeter (± 0.1°C) |  |  |

**CALCULATIONS (Show all calculation setups, including units)**

|  |  |
| --- | --- |
| **Show work here** | **Result** |
| 14. Calculate the heat of fusion of ice in J/g for each trial. | Trial 1 |
| Trial 2 |
| 15. Average ∆Hfus of ice |  |
| 16. Percent error in ∆Hfus of ice |  |
| 17. List of student results for ∆Hfus of ice |
| 18. Standard deviation of student results (show calculation) |  |
| 19. Calculate the ∆Hsoln of NH4Cl, in kJ/mol. Include sign. |  |
| 22. Calculate the ∆Hsoln of Na2CO3, in kJ/mol. Include sign. |  |

**Questions:**

**Part 1**

1. If you accounted for the fact that a small amount of the ice added was already melted, how would the calculated heat of fusion change: would it be less than or greater than the value found in the original calculation? Explain thoroughly.

2. How could you determine the heat of vaporization of water at 100°C in a similar experiment? Explain thoroughly.

3. Once you have calculated the standard deviation of the student results for the class, explain its significance. (We have 95% confidence that the true value of ∆Hfus lies between and , assuming only random errors.)

**Part 2**

4. Which solute gave off heat as it dissolved? Explain where this heat came from.

**Evaluation of Results**

5. Discuss the most likely sources of error in this experiment. Include assumptions we make in the calculations that may not necessarily be valid.