Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

Foundations Physical Science

Lab: Heats of Solution

AIM:- To find out the heat of solution of ammonium nitrate, and calcium chloride.

APPARATUS: - Polystyrene cup, thermometer, measuring cylinder.

CHEMICALS: - Ammonium nitrate, sodium hydroxide, calcium chloride and tap water.

PROCEDURES:-

1. Weigh out 8 grams of ammonium nitrate. If you get a mass of around 8g, that is fine, just record your mass! DO NOT put any solid back into the container once it is poured out.
2. Collect 100 mL of tap water and measure its temperature (Ti). Then add to the Styrofoam cup calorimeter.



1. Stir the mixture to dissolve the 8g of ammonium nitrate in 100 mL of distilled water and find the highest or lowest temperature as the solid is dissolving.
2. Assuming that 1cm3 of water is equal to 1g of water and the specific heat capacity of the solution is equal to 4.2J/goC, calculate the heat change in this experiment is equal to Q = mass of water (100g) X specific heat capacity (4.2) X temperature difference.
3. Repeat procedures 1-4 for sodium hydroxide and calcium chloride.

NOTE:- Heat of solution is the quantity of heat energy (Q) liberated (exothermic) or absorbed (endothermic) by dissolving any compound. Q = mc **ΔT**

Data Table: Calculating the Heat of solutions for three solids.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Mass of solid****(g)** | **Specific heat of water****(J/goC)** | **Temperature of tap water****(oC)** | **Temperature of solution****(oC)** | **Change in Temperature****(Tf-Ti= ΔT=)** | **Heat of solution****(J)** | **Heat of solution per gram of solid****(J/g)** |
| **Ammonium Nitrate**  |  |  | **Ti=** | **Tf=** | **ΔT=** |  |  |
| **Calcium Chloride** |  |  | **Ti=** | **Tf=** | **ΔT=** |  |  |

ANSWER THE FOLLOWING QUESTIONS.

1. Calculate the heat of solution for each of the solids. Insert your answer in the table.

(Show your work below Q=mC **ΔT**)

Energy = (mass of water)(specific heat of water)(change in temperature)

1. Which if the following solids has an exothermic (water warms up) heat of solution?
2. Which of the following solids has an endothermic (water cools down) heat of solution?
3. What are some of the why the temperature change might not be as accurate as we might like?