Name_____ Date_____Period_____
Regents Chemistry
Long Beach High School Laboratory Experiment #_____

Heat of Reaction of Supersaturated Sodium Acetate (Hand Warmers Lab)

$$NaC_2H_3O_{2(aq)} + 3H_2O \rightarrow NaC_2H_3O_2 \cdot 3H_2O_{(s)} + heat$$

Guiding Question: This reaction generates heat used for a hand warmer. How much heat is liberated from a common hand warmer?

Prelab Questions:

1. Is this reaction endothermic or exothermic? How can you tell?

2. What should be the sign of the heat, + or -?

3. Find the molar mass of $NaC_2H_3O_2 \cdot 3H_2O_{(s)}$

Procedure: When working with the hand warmer, it is important that you do not start the reaction early.

1. Mass the hand warmer.

   Mass of handwarmer: _____

2. Add 200g of water to a coffee cup and record the exact mass added.

   Mass of water: _____

3. Measure the initial temperature of the water.

   Initial Temperature of water: _____

4. Crinkle the metal clip in the hand warmer and fold the hand warmer in half and submerge in the water.
5. Quickly top the coffee cup and insert the thermometer. Stir with the thermometer.
6. Find and record the highest temperature of water.

   Final Temperature of water: _____

Calculations:

1. Calculate the heat of the surroundings (water) in **Joules**.

2. Calculate the heat of the system (hand warmer) in **kJ**.

3. Calculate the moles of acetate in the handwarmer.

4. Calculate the heat of the system (hand warmer) in **kJ/mol**. (Use moles of $NaC_2H_3O_2 \cdot 3H_2O_{(s)}$)

5. This reaction should produce 19.7 KJ/mol. Calculate your percent error.

6. Explain the direction of heat flow while the hand warmer is in use.