**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Heat of Reaction**

Guiding Question: How much heat is absorbed or released when 0.100 moles of NaOH and NH4Cl are dissolved in water?

Pre-Lab Questions:

1. Calculate the number of grams of NaOH that are equivalent to 0.100 moles of NaOH.
2. Calculate the number of grams of NH4Cl that are equivalent to 0.100 moles of NH4Cl.

Materials: Calorimeter, thermometer, cylinder, NaOH , NH4Cl.

Procedure:

1. Measure approximately 100mL of water into a cylinder and pour into the calorimeter.
2. Record the initial temperature of the water.
3. Measure out exactly 0.100 moles of NaOH and place it into the calorimeter.
4. While mixing, find the highest or lowest temperature.
5. Rinse and dry the calorimeter.
6. Repeat steps 1-5 with 0.100moles of NH4Cl.

**Data**

|  | **NaOH** | **NH4Cl** |
| --- | --- | --- |
| **Volume of water** |  |  |
| **Initial temperature of water** |  |  |
| **Mass of solute** |  |  |
| **Final temperature of solution** |  |  |

Questions: Show work, units and sigfigs.

1. Using q=mcΔT, calculate the heat absorbed by water when dissolving NaOH.
2. Calculate the heat released by the NaOH in kJ/mol.
3. Using Table I, Write out the reaction of dissolving NaOH with your heat as either the reactant or product (depending on if the reaction is endothermic or exothermic).
4. Using table I, calculate your percent error of the heat of dissolving NaOH.
5. Using q=mcΔT, calculate the heat change of water when dissolving NH4Cl.
6. Calculate the heat change of the NH4Cl in kJ/mol.
7. Using Table I, write out the reaction of dissolving NH4Cl with your heat as either the reactant or product.
8. Using table I, calculate your percent error of the heat of dissolving NH4Cl.
9. Draw a model that represents how heat is transferred between the NH4Cl and the water as it dissolves.
10. Sketch potential energy diagrams that would depict the energy of the dissolving of NaOH and NH4Cl.



**NaOH(s) 🡪 Na+(aq) + OH-(aq) NH4Cl(s) 🡪 NH4+(aq) + Cl-(aq)**

