Physical Science

For Absences - Calorimetry Lab Simulation

Goal: To better understand calorimetry experiments

Instructions:

1. Obtain a computer and open a internet browser page
2. Go to the page [www.chem.iastate.edu/group/Greenbowe/sections/projectfolder/animationsindex.htm](http://www.chem.iastate.edu/group/Greenbowe/sections/projectfolder/animationsindex.htm)

OR google “Greenbowe” and click on the “animationsindex- Iowa State University” page

1. Scroll Down to the “Thermochemistry” menu
2. Click on **“Heat of Solution experiments”** and close the blue and white pop-up box
3. First use the compound ammonium nitrate, **“NH4NO3”**
4. Use the scroll bar in the “compounds” box to change the mass to **5.00g**
5. Use the scroll bar in the “water” box to change the volume to **100.00 mL**
6. Record the Initial Temperature and Final Temperature in the table below.

|  |  |
| --- | --- |
| Mass of NH4NO3 (g) |  |
| volume of water (mL) |  |
| Total Mass (Mass of NH4NO3 + volume of water (g)) |  |
| Initial Temperature (ºC) |  |
| Final Temperature (ºC) |  |
| ∆T = Change in Temperature (ºC) [subtract final T – initial T] |  |

Using the information in the table above, solve for the amount of heat released (Q) in Joules, using the formula Q = mCΔT (the specific heat of water is 4.184 J/gºC)

|  |  |  |  |
| --- | --- | --- | --- |
| Given/Unknown | Equation | Substitution | Answer with Units |
|  |  |  |  |

1. Did the temperature value increase or decrease?
2. Heat is released from the reaction if the temperature increases and absorbed by the system if the temperature decreases. In the reaction with NH4NO3, was heat released or absorbed?
3. If reactions where heat is released are called “exothermic” and reactions where heat is absorbed are called “endothermic” would this reaction be considered exothermic or endothermic?

Repeat the same experiment, but change the salt first to Calcium Chloride (CaCl2)

|  |  |
| --- | --- |
| Mass of CaCl2 (g) |  |
| volume of water (mL) |  |
| Total Mass (Mass of CaCl2 + volume of water (g) |  |
| Initial Temperature (ºC) |  |
| Final Temperature (ºC) |  |
| ∆T = Change in Temperature (ºC) [subtract final T – initial T] |  |

Using the information in the table above, solve for the amount of heat released (Q) in Joules, using the formula Q = mCΔT (the specific heat of water is 4.184 J/gºC)

|  |  |  |  |
| --- | --- | --- | --- |
| Given/Unknown | Equation | Substitution | Answer with Units |
|  |  |  |  |

1. Did the temperature value increase or decrease?
2. Heat is released from the reaction if the temperature increases and absorbed by the system if the temperature decreases. In the reaction with NH4NO3, was heat released or absorbed?
3. If reactions where heat is released are called “exothermic” and reactions where heat is absorbed are called “endothermic” would this reaction be considered exothermic or endothermic?