Revised August 2011

AP LAB 9a: Enthalpy Changes

Aim To calculate values for the enthalpy changes occurring in two reactions

Apparatus Insulated cup, thermometer, stirring rod, electronic balance, measuring cylinder

Chemicals 1.00 M citric acid solution, 0.200 M $CuSO_4$ solution, zinc granules, sodium hydrogen carbonate powder

Method

EXPT A

1. Using a measuring cylinder place 100. mL of 0.200 M $CuSO_4$ solution into an insulated cup.
2. Record the initial temperature of the $CuSO_4$ solution.
3. Add 2.00 g (an excess) of zinc granules and stir the contents of the cup.
4. Record the **highest** temperature reached.

EXPT B

1. Using a measuring cylinder place 100. mL of 1.00 M citric acid ($C_6H_8O_7$) solution into an insulated cup.
2. Record the initial temperature of the citric acid.
3. Add, **a little at a time each time allowing the effervescence to subside**, 26.0 g (an excess) of sodium hydrogen carbonate powder and stir the contents of the cup.
4. Record the **lowest** temperature reached.

Results

	EXPT A	EXPT B
Initial Temperature in K		
Final Temperature in K **(After mixing)**		
Change in K		

Conclusion/Calculation

1. Using the equation

$$q = m\ c\ \Delta T$$

Where;

m = mass of solution (assume density of solutions to be 1.00 g mL^{-1})
c = specific heat capacity of the solutions (assume to be 4.18 kJ kg^{-1} K^{-1})
ΔT = temp change (and is calculated by subtracting the **final temperature from the initial temperature**)

Calculate the heat change (q) in each of your experiments.

EXPT A

EXPT B

2. Using your answers from question #1, calculate the ΔH for the following reactions.