Procedure

The Temperature will be monitored using the Logger Pro program. Open the program on the Mac and, if the Temperature probe is properly connected, you will see a screen labeled Temperature vs. time. The program is now ready for data acquisition.

When you want to acquire data you click on the start button (green arrow). When you are finished collecting a data set, click stop (red square).

For reaction (1) you should use 100.0 mL of 1 M HCl and 0.07 g of Mg For reaction (2) you should use 100.0 mL of 1 M HCl and .25 g of MgO Record the exact masses of each solid reagent. Run each experiment 3 times.

Data

You will need to construct your own data tables for this lab. You are going to perform the heat of reaction with Mg three times and the heat of reaction with MgO three times. Carefully consider all of the data you will need for all three trials when you prepare your data tables.

Print a copy of your graphs of temperature vs time for each of include in your lab writeup. Analysis and Calculations:

Analysis and Calculations:

Use the data you collected b calculate the entirely Change/mol ($\Delta H^{o}_{rxn}/mole$) for Mg or MgO for each advidual trial

 $\Delta H_{rxn}/mole = - (s_{water} \times m_{water} \times \Delta T_{water} + C_{cal} \times \Delta T_{cal})/moles of reactant (Mg or MgO)$ solid)

Don't average the change in temperature (ΔT_{cal}) and don't average the mass. Do 6 separate calculations. Three for Mg and three for MgO. Show all calculations and clearly indicate your answers.

- 2. Determine an average value of ΔH^{o}_{rxn} /mole for Mg and MgO from your three trials for each.
- 3. Using the answer from question 2 along with the enthalpy of formation for water (given earlier in the lab) use Hess's law to calculate the enthalpy of formation for magnesium oxide (see equations 1-4 on pages 1 and 2).
- 4. Compare your value of the enthalpy of formation of magnesium oxide to the value in your text. Determine a value for percent error.

Show all your calculations and clearly indicate your answer.

Results

See the lab report format for a description of the results table.