

Heats of Reaction for the Combustion of Magnesium

Chemistry 30 Lab

Name _____ Partner _____ Score _____

Purpose:

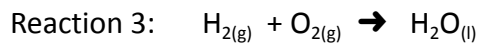
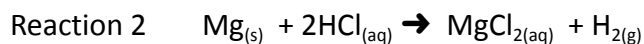
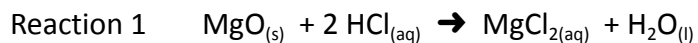
- To determine a lab value for the heat of reaction for the combustion of magnesium.
- To determine the percentage error for this procedure
- To explain reasons why for the percentage error

Prelab:

The theoretical value for the enthalpy of formation of magnesium oxide is



Manipulate the equations below to find the enthalpy of formation of magnesium oxide. It should be the same value as given above!



Materials

- $\text{MgO}_{(s)}$, $\text{Mg}_{(s)}$ and $1.00 \frac{\text{mol}}{\text{L}} \text{HCl}_{(aq)}$
- Thermometer(s)
- Styrofoam cups

Procedure:

- For Reaction 1 above, combine 1.00 g of magnesium oxide with 100 mL of $1.00 \frac{\text{mol}}{\text{L}} \text{HCl}_{(aq)}$ in a Styrofoam cup. Stir.
 - Be sure to measure the temperature of the acid before the reaction occurs and record
 - Be sure to measure the highest temperature of the mixture as the reaction progresses and record.
 - The products can be flushed down the drain once the reaction is complete.
- For Reaction 2 above, combine 0.50 g of magnesium metal with 100 mL of $1.00 \frac{\text{mol}}{\text{L}} \text{HCl}_{(aq)}$ in a Styrofoam cup. Stir.
 - Be sure to measure the temperature of the acid before the reaction occurs and record
 - Be sure to measure the highest temperature of the mixture as the reaction progresses and record.
 - The products can be flushed down the drain once the reaction is complete.
- Reaction 3 will not be done. Use the heat of formation given in the data booklet for this reaction.

Observation Table:

Reaction 1

Mass of magnesium oxide used	Initial temperature of acid	Final temperature of mixture

Reaction 2

Mass of magnesium metal	Initial temperature of acid	Final temperature of mixture

Analysis:

The $\text{HCl}_{(\text{aq})}$ will be treated as if it is the water of a calorimeter. Use its specific heat capacity as

$$4.19 \frac{\text{kJ}}{\text{kg}^\circ\text{C}}$$

- Calculate the enthalpy of the reaction for
 - Reaction 1
 - Reaction 2.
- Use this information and the theoretical value for Reaction 3 to determine the experimental value for the enthalpy of combustion of magnesium.
- Calculate the percentage error in the value found in step 2.
- Justify the percentage error found in step 3. Do NOT give the excuse that you may have made errors in measuring.