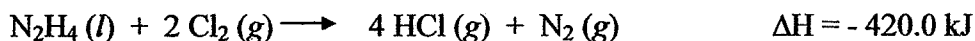


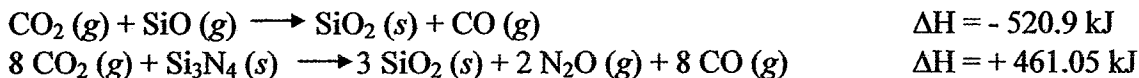
Thermochemistry Practice #1

- A 2.05 g solid is heated to 74.21°C and immersed in 26.05 g H₂O in a constant-pressure calorimeter. The initial temperature of the water is 27.20°C and $c_{\text{solid}} = 0.519 \text{ J/g K}$.
 - What is the change in temperature for the water and the solid?
 - Does this answer make sense?
- A 0.1964 g sample of quinine (C₆H₄O₂) is burned in a bomb calorimeter that has a heat capacity of 1.56 kJ/K. The temperature of the calorimeter increases by 3.2 K. Calculate the heat of combustion of quinine per gram and per mole.
- The specific heat capacities of hafnium and ethanol are 0.146 J g⁻¹ K⁻¹ and 2.45 J g⁻¹ K⁻¹, respectively. A piece of hot hafnium weighing 15.6 g at a temperature of 160.0°C is dropped into 125 g of ethanol that has an initial temperature of 20.0°C. What is the final temperature that is reached, assuming no heat loss to surroundings?
- The generation of 1430 J of heat inside a calorimeter causes the temperature to increase by 1.93°C. What is the heat capacity of the calorimeter?
- The dissolution of a small amount of salt in the water in the calorimeter described in question 4 causes a temperature rise of 3.46°C. What amount of heat was evolved in the dissolution of the salt?
- Hydrazine (N₂H₄) reacts with chlorine gas according to the following equation.



Calculate the change in enthalpy for this reaction under each of the following conditions.

- 25.4 g hydrazine reacts with excess chlorine
 - 1.45 mol HCl (g) is generated
- Given the following two reactions and corresponding enthalpy changes,



Compute the change in enthalpy for the following reaction.



- Using the table of ΔH_f° values, determine the standard heats of reaction for the following processes at 25°C and 1 atm.
 - The combustion of propane (C₃H₈) gas.
 - The vaporization of water.