1. Find the work in Joules done by an ideal gas expanding from 1.00 L to 5.00 L…

a. against a vacuum.

b. against a constant pressure of 2.00 atm.

2. A gas is compressed from 10.00 L to 3.00 L at a constant pressure of 2.75 atm. If 953 J of heat escape the container, what is the energy change for the gas?

3. When 26.7 g of H2S was burned in excess oxygen, 406 kJ was released. What is H for the following equation?

2 H2S(g) + 3 O2(g) 🡪 2 SO2(g) + 2 H2O(g)

4. Calculate the heat released when 266 g of white phosphorus burns in air, given the equation

P4 (s) + 5 O2 (g) 🡪 P4O10 (s) H = -3013 kJ/mol

5. A 1.50 g sample of an unknown substance is burned in a constant-volume bomb calorimeter. The temperature of the water in the calorimeter rises from 18.0oC to 21.4oC. The calorimeter, including the water, has a heat capacity of 305.7 J/oC. If the substance has a molar mass of 42.0 g/mol, find the molar heat of combustion of the substance.

6. How much heat energy is needed to heat 50.0 g of ice at -15.0oC to steam at 125oC?

(heat of fusion = 6.01 kJ/mol, heat of vaporization = 40.8 kJ/mol)

7. Look up standard heats of formation in order to find the following heats of reaction.

a. Mg +2 HCl 🡪 MgCl2 + H2

b. C3H8 + 5 O2 🡪 3 CO2 + 4 H2O

c. H2CO3 🡪 H2O + CO2

8. What is the value for ΔH for the following reaction?   
CS 2 (l) + 2 O 2 (g) → CO 2(g) + 2 SO 2 (g)   
  
Given:   
C(s) + O 2 (g) → CO 2 (g); ΔH f = -393.5 kJ/mol   
S(s) + O 2 (g) → SO 2 (g); ΔH f = -296.8 kJ/mol   
C(s) + 2 S(s) → CS 2 (l); ΔH f = 87.9 kJ/mol