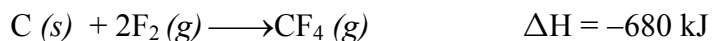
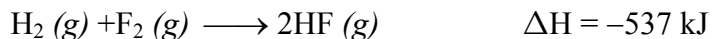


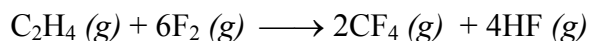
These problems are not meant to introduce the problems associated with thermochemistry. You should already have been introduced to the concepts in your lecture. These are just problems for extra practice. They are presented in random order, on purpose, to let you practice RECOGNIZING what TYPE of problem is in front of you, so that you know how to approach the problem.

Often you will find it much easier when you can identify the type of problem first.

1. From the following enthalpies of reaction:



calculate  $\Delta H$  for the reaction of ethylene with  $\text{F}_2$ :

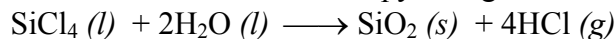


2. When a 4.25-g sample of solid ammonium nitrate dissolves in 60.0 g of water in a coffee-cup calorimeter, the temperature drops from 22.0 °C to 16.9°C. Calculate  $\Delta H$  in (kJ/mol  $\text{NH}_4\text{NO}_3$ ) for the solution process  $\text{NH}_4\text{NO}_3 (s) \longrightarrow \text{NH}_4^+ (aq) + \text{NO}_3^- (aq)$   
Assume that the specific heat of the solution is the same as that of pure water.

3.  $\text{CH}_3\text{OH} (g) \longrightarrow \text{CO} (g) + 2\text{H}_2 (g) \quad \Delta H = +90.7 \text{ kJ}$

Calculate the amount of heat transferred when 45.0 g of  $\text{CH}_3\text{OH} (g)$  are decomposed by this reaction.

4. Calculate the standard enthalpy change for the following reactions:



substance	$\Delta H_f^\circ$ kJ/mol
$\text{SiCl}_4 (l)$	- 640.1
$\text{SiO}_2 (s)$	- 910.9
$\text{HCl} (aq)$	- 167.2
$\text{HCl} (g)$	- 92.30
$\text{H}_2\text{O} (g)$	- 241.82
$\text{H}_2\text{O} (l)$	- 285.83

5.  $2\text{Mg} (s) + \text{O}_2 (g) \longrightarrow 2\text{MgO} (s) \quad \Delta H = -1204 \text{ kJ}$

How many kJ of heat are absorbed when 7.50 g of  $\text{MgO} (s)$  are decomposed into  $\text{Mg} (s)$  &  $\text{O}_2 (g)$ ?

6. Write a balanced equation that corresponds to  $\Delta H_f^\circ$  for  $\text{SO}_2 (g)$ .

7. A 440. g quantity of a certain metal is heated to 100.0 °C. It is immediately thrust into 258 g of water that is initially at 25.0°C. The temperature of the metal-water mixture rises to 36.5 °C. What is the specific heat of the metal? Assume the density of the water is 0.998 g/mL and the specific heat capacity of the water is 4.184 J/g.°C.