**Hess’ Law**

1. Find the ∆Hrxn for the reaction: Sn(s) + Cl2(g) → SnCl4(l)

Sn(s) + Cl2(g) → SnCl2(s) ΔH = -325 kJ   
SnCl2(s) + 2Cl2(g) → SnCl4(l) ΔH = -186 kJ

1. Find the ∆Hrxn for the reaction: 2H2O2(l) → 2H2O(l) + O2(g)

2H2(g) + O2(g) → 2H2O(l) ΔH = -572 kJ   
H2(g) + O2(g) → H2O2(l) ΔH = -188 kJ 

1. Find the ∆Hrxn for the reaction: 2CO(g) + 2NO(g) → 2CO2(g) + N2(g)

2CO(g) + O2(g) → 2CO2(g) ΔH = -566.0 kJ

N2(g) + O2(g) → 2NO(g) ΔH = -180.6 kJ

1. Find the ∆Hrxn for the reaction: 4Al(s) + 3MnO2(s) → 2Al2O3(s) + 3Mn(s)

4Al(s) + 3O2(s) → 2Al2O3(s) ΔH = -3352 kJ

Mn(s) + O2(g) → MnO2(s) ΔH = -521 kJ

1. What is the enthalpy for the following reactions?
   1. 2HF(g) → H2(g) + F2(g)
   2. SO3(g)    +    H2O(g)    →    H2SO4(aq)
   3. 3 NH3(g) + 7O2(g)   → 4NO2(g) + 6H2O(l)
   4. 2H2S(g) + 3O2(g) → 2H2O(l) + 2 SO2(g)
2. Calculate the ∆Hᵒrxn for BaO(s) + SO3(g) → BaSO4(s)

∆Hᵒf (BaO) = -548 kJ/mol

∆Hᵒf (SO3) = -395.7 kJ/mol

∆Hᵒf (BaSO4) = -1473 kJ/mol

1. Calculate the ∆Hᵒrxn for C3H8(g) + 5O2(g) → 3CO2(g) + 4H2O(l)

∆Hᵒf (C3H8) = -103.95 kJ/mol

∆Hᵒf (CO2) = -393.5 kJ/mol

∆Hᵒf (H2O) = -285.8 kJ/mol

**KEY**

**Hess’ Law**

1. Find the ∆Hrxn for the reaction: Sn(s) + Cl2(g) → SnCl4(l)

Sn(s) + Cl2(g) → SnCl2(s) ΔH = -325 kJ   
SnCl2(s) + 2Cl2(g) → SnCl4(l) ΔH = -186 kJ

**ΔH = -511 kJ**

1. Find the ∆Hrxn for the reaction: 2H2O2(l) → 2H2O(l) + O2(g)

2H2(g) + O2(g) → 2H2O(l) ΔH = -572 kJ   
H2(g) + O2(g) → H2O2(l) ΔH = -188 kJ 

**ΔH = -196 kJ**

1. Find the ∆Hrxn for the reaction: 2CO(g) + 2NO(g) → 2CO2(g) + N2(g)

2CO(g) + O2(g) → 2CO2(g) ΔH = -566.0 kJ

N2(g) + O2(g) → 2NO(g) ΔH = -180.6 kJ

**ΔH = -385.4 kJ**

1. Find the ∆Hrxn for the reaction: 4Al(s) + 3MnO2(s) → 2Al2O3(s) + 3Mn(s)

4Al(s) + 3O2(s) → 2Al2O3(s) ΔH = -3352 kJ

Mn(s) + O2(g) → MnO2(s) ΔH = -521 kJ

**ΔH = -1789 kJ**

1. What is the enthalpy for the following reactions?
   1. 2HF(g) → H2(g) + F2(g)

**542 kJ = ∆Hrxn**

* 1. SO3(g)    +    H2O(g)    →    H2SO4(aq)

**-118 kJ = ∆Hrxn**

* 1. 3 NH3(g) + 7O2(g)   → 4NO2(g) + 6H2O(l)

-**1444 kJ = ∆Hrxn**

* 1. 2H2S(g) + 3O2(g) → 2H2O(l) + 2 SO2(g)

**-1124 kJ = ∆Hrxn**

1. Calculate the ∆Hᵒrxn for BaO(s) + SO3(g) → BaSO4(s)

∆Hᵒf (BaO) = -548 kJ/mol

∆Hᵒf (SO3) = -395.7 kJ/mol

∆Hᵒf (BaSO4) = -1473 kJ/mol

**-529.3 kJ = ∆Hrxn**

1. Calculate the ∆Hᵒrxn for C3H8(g) + 5O2(g) → 3CO2(g) + 4H2O(l)

∆Hᵒf (C3H8) = -103.95 kJ/mol

∆Hᵒf (CO2) = -393.5 kJ/mol

∆Hᵒf (H2O) = -285.8 kJ/mol

**-2219.8 kJ = ∆Hrxn**