Honors Chemistry Hour\_\_\_\_\_ Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
Dr. Wexler  
Hess’s Law  
Date\_\_\_\_\_\_\_

Germain Henri Hess (1802 - 1850) is known for his thermochemical studies. **Hess's Law** states that *the heat evolved or absorbed in a chemical process is the same whether the process takes place in one or in several steps*.

**1. Use the thermochemical equations shown below to determine  
the enthalpy for the reaction for N2O4(g) → 2NO2(g)**

½ N2(g) + O2(g) → NO2(g) ΔHo = 33.9 kJ

N2(g) + 2O2(g) → N2O4(g) ΔHo = 9.6 kJ

**2. Use the thermochemical equations shown below to determine  
the enthalpy for the reaction for N2(g) + 3H2(g) → 2NH3(g)**

2NO2(g) + 7H2(g) → 2NH3(g) + 4H2O(l) ΔHo = 142.5 kJ

2NO2(g) → N2(g) + 2O2(g) ΔHo = 82.5 kJ

H2O(l) → H2(g) + ½ O2(g) ΔHo = -43.7 kJ

**3. Use the thermochemical equations shown below to determine  
the enthalpy for the reaction for CH3COOH(l) → 2C(s) + 2H2(g) + O2(g)**

2CO2(g) + 2H2O(l) → CH3COOH(l) + 2O2(g) ΔHo = 3484 kJ

C(s) + O2(g) → CO2(g) ΔHo = -1576 kJ

2H2(g) + O2(g) → 2H2O(l) ΔHo = -2288 kJ