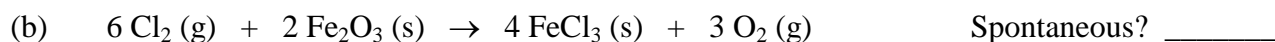


Thermochemistry: Gibbs Free Energy Calculations

1. Calculate ΔG° to predict if the following reactions are spontaneous under standard conditions.



2. Consider the following chemical equation: **A + B → C + D**

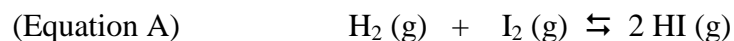
If $\Delta H^\circ = -844 \text{ kJ}$ and $\Delta S^\circ = -165 \text{ J/K}$, is this reaction spontaneous at 298 K ?

3. Consider the following chemical equation: **A + B → C + D**

If $\Delta H^\circ = 572 \text{ kJ}$ and $\Delta S^\circ = 179 \text{ J/K}$, is this reaction spontaneous at 298 K ?

If a reaction is not spontaneous under standard conditions at 298 K, at what temperature (if any) would the reaction become spontaneous?

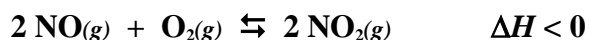
4. Use the green sheet to calculate the ΔG° for each reaction. Then, calculate the K_{eq} at 298 K for each of the following reactions. $\Delta G^\circ = -RT \ln K$ (ΔG° must be in **Joules!**)



5. Based on your values for K_{eq} in the previous problem, which side (reactants or products) of the equilibrium reaction is favored? *Recall that a BIG K_{eq} favors the products side.*

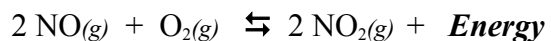
(Equation A) _____ (Equation B) _____

6. Consider the following equation:



(a) Is this an endothermic or exothermic process? Explain your reasoning.

(b) Which equation shown below would best fit the above equation?



(c) Would you expect to ΔS to be positive or negative for this chemical reaction? Explain.