Chem 116
Lecture 24 Notes (JR)

Gibbs Free Energy

- Second law of thermodynamics: Entropy must always increase
(the total of the system and surroundings must increase)

$\Delta G = \Delta H - T\ \Delta S$

- The answer to ΔG determines the spontaneity of a reaction. If the answer is negative, then the reaction is spontaneous. If the answer is positive, then the reaction is not spontaneous.

The number of ΔG will depend on the enthalpy change and the entropy change times the absolute temperature (remember to convert to Kelvin).

Review Session: Monday 1PM (Room is W-1-006)

Look at which factor is determining the sign of ΔG (either enthalpy or entropy change).

- $H_2O(l) \rightarrow H_2O(g)$ is a physical change because it is the same chemical but in a different state.

- It is endothermic since you must put energy into it (goes from a low energy state to a higher energy state).

- The gas state is in more disorder than the liquid state, so for this change the ΔS is positive

What ΔG means:
- Positive ΔG : not spontaneous
- Zero ΔG : at equilibrium
- Negative ΔG : spontaneous