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CHEM 160 THERMODYNAMICS

Key Terms:
ΔG – Gibbs free energy
ΔH – Enthalpy [KJ/mol]
ΔS – Entropy [J/K]

Key Equations:
$\Delta G = \Delta H - T\Delta S$
$S = K \ln W$ (K= Boltzmann = 1.38×10^{-23})
$W = B^N$ (B=#boxes, N=#molecules)
$\Delta G^\circ_{rxn} = [\Sigma \Delta G^\circ_{Products}] - [\Sigma \Delta G^\circ_{Reactants}]$
(Same table for ΔH° and ΔS°) (Σ=Sum of)

Key Concepts:
ΔG > 0 => non-spontaneous
ΔG < 0 => spontaneous

ΔH > 0 => Endothermic
ΔH < 0 => Exothermic

ΔG° , ΔH° , ΔS° => Standard conditions : 1 atm, 1M, 25°C
*These numbers can be read from a table

ΔS (entropy) is defined as the disorder (or randomness) of a system. The second law of thermodynamics states that in a spontaneous process, the total entropy increases (ΔS > 0).

Entropy and Pressure are inversely related; as pressure increases, entropy decreases.

Entropy and Temperature are directly related; as temperature increases, entropy increases.

ΔH	ΔS	ΔG
(-)	(+)	(-)
(+)	(-)	(+)
(+)	(+)	(+)
(-)	(-)	(-)

*How to read the table:
If ΔH (-) and ΔS (+), then ΔG is (-)