N6 – Entropy

Key Concepts About Entropy
#1 - a thermodynamic function that increases as the number of energetically equivalent ways of arranging the components increases, S.
#2 – Random systems have more energy dispersal and are more energetically stable, lower energy, than ordered systems. Therefore, entropy change is favorable when the result is more energy dispersal, when there are more microstate arrangements. When $\Delta S°$ is positive.
#3 – Increase in entropy of the universe is the driving force for spontaneous reactions.
#4 – Nature proceeds toward the states that have the highest probabilities of existing.

Practice Problem:

For the Rx: **$2NO(g) + O_2(g) \rightarrow 2NO_2(g)$**

$\Delta S°_{rxn}$= -146.5 J/mol•K

Calculate the standard molar entropy of $O_2(g)$.

$\Delta S°_{NO(g)}$ = 210.8 J/mol•K , $\Delta S°_{NO2(g)}$ = 240.1 J/mol•K

Some Changes that Increase Entropy
#1 - Products are in a more dispersed arrangement.
#2 - Larger numbers of product molecules than reactant molecules.
#3 - Rxn's that have an increase in temperature (exothermic).
#4 – Products that have more degrees of movement.
#5 – Products that have more molecular complexity.

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