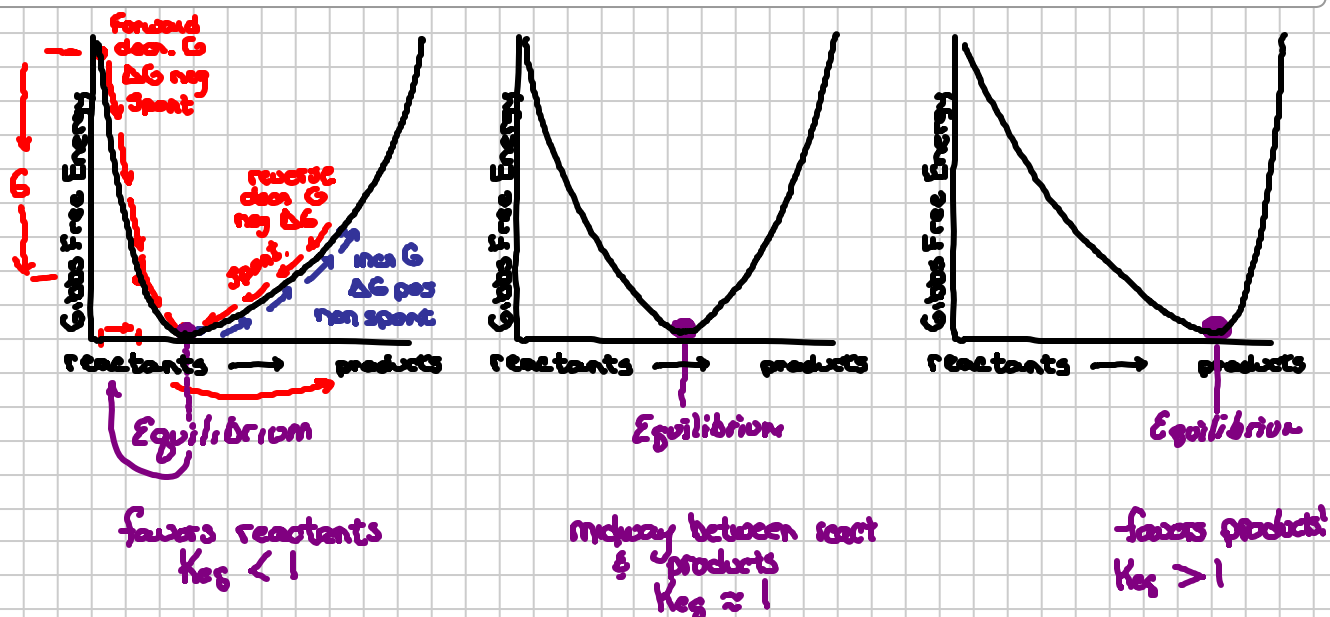


Lecture 19.4 Gibbs Free Energy and Equilibrium

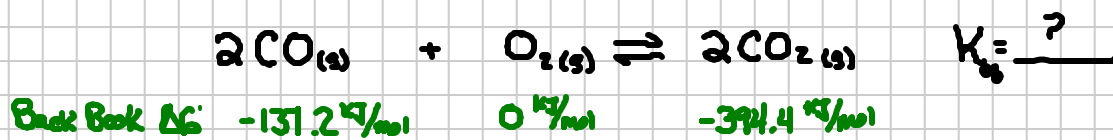
Note Title

3/18/2012



At equilibrium $\Delta G_{rxn} = 0$... $\Delta G_{rxn} = \Delta G_{rxn}^{\circ} + RT \ln Q$
 $Q = K_{eq}$... $0 = \Delta G_{rxn}^{\circ} + RT \ln K_{eq}$
 .. or $K_{eq} = e^{\frac{-\Delta G_{rxn}^{\circ}}{RT}}$
 calc equil. constants from Therm data

- Example: Calculate the equilibrium constant for the following chemical reaction @ 25C under standard conditions:



$$\Delta G_{rxn} = 2(-394.4) - 2(-137.2) - 0 = -514.4 \text{ kJ/mol}$$

$$\Delta G_{rxn} = -514,400 \text{ J/mol}$$

$$K_{eq} = e^{\frac{-\Delta G_{rxn}}{RT}} = e^{\frac{-(-514400)}{(8314)(298.15)}} = \underbrace{1.33 \times 10^{10}}_{\text{HUGE... favors products.}}$$

Completion? rxn.