Thermodynamics

Process

First Law

State Function

Bond Disruption

Bond Formation

Second Law

Will a process occur?
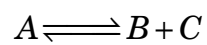

Standard conditions

Equations

$$\Delta G° = -RT \ ln \ K_{eq}$$

$$R = 8.3145 \frac{joules}{mol \bullet K}$$

$$K_{eq} = \frac{[\text{Products}]}{[\text{Reactants}]}$$

$$A \rightleftharpoons B + C$$

$$K_{eq} = \frac{[B][C]}{[A]} \qquad \text{(must use units of } \textbf{\textit{molar}})$$

$$\Delta G = \Delta G° + RT \ ln\left(\frac{[\text{Products}]}{[\text{Reactants}]}\right)$$

1. What is the First Law of thermodynamics?

2. What is the Second Law of thermodynamics?

3. Is the process $2\ H_2 + O_2 \rightleftharpoons 2\ H_2O$ likely to occur spontaneously? Why?

4. Of the terms ΔH, ΔS, ΔG, and $\Delta G°$, which determines whether a process will occur spontaneously?

5. How do ΔG and $\Delta G°$ differ?