Chemical Thermodynamics

Thermochemistry

- Start looking at techniques for chemical systems undergoing change.
- Focus on constant pressure processes
- Evaluate using tabulated heat capacities

Thermochemistry

- Remember heat capacity of an atomic solid.

- From heat capacity, determine entropy.

3rd Law

- 3rd Law of thermodynamics defines the zero point for entropies.

- Absolute reference scale not needed for enthalpies

Phase transitions

- Integrating heat capacities over T works fine until a phase transition is encountered.

- Phase transition results in discontinuities.

Phase transitions

- Consider Gibbs free energy.

- No discontinuities.

Example

- Liquid C_6H_6 boils at Tb = 353 K with $\Delta_{vap}\bar{H}^0$.
  $\bar{C}_p^{\,0}$ (l) = 135.1 J/Kmol and $\bar{C}_p^{\,0}$ (g) = 81.6 J/Kmol
- Calculate $\Delta_{vap}\bar{H}^0$ at 300 K.

Example

- Calculate $\Delta_{vap}\overline{S}^0$ at 300 K.

Generic

- For generic chemical reaction.