Chemical Thermodynamics

Heat transfer

- Heat transfer, q, can be measured through calorimetry.
 - Load bomb
 - Measure T_{init}
 - o Ignite
 - Measure T_{final}
- Constant Volume



Heat transfer

- However, most chemistry is performed at constant pressure.
- Introduce enthalpy, H

Heat transfer

- Enthalpy is a state function
- Evaluate in a similar manner as internal energy U.

Partial derivative

Certain partial derivatives in ∆U and ∆H are not tabulated

 To evaluate we need more information; 2nd law, G and A

Spontaneous Process

Isothermal expansion of an ideal gas





Spontaneous Process

2nd Law and entropy

Differential form

Entropy

Internal energy and entropy

Differential form

Enthalpy and Entropy

Enthalpy and entropy

To determine whether process is allowed need to know entropy change of universe

Gibbs Free energy

Gibbs free energy, G

Need to restrict to constant pressure

Helmholtz Free energy

Helmholtz free energy, A

Need to restrict to constant volume