2.996 Fundamentals of Advanced Energy Conversion Lecture Memo

Lecture number: 5
Date: February 18th, 2004

- **Chemical thermodynamics: Adiabatic flame temperature**
  Enthalpy of reaction
  Low and high heating values

- **Availability of a chemical reaction: Gibbs free energy, efficiency**

- **Direct conversion: Fuel cell**
  Efficiency change with respect to operating temperature
  Reactions in fuel cells
  Electrolyzer

- **Indirect conversion: Carnot cycle efficiency**
  Internal combustion engine (SI)
  Otto cycle efficiencies
  1) **Air standard cycle**
  2) **Fuel/air cycle**
  3) **Complete/incomplete combustions**