2.996 Fundamentals of Advanced Energy Conversion Lecture Memo

Lecture number: 6
Date: February 23rd, 2004

- **Thermodynamics of a fuel cell**
    Maximum work, Ideal electric potential, and Nernest Equation
    Efficiencies: first, second and fuel utilization
    Change of the first law efficiency with changes in Temperature

- **Chemical Equilibrium**
    Constant U,V constraints: Maximization of entropy
    Constant T,P constraints: Minimization of gibbs free energy
    The fundamental equation
    The chemical potential
    Law of mass action
    Equilibrium constant
    Endothermic and exothermic reactions

- **Fuel reforming**
    Steam reforming
    Water gas shift