

Chem 4444a. Assignment 1

Due: Sept. 28, 2009

Review of thermodynamics

1. Use the definition of thermodynamic potential found in your notes and explain why the Helmholtz free energy is the thermodynamic potential for a system that undergoes a process at constant number of moles, volume and temperature.
2. For a system that undergoes a process at constant number of moles, pressure and temperature, show that the Gibbs free energy is the thermodynamic potential.
3. Using the statement of the second law described in your notes explain the statement of the second law of thermodynamics of that the entropy of the universe increases.
4. a) Write down the expressions for the definition of the chemical potential and also provide a physical explanation for the meaning of the chemical potential. b) Is the chemical potential an extensive or intensive property of the system? Provide explanation for your answer.