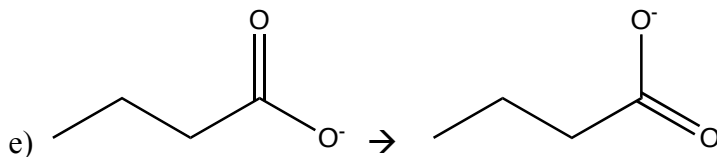
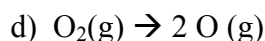


CH353 – Physical Chemistry I
Spring 2013, Unique 52575

Homework, Week 8

1. Based on your general chemistry knowledge, determine whether the chemical potential of the reactants in the following balanced equations is greater than, less than, or equal to the chemical potential of the products. You may assume each reaction is taking place under standard conditions unless otherwise indicated.



2. Consider a system consisting of n_1 moles of component 1 and n_2 moles of component 2. Derive an expression for the Gibbs free energy of this system.

3. At 25°C , the density of a 50% (m/m) solution of ethanol and water is 0.914 g cm^{-3} . Given that the partial molar volume of water in the solution is $17.4 \text{ cm}^3 \text{ mol}^{-1}$, determine the partial molar volume of the ethanol.

4. What proportions of hexane and heptane should be mixed by mole fraction to achieve the greatest entropy of mixing?

5. The molar enthalpy of fusion of ice at 273.15 K and 1.0 atm is 6010 J mol^{-1} . The change in volume caused by the fusion of ice under the same conditions is $-1.63 \text{ cm}^3 \text{ mol}^{-1}$. You may assume that these values remain constant as a function of pressure. Estimate the melting temperature of ice at 1000 atm .