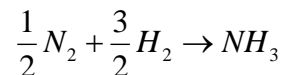


EG3029 Chemical Thermodynamics

Tutorial 9

Problem 1:

For the ammonia synthesis reaction

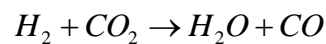


with 0.5 mol N_2 and 1.5 mol H_2 as the initial amounts of reactants and with the assumption that the equilibrium mixture is an ideal gas, show that

$$\varepsilon_e = 1 - \left(1 + 1.299 K \cdot \frac{P}{P^\circ} \right)^{-\frac{1}{2}}$$

Problem 2:

Assuming that all species and their mixtures are ideal gases, derive an equation for the Gibbs energy G as a function of the reaction coordinate ε for the water-gas shift reaction at 1000 K.



Extra task: use Excel or Matlab to plot $G(\varepsilon)$ and determine the equilibrium reaction coordinate as well as the composition at equilibrium.