Equilibrium and Solubility Equilibria

1. Calculate the solubility product constant for lead(II) chloride, if 50.0 mL of a saturated solution of lead(II) chloride was found to contain 0.2207 g of lead(II) chloride dissolved in it.

2. Initially, a mixture of 0.100 M NO, 0.050 M H_2, 0.100 M H_2 O was allowed to reach equilibrium (initially there was no N_2). At equilibrium the concentration of NO was found to be 0.062 M. Determine the value of the equilibrium constant, K_c , for the reaction

3. Calculate the solubility of solid CaF_2 (K_{sp} = 4.0 x 10^{-11}) in a 0.025 M NaF solution.

4. For the reaction below at 25°C, KC = 115. If 0.050 moles of each reactant and 0.600 moles of product are placed in a 1.00 L flask, what are the equilibrium concentrations?

$$H_2\,(g) + F_2\,(g) \rightleftarrows 2HF\,(g)$$

5. In a study of halogen bond strengths, 0.50 mol of iodine gas was heated in a 2.5 L vessel, and the following reaction occurred

$$I_2\,(g) \rightleftarrows 2I\,(g)$$

   a. Calculate [I_2] and [I] at equilibrium at 600 K; K_c = 2. 94 × 10^{-10}

   b. Calculate [I_2] and [I] at equilibrium at 2000 K; K_C = 0. 209