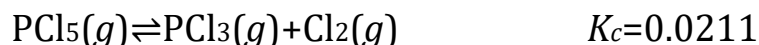


K_{eq} Practice -- Chemistry 121 Hanson

Most answers are at the OpenStax site. Note that the OpenStax text does not assume you have an equation-solving calculator. Since you do, please learn how to use it. Make an ICE table, express the equilibrium expression in term of a variable x , solve for x using your calculator's solver, then use x to get the equilibrium values.

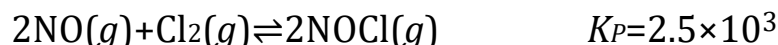
1. What are the concentrations of PCl_5 , PCl_3 , and Cl_2 in an equilibrium mixture produced by the decomposition of a sample of pure PCl_5 with $[\text{PCl}_5] = 2.00 \text{ M}$?



2. Calculate the equilibrium concentrations of NO , O_2 , and NO_2 in a mixture at 250°C that results from the reaction of 0.20 M NO and 0.10 M O_2 . (answer at OpenStax is wrong; I got $x=0.0965$)



3. Calculate the pressures of NO , Cl_2 , and NOCl in an equilibrium mixture produced by the reaction of a starting mixture with 4.0 atm NO and 2.0 atm Cl_2 .

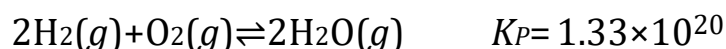


4. At 25°C and at 1 atm , the partial pressures in an equilibrium mixture of N_2O_4 and NO_2 are $P_{\text{N}_2\text{O}_4} = 0.70 \text{ atm}$ and $P_{\text{NO}_2} = 0.30 \text{ atm}$.

(a) Predict how the pressures of NO_2 and N_2O_4 will change if the total pressure increases to 9.0 atm . Will they increase, decrease, or remain the same?

(b) Calculate the partial pressures of NO_2 and N_2O_4 when they are at equilibrium at 9.0 atm and 25°C .

5. Consider the reaction between H_2 and O_2 at 1000 K



If 0.500 atm of H_2 and 0.500 atm of O_2 are allowed to come to equilibrium at this temperature, what are the partial pressures of the components?

6. Liquid N_2O_3 is dark blue at low temperatures, but the color fades and becomes greenish at higher temperatures as the compound decomposes to NO and NO_2 . At 25°C , a value of $K_P = 1.91$ has been established for this decomposition. If 0.236 moles of N_2O_3 are placed in a 1.52-L vessel at 25°C , calculate the equilibrium partial pressures of $\text{N}_2\text{O}_3(g)$, $\text{NO}_2(g)$, and $\text{NO}(g)$.