

ICE Problems

Calculating K_p from Pressure Data.

- The reaction between 1.000 atm NO and 1.000 atm O_2 to produce NO_2 at $184^\circ C$ was studied. At equilibrium, $P_{O_2} = 0.506$ atm.
- Calculate K_p .

Equilibrium conc. from K_c or K_p .

- The equilibrium between nitric oxide, oxygen, and nitrogen is described by the following equation:
 $2NO(g) \rightleftharpoons N_2(g) + O_2(g)$;
- $K_c = 2.3 \times 10^{30}$ at 298 K. In the atmosphere, $P_{O_2} = 0.209$ atm and $P_{N_2} = 0.781$ atm. What is the equilibrium partial pressure of NO?

Calculating Equilibrium Pressures.

Assume that gaseous hydrogen fluoride is synthesized from hydrogen gas and fluorine gas at a temperature where the equilibrium constant is 1.00×10^2 . Suppose HF at 5.000×10^{-1} atm, H_2 at 1.000×10^{-2} atm, and F_2 at 5.000×10^{-3} atm are mixed in a flask. Calculate the equilibrium pressures of all species.

Determining Equilibrium Conc. from Initial Conc. and K_c .

- $2HI(g) \rightleftharpoons H_2(g) + I_2(s)$
- The decomposition of HI at room temperature was studied by injecting 2.50 mol HI into a 10.32 L vessel at $25^\circ C$. What is $[H_2]$ at equilibrium for the above reaction where the equilibrium constant, $K_c = 1.26 \times 10^{-3}$?

- $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$
- $K_c = 4.2 \times 10^{-2}$
- An inorganic chemist studying the reactions of phosphorus halides mixes 0.1050 mol PCl_5 with 0.0450 mol Cl_2 and 0.0450 mol PCl_3 in a 0.5000-L flask at $250^\circ C$ according to the above equation. In which direction will the reaction proceed?
- What are the equilibrium concentrations of the other components?