Chemical Equilibrium Calculations

Chemical Equilibrium Calculations

The Concept

- There are two primary types of equilibrium calculations we will be making....
  - Ones in which you know the equilibrium conditions
  - Ones in which you don't know the equilibrium conditions
- Let's look at them one at a time

Chemical Equilibrium Calculations

Calculations where equilibrium conditions are known

- For the Haber process, $K_p = 1.45 \times 10^{-5}$ at 500°C. In an equilibrium mixture of the three gases at 500°C, the partial pressure of H_2 is 0.928 atm and that of N_2 is 0.432 atm. What is the partial pressure of NH_3 in this equilibrium mixture?

Chemical Equilibrium Calculations

Calculations where equilibrium conditions are not known

- Steps
  - Write the balanced equation for the reaction
  - Create an "ICE" box
  - Populate the ice box with given values
  - Use the ice box to make predictions and complete the Kc

A mixture of 5.000 x 10^{-3} mol of H_2 and 1.000 x 10^{-2} mol of I_2 is placed in a 5.000L container at 448°C and allowed to come to equilibrium. Analysis of the equilibrium mixture shows that the concentration of HI is 1.87 x 10^{-3} M. Calculate the Kc for this reaction.

A 1.000L flask is filled with 1.00 moles of H_2 and 2.00 moles of I_2. The K_c is 51 at 448°C. What are the concentrations of H_2, I_2 and HI at equilibrium?

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Homework

- 15.31 / 15.32 / 15.33a / 15.34 a&b / 15.35 / 15.36 / 15.37 / 15.38 a&b
  15.39 / 15.41a&b / 15.43 / 15.55 / 15.57