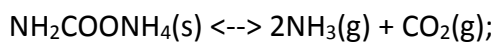


Answer on Question #42773 - Chemistry - Physical Chemistry

Question:

The decomposition of ammonium carbamate takes place according to



Show that if all NH_3 and CO_2 results from the decomposition of $\text{NH}_2\text{COONH}_4$, $K_p = (4/27)P^3$, where P is total pressure in equilibrium.

Solution:

The total pressure of a mixture of gases is equal to the sum of the partial pressures. If P is the total pressure in equilibrium system, then according to the chemical reaction the pressure of CO_2 is $P/3$ and pressure of NH_3 is $2P/3$. Hence the equilibrium constants K_p can be expressed as follows:

$$K_p = P_{\text{NH}_3} * P_{\text{CO}_2} = \left(\frac{2}{3}P\right)^2 * \frac{1}{3}P = \frac{4}{27}P^3$$

Answer: $K_p = \frac{4}{27}P^3$