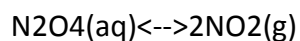


Answer on Question #41969, Chemistry, Other

Question:



$$K_{\text{eq}} = 11$$

you start with 1M N_2O_4 and then the system goes to equilibrium. Find the equilibrium concentrations of each material.

Answer:

| | | |
|--------------------------------------|---|----|
| | $\text{N}_2\text{O}_4(\text{aq}) \rightleftharpoons 2\text{NO}_2(\text{g})$ | |
| Starting concentrations (mole/L): | 1 | 0 |
| Equilibrium concentrations (mole/L): | 1-x | 2x |

$$K_{\text{eq}} = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]}$$

$$11 = \frac{(2x)^2}{1-x}$$

$$11 = \frac{4x^2}{1-x}$$

$$4x^2 = 11 - 11x$$

$$4x^2 + 11x - 11 = 0$$

$$x = 0.78$$

The equilibrium concentrations of N_2O_4 will be: $1 - 0.78 = 0.22$ mole/L

The equilibrium concentrations of NO_2 will be: $2 * 0.78 = 1.56$ mole/L

Answer: 0.22 and 1.56 mole/L of N_2O_4 and NO_2 respectively.