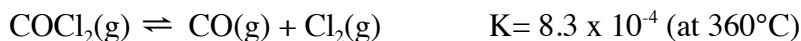


LECTURE 18

1. Phosgene (COCl_2) is a chemical warfare agent that decomposes by the reaction:



Calculate the $[\text{CO}]$, $[\text{Cl}_2]$, and $[\text{COCl}_2]$ when 10.0 mol of phosgene decompose at 360°C and reach equilibrium in a 5.00-L flask.

$$\begin{aligned} [\text{CO}] &= [\text{Cl}_2] = x = 0.041 \text{ M} \\ [\text{COCl}_2] &= 2.00 \text{ M} - x = 1.96 \text{ M} \end{aligned}$$

2. For the reaction in question 1, predict whether the reaction will shift toward products or reactants when the following stress to the system is applied.

(a) $\text{COCl}_2(g)$ is added. **Shift toward products**

(b) $\text{Cl}_2(g)$ is added. **Shift toward reactants**

3. The decomposition of nitrosyl bromide (NOBr) proceeds by the following reaction:



Calculate the $[\text{NOBr}]$, $[\text{NO}]$, and $[\text{Br}_2]$ when 10.0 mol of nitrosyl bromine is placed in a 5.00-L closed vessel and allowed to decompose.

$$\begin{aligned} [\text{NO}] &= 0.415 \text{ M} \\ [\text{Br}_2] &= 0.207 \text{ M} \\ [\text{NOBr}] &= 1.585 \text{ M} \end{aligned}$$

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