

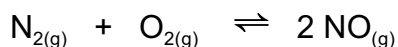
Equilibrium Calculations

1. The decomposition of nitrogen monoxide gives this equilibrium:



Initially 0.867 mol/L of $\text{NO}_{(g)}$ was placed in a 1.0 L sealed flask at 500 °C. If the percent reaction of $\text{NO}_{(g)}$ is 35 %, calculate K_c . **(0.0725)**

2. In a 1.00 L vessel, 0.500 mol of nitrogen gas and 0.500 mol of oxygen gas were reacted at 773 K to produce nitrogen monoxide gas. The percent reaction was found to be 20.0%.



Calculate the equilibrium concentrations of all three species.

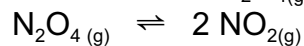
(N_2 & $\text{O}_2 = 0.4 \text{ mol/L}$; $\text{NO} = 0.2 \text{ mol/L}$)

3. An equilibrium was established in a 1.00 L container when 0.700 mol of phosphorus pentachloride gas was decomposed at 500 K. At equilibrium, the concentration of chlorine gas was 0.0740 mol/L. **(omit solids; 2.43×10^{-11})**



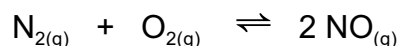
Calculate the equilibrium constant for this system.

4. After 0.869 mol/L $\text{N}_2\text{O}_{4(g)}$ was added to a 1.00 L container at 105 °C, a brown gas, NO_2 , appeared. The percent reaction of $\text{N}_2\text{O}_{4(g)}$ was found to be 36%.

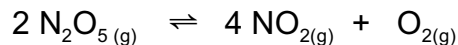


Calculate the equilibrium constant for this system. **(0.704)**

5. At high temperatures, nitrogen and oxygen gases react to produce nitrogen monoxide. Calculate the equilibrium concentration of nitrogen monoxide if the equilibrium concentrations of oxygen and nitrogen are 0.357 mol/L and K is 2.8×10^{-4} at 1800 K.
(0.00597 mol/L)



6. 1.32 mol/L $\text{N}_2\text{O}_{5(g)}$ was placed in a sealed vessel. Calculate the equilibrium concentration of the products, $\text{NO}_{2(g)}$ and $\text{O}_{2(g)}$, if the percent reaction of $\text{N}_2\text{O}_{5(g)}$ was measured to be 15%.



($\text{NO}_2 = 0.36 \text{ mol/L}$; $\text{O}_s = 0.099 \text{ mol/L}$)