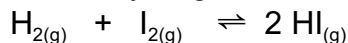


1. An equilibrium was established in a 1.00 L reaction vessel at 250 °C. The initial concentration of $\text{PCl}_{5(g)}$ was 0.861 mol/L. The vessel was found to contain 0.257 mol/L of chlorine gas at equilibrium.



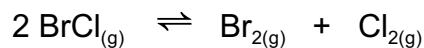
Calculate K_c for the reaction at this temperature. **(0.0116)**

2. 0.563 mol/L of $\text{HI}_{(g)}$ was placed in a 1.00 L reaction vessel. The temperature was raised to 300 °C and maintained until equilibrium was established. At equilibrium the vessel was found to contain 0.158 mol/L each of hydrogen and iodine.



Calculate the value for K_c for this equilibrium. **(2.44)**

3. Bromine chloride, $\text{BrCl}_{(g)}$ decomposes to form its elements. 0.537 mol/L of $\text{BrCl}_{(g)}$ and 0.100 mol/L of $\text{Cl}_{2(g)}$ were placed in a closed container and allowed to establish an equilibrium at 200 °C. The equilibrium concentration of chlorine gas was measured to be 0.215 mol/L.



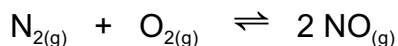
Determine K_c for this equilibrium. **(0.262)**

4. 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)**

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

6. 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. **(2.43×10^{-11})**



Calculate the equilibrium constant for this system.