

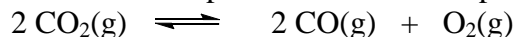
●Equilibrium

When heated, phosphorus pentachloride, forms phosphorus trichloride and chlorine as follows:



When 1.00 mol PCl_5 in a 1.00 L container is allowed to come to equilibrium at a certain temperature, the mixture is found to contain 0.135 mol PCl_3 . What is the molar composition of the mixture?

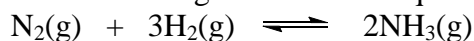
Carbon dioxide decomposes at elevated temperatures:



At 3000K, 2.00 mol CO_2 is placed into a 1.00 L container and allowed to come to equilibrium. At equilibrium, 0.90 mol CO_2 remains. What is the value of K_c ?

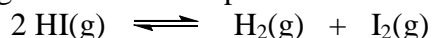
An initial mixture of nitrogen and oxygen is allowed to react in a rigid container at 2273 K according to the reaction $\text{N}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$. At equilibrium, the concentrations are $[\text{N}_2] = 0.1982 \text{ M}$, $[\text{O}_2] = 0.1482 \text{ M}$, $[\text{NO}] = 0.0036 \text{ M}$. What were the initial concentrations of nitrogen gas and oxygen gas that were allowed to react?

Consider the following reaction with equilibrium constant $K_c = 1.2$ at 375°C.



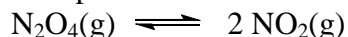
If you carry out an experiment beginning with a hydrogen concentration of 0.76 M, a nitrogen concentration of 0.60 M, and an ammonia concentration of 0.48 M, what will be the net direction of reaction to reach equilibrium?

Hydrogen iodide decomposes as follows:



At 800K, K for this reaction is 0.016. If 0.50 mol HI is placed in a 5.00 L flask, what will be the composition of the equilibrium mixture?

N_2O_4 decomposes as follows:



At 100°C, $K = 0.36$. If a 1.00 L flask initially contains 0.100 mol N_2O_4 , what will be the concentration of NO_2 at equilibrium?