

$K_p$

① When A is heated in a closed system to  $400^\circ\text{C}$ , the following equilibrium is set up:

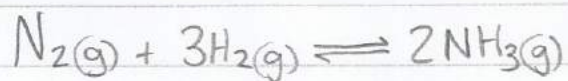


The equilibrium partial pressures of the three gases were found to be:  
A 5.1 kPa B 95 kPa C 95 kPa. Calculate  $K_p$  at this temperature.

② This refers to the equilibrium  $\text{N}_2\text{O}_4(\text{g}) \rightleftharpoons 2\text{NO}_2(\text{g})$

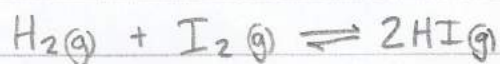
A vessel containing only dinitrogen tetraoxide was held at a temperature of 350k until equilibrium was established. The equilibrium pressure was 123 kPa and the mole fraction of nitrogen dioxide was found to be 0.800. Calculate the value of  $K_p$  at this temperature.

③ A mixture of nitrogen and hydrogen in the mole ratio 1:3 (as required by the equation) was heated to 700K and a pressure of 79 atmosphere in the presence of an iron catalyst. The equilibrium mixture was found to contain the following proportions of gases (by volume):  $N_2$  21%,  $H_2$  63%,  $NH_3$  16%. Calculate the value for  $K_p$  at this temperature.



④ A mixture of nitrogen and hydrogen in the mole ratio 1:3 (as required by the equation) was heated to 700K and a pressure of 79 atmosphere in the presence of an iron catalyst. The equilibrium mixture was found to contain 16% of ammonia by volume. Calculate the value for  $K_p$  at this temperature.

⑤ Hydrogen and iodine were heated in a closed container at 1100k until equilibrium was reached:

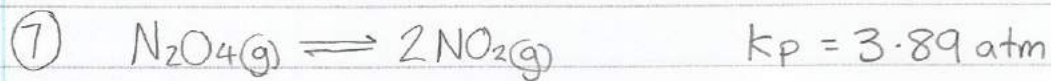


The equilibrium partial pressures were hydrogen 50kPa; iodine 50kPa; and the total equilibrium pressure was 350kPa. find  $K_p$ .

6) 0.200 moles of dinitrogen tetroxide,  $N_2O_4$ , were allowed to reach equilibrium at  $25^\circ C$  according to the equation:



The equilibrium mixture contained 4.60g of nitrogen dioxide and the equilibrium pressure was 0.431 atmospheres. find  $K_p$  at  $25^\circ C$ .



When the above equilibrium was established at 350 K, the partial pressure of  $\text{N}_2\text{O}_4$  was found to be 0.200 atm. Calculate the partial pressure of the  $\text{NO}_2$ , and the total pressure.



When 1.00 mole of dinitrogen tetroxide was heated to 350K in a closed container, the equilibrium mixture was found to contain 0.600 mole of nitrogen dioxide. Calculate the total pressure at equilibrium, and the partial pressures of  $\text{N}_2\text{O}_4$  and  $\text{NO}_2$ .