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Kuis ini saya kerjakan dengan jujur-jujurnya.

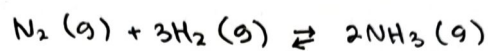
6.) Knowns :

equilibrium constant of $K_c = 1,2$ at 375°C

starting concentration $[\text{H}_2]_0 = 0,76\text{ M}$, $[\text{N}_2]_0 = 0,60\text{ M}$, $[\text{NH}_3]_0 = 0,48\text{ M}$

asked :

which species will increase and decrease in concentration at equilibrium



calculations :

$$Q = \frac{[\text{NH}_3]^2}{[\text{N}_2][\text{H}_2]^3} = \frac{(0,48)^2}{(0,60)(0,76)^3} = 0,87$$

$$Q < K_c$$

Result :

$[\text{N}_2]$ and $[\text{H}_2]$ will decrease

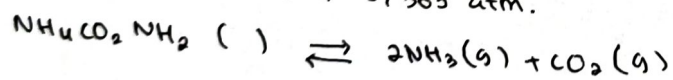
$[\text{NH}_3]$ will increase

! If $Q < K$, the reaction will proceed Forward so the concentration of reactants will decrease and that product will increase

3.) Knowns :

reversible decomposition of solid ammonium carbamate at 40°

total gas pressure is $0,363\text{ atm}$.



asked :

calculate the equilibrium constant K_p

calculations :

$$K_p = (P_{\text{NH}_3})^2 (P_{\text{CO}_2})$$

Equilibrium of P_{NH_3} is $0+2x$

Equilibrium of P_{CO_2} is $x+0$

$$\text{so, } P_{\text{NH}_3} + P_{\text{CO}_2} = 0,363$$

$$2x + x = 0,363$$

$$x = 0,121$$

$$P_{\text{NH}_3} = 2x = 0,242\text{ atm}$$

$$P_{\text{CO}_2} = x = 0,121\text{ atm}$$

$$K_p = (P_{\text{NH}_3})^2 (P_{\text{CO}_2}) = (0,242)^2 (0,121) = 7,09 \times 10^{-3}$$

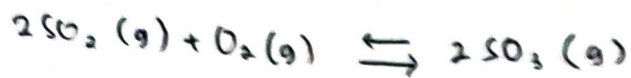
Result :

$$K_p = 7,09 \times 10^{-3}$$

5.) knowns :

equilibrium constant $K_p = 5.60 \times 10^4$ at 350°C

initial pressure of SO_2 is 0.350 atm , O_2 is 0.762 atm .



asked :

whether the pressure at equilibrium will be greater than or less than the initial pressure (1.112 atm)?

calculations :

	SO_2	O_2	SO_3
initial	0.350	0.762	0
change	$-2x$	$-x$	$+2x$
Equilibrium	$0.350 - 2x$	$0.762 - x$	$2x$

total pressure :

$$P_{\text{total}} = (0.350 - 2x) + (0.762 - x) + 2x$$

$$P_{\text{total}} = 1.112 - x$$

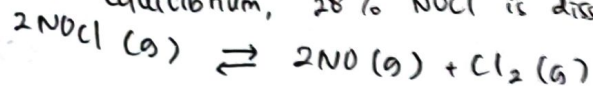
Result :

Equilibrium pressure must be less than 1.112 atm

4.) knowns :

2.50 mol NOCl in a 1.50 L at 400°C

after equilibrium, 28% NOCl is dissociated.



asked :

find the equilibrium constant K_c

calculations :

Molarity of NOCl ,

$$[\text{NOCl}] = \frac{2.50 \text{ mol}}{1.5 \text{ L}} = 1.667 \text{ M}$$

	$[\text{NOCl}]$	$[\text{NO}]$	$[\text{Cl}_2]$
Initial	1.667	0	0
change	$-2x$	$+2x$	$+x$
Equilibrium	$1.667 - 2x$	$2x$	x

28% NOCl dissociated

$$[\text{NOCl}]_0 - [\text{NOCl}]_{\text{equil}} = 0.28 [\text{NOCl}]_0$$

$$2x = 0.28(1.667) \Rightarrow x = 0.2334$$

from the value x ,

$$K_p = \frac{[NO]^2 [Cl_2]}{[NOCl]^2} = \frac{(2x)^2 (x)}{(1,667 - 2x)^2}$$

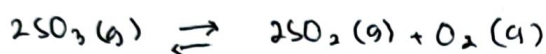
$$K_p = \frac{[2(0,2334)]^2 (0,2334)}{[1,667 - 2(0,2334)]^2} = 0,0353$$

Result :

$$K_p = 0,0353$$

2.) knowns :

$K_p = 1,8 \times 10^{-5}$ at $350^\circ C$ for



asked :

$$K_c = ?$$

calculations :

$$K_p = K_c (RT)^{\Delta n_g}$$

$$R = 0,0821 \frac{L \cdot atm}{mol \cdot K}$$

T = absolute temp in K

$$\Delta n_g = \sum n_{\text{gaseous product}} - \sum n_{\text{gaseous reactants}}$$

$$\Delta n_g = (2+1) - 2 = 1$$

$$K_c = \frac{K_p}{(RT)^{\Delta n_g}} = \frac{1,8 \times 10^{-5}}{[0,0821] (350+273)^1} = 3,5 \times 10^{-7}$$

Result :

$$\text{at } 350^\circ C, K_c = 3,5 \times 10^{-7}$$

1.) asked :

a.) largest equilibrium constant ?

b.) smallest equilibrium constant ?

calculation :

$$K_p = K_c [RT]^{\Delta n} \rightarrow RT \text{ is same, } \Delta n \text{ too.}$$

$$K_p = K_c$$

$$K_{p1} = \frac{[AB]^2}{[B]^2 [A]^2} \Rightarrow A + B \rightleftharpoons AB$$

$$K_{p2} = \frac{[AC]^3}{[A] [C]} \Rightarrow A + C \rightleftharpoons 3AC$$

$$K_{p3} = \frac{[AO]}{[A]^3 [O]^3} \Rightarrow 3A + 3O \rightleftharpoons AO$$

Result :

a.) K_{p2} is the largest

b.) K_{p3} is the smallest.