

Exercise ICE table:

Exercise 7

Calculation~system not at equilibrium

A system was charged with NOCl gas until its concentration reached 0.400 mol L⁻¹. The temperature of the system was then increased to 245°C and it was allowed to reach equilibrium according to equation. At equilibrium, the concentration of Cl₂ was 0.0225 mol L⁻¹. Calculate the value of K_c at this temperature

At T = 245
0.40 mol/L NOCl(g)



Answer:

	$2\text{NOCl(g)} \rightleftharpoons \text{Cl}_2\text{(g)} + 2\text{NO(g)}$		
[] initial			
[] change			
[] at equilibrium			

Given info:

$$K_c = \frac{[\text{Cl}_2][\text{NO}]^2}{[\text{NOCl}]^2}$$

[Cl₂]_{eq} = 0.0225 mol/L

At equilibrium,

[Cl₂] is 0.0225 mol/L = x

[NOCl] = 0.400 - 2x
= [] mol/L

[NO] = 2x
= [] mol/L

Substitute the value of [] at equilibrium in the K_c formula

$$K_c = \frac{[]^{\square} []^{\square}}{[]^{\square} []^{\square}}$$

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