

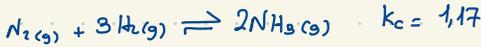
P235 EJ. 1

a)  $k_c = \frac{[NO_2]^2}{[N_2O_4]}$

b)  $k_c = \frac{[HI][I_2]}{[HI]^2}$

c)  $k_c = \frac{[NH_3]^2}{[N_2][H_2]^3}$

P235 EJ. 3



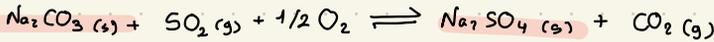
$k_p = k_c (RT)^{\Delta n} = 1,17 (0,082 \cdot (250 + 273))^{2-4} = 4,08 \cdot 10^{-4}$

P235 EJ. 5

$Q = \frac{[CO_2][H_2]}{[CO][H_2O]} = \frac{\frac{2}{0,5} \cdot \frac{2}{0,5}}{\frac{1}{0,5} \cdot \frac{1}{0,5}} = 4$

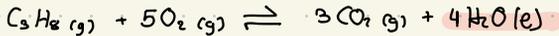
$Q > k_p \Rightarrow$  DESPLAZADO A LA IZQ  
(1,5) A REACTIVOS

LABORATORIO



$k_c = \frac{[CO_2]}{[SO_2][O_2]^{1/2}} \Rightarrow \frac{P_{CO_2}}{P_{SO_2} P_{O_2}^{1/2}} = k_p$

Los sólidos o líquidos  
puros no aparecen  
en la constante



$k_c = \frac{[CO_2]^3}{[C_3H_8][O_2]^5}; \quad k_p = \frac{P_{CO_2}^3}{P_{C_3H_8} P_{O_2}^5}$

P241 EJ 11  $V = 2L$   $T = 1800^\circ C$



no	2,1	1,6		
REAC	X	X		
FORMAN			X	X
EQ	2,1-X	1,6-X	X	X
	0,9 mol CO <sub>2</sub>			
EQ	0,9	0,4	1,2	1,2

$$K_c = \frac{[H_2O][CO]}{[CO_2][H_2]} = \frac{1,2 \cdot 1,2}{0,9 \cdot 0,4} = 4$$

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

$$\Delta n = 0$$

P241 EJ 12  $I_2(g) + Cl_2(g) \rightleftharpoons 2ICl(g)$  5L

no			0,5
REAC			2x
n eq	X	X	0,5-2x
[eq]	X/5	X/5	$\frac{0,5-2x}{5}$
	0,02	0,02	0,06

$$K_c = \frac{[ICl]^2}{[I_2][Cl_2]} = \frac{\left(\frac{0,5-2x}{5}\right)^2}{\frac{X}{5} \cdot \frac{X}{5}} = \frac{(0,5-2x)^2}{X^2} = 9$$

$$(0,5-2x)^2 = 9 \cdot X^2 \quad X = 0,1 \text{ mol}$$

P241 EJ 13



no	0,02		
reac	2x	2x	x
reac (	X	X	X/2)
eq	0,02-2x	2x	X

$\Rightarrow$  OTRA FORMA

$$1,6g SO_3 \frac{1 \text{ mol}}{80g} = 0,02 \text{ mol } SO_3$$

$$n_T = n_{SO_3} + n_{SO_2} + n_{O_2} = 0,02 - 2x + 2x + x = 0,02 + x$$

$$PV = nRT \quad 1,2 \cdot 2 = n_T \cdot 0,082 \cdot 1073 \quad n_T = 0,0284$$

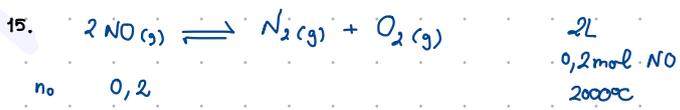
$$\left. \begin{array}{l} x = 0,0084 \\ x = n_0 \cdot \alpha \end{array} \right\} 0,0084 = 0,02 \cdot \alpha$$

$$\alpha = 0,0084$$

$$0,84\%$$

$$K_c = \frac{[SO_2]^2 [O_2]}{[SO_3]^2} = \frac{\left(\frac{2x}{2}\right)^2 \frac{x}{2}}{\left(\frac{0,02-2x}{2}\right)^2} = \frac{\frac{x^3}{2}}{(0,01-x)^2} = 0,1184 \text{ (mol/l)}$$

$$K_p = K_c (RT)^{\Delta n} = 0,1184 \cdot (0,082 \cdot 1073)^1 = 10,41 \text{ atm}$$



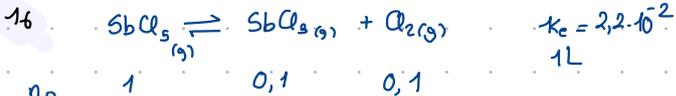
$C_0 = \frac{0,2}{2} = 0,1$

$C_{eq} = 0,1 - 2x$        $x$        $x$

$K_c = \frac{[\text{N}_2][\text{O}_2]}{[\text{NO}]^2} \Rightarrow 1,1 \cdot 10^{-3} = \frac{x^2}{(0,1-2x)^2}$

$x = 0,049 \text{ M} = [\text{N}_2] = [\text{O}_2]$

$\alpha = \frac{n_{\text{disociados}}}{n_i} \Rightarrow \alpha = 0,98$  moles       $[\text{NO}] = 1,4 \cdot 10^{-3} \text{ M}$       NOTA: CAMBIA MUCHO SI SE REDONDEA

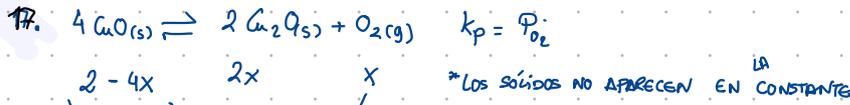


$n_0 = 1$       0,1      0,1

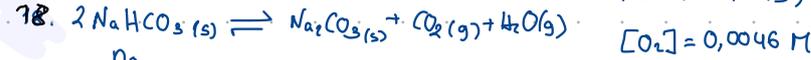
$C_0 = 1$       0,1      0,1       $Q = \frac{0,1 \cdot 0,1}{1} = 0,01$        $Q < K_c$       EVOLUCIONA REACTIVOS  $\rightarrow$  PROD.

$C_e = 1-x$       0,1+x      0,1+x

$2,2 \cdot 10^{-2} = \frac{(0,1+x)^2}{1-x}$        $x = 0,045$        $[\text{Cl}_2] = [\text{SbCl}_3] = 0,145 \text{ M}$   
 $[\text{SbCl}_5] = 0,955 \text{ M}$

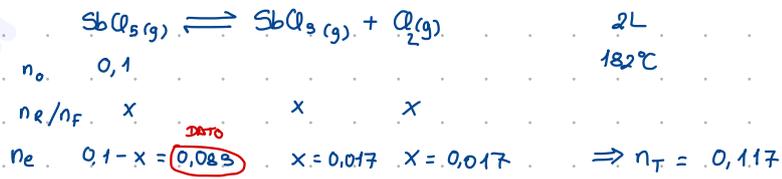


$n_{\text{CuO}} = 1,98$        $4,6 \cdot 10^{-3} \cdot 2$        $P_{\text{O}_2} = n_{\text{O}_2} \frac{RT}{V}$        $0,49 \cdot V = n_{\text{O}_2} \cdot RT$   
 $m_{\text{CuO}} = 157 \text{ g}$        $\frac{0,49}{0,082(1024+273)} = \left( \frac{n_{\text{O}_2}}{V} \right) \cdot RT$



$n_0 = 2x$        $x$        $x$   
 tienen = cantidad y con los únicos gases del sistema  $\Rightarrow P_{\text{CO}_2} = 870 \text{ mmHg} = P_{\text{H}_2\text{O}}$   
 $K_p = P_{\text{CO}_2} \cdot P_{\text{H}_2\text{O}} = \frac{870}{760} \cdot \frac{870}{760} = 1,29$   
 $K_p = K_c \cdot RT^{\Delta n}$        $1,29 = K_c (0,082 \cdot (393))^2$   
 $K_c = 1,2 \cdot 10^{-3}$

P256 n° 5



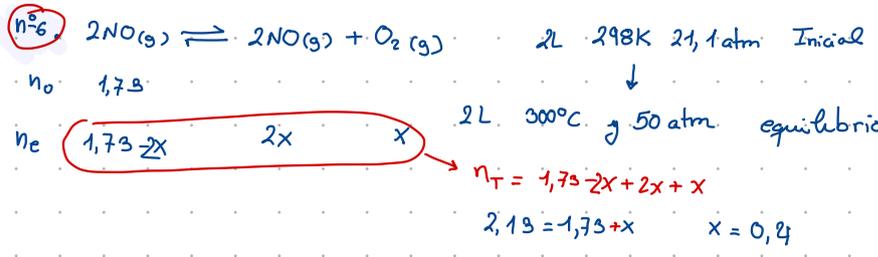
$PV = nRT$   
 $P_T \cdot 2 = 0,117 \cdot 0,082 \cdot (182+273)$   
 $P_T = 2,18 \text{ atm}$

$$K_c = \frac{[\text{SbCl}_3][\text{Cl}_2]}{[\text{SbCl}_5]} = \frac{\frac{0,017}{2} \cdot \frac{0,017}{2}}{\frac{0,083}{2}} = 1,74 \cdot 10^{-3}$$

$$K_p = K_c (RT)^{\Delta n} = 1,74 \cdot 10^{-3} (0,082 \cdot (182+273))^1 = 6,5 \cdot 10^{-2}$$

$\Delta n = 2 - 1 = 1$

n° 6



$PV = nRT \quad 21,1 \cdot 2 = n_0 \cdot 0,082 \cdot 298 \quad n = 1,73$

$50 \cdot 2 = n \cdot 0,082 \cdot 573 \quad n_e = 2,19$

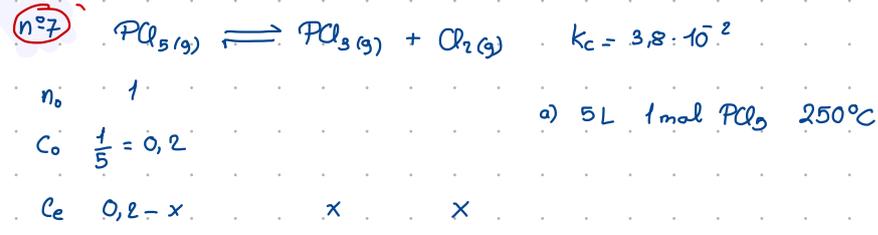
$$K_c = \frac{[\text{NO}_2]^2 [\text{O}_2]}{[\text{NO}]^2} = \frac{\left(\frac{2 \cdot 0,4}{2}\right)^2 \left(\frac{0,4}{2}\right)}{\left(\frac{0,93}{2}\right)^2} = 0,147 = 0,15$$

$n_D = 0,4 \cdot 2 \quad \alpha = \frac{0,4 \cdot 2}{1,73} = 0,46$

$$K_p = K_c (RT)^{\Delta n} = 0,15 (0,082 \cdot 573)^1 = 7,04$$

$\Delta n = 3 - 2 = 1$

n° 7



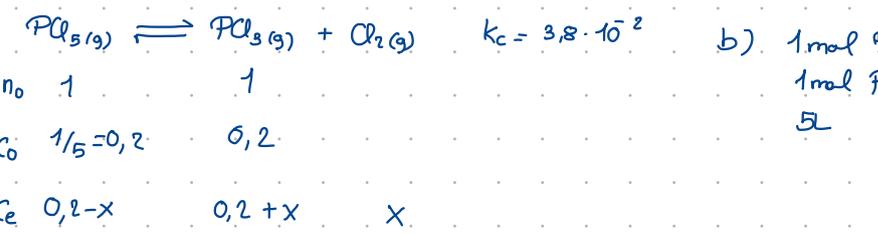
$$K_c = \frac{[\text{PCl}_3][\text{Cl}_2]}{[\text{PCl}_5]} = \frac{x^2}{0,2-x} = 3,8 \cdot 10^{-2} \Rightarrow \text{solve da un valor negativo} \Rightarrow \text{resolver con ecuación}$$

$\alpha = 0,35$

$$x^2 = 3,8 \cdot 10^{-2} (0,2-x)$$

$$x^2 + 0,038x - 0,0076 = 0$$

$x = 0,07 \quad [\text{PCl}_5] = 0,131 \text{ M} \quad [\text{PCl}_3] = [\text{Cl}_2] = 0,07 \text{ M}$



$$K_c = \frac{(0,2+x)(x)}{(0,2-x)} = 0,038$$

$$0,2x + x^2 = 0,0076 - 0,038x$$

$x = 0,029 \quad [\text{Cl}_2] = 0,029 \text{ M} \quad \alpha = 0,14$   
 $[\text{PCl}_3] = 0,229 \text{ M}$   
 $[\text{PCl}_5] = 0,017 \text{ M}$

