Oposiciones 2016

Examen Cataluña 2000.-

Ejercicio C.4.-

$T_1 = 1400K \rightarrow Kp = 3'07 \cdot 10^3 Pa$

$Br_2(g) \rightleftharpoons 2Br(g)$ $T_2 = 1600K \rightarrow Kp = 2,58 \cdot 10^4 Pa$

a) ¿α? $P_T = 10 KPa$

b) ΔH_r?

$\ln \frac{Kp_2}{Kp_1} = -\frac{\Delta H}{R}\left(\frac{1}{T_2} - \frac{1}{T_1}\right)$ Ec de Van't Hoff

a) $P_T = 10 KPa \times \frac{10^3 Pa}{1 KPa} = 10 \cdot 10^3 = 10^4 Pa$

Br_2	$\rightleftharpoons$	$2Br$	$n_T = n_o - n_o\alpha + 2n_o\alpha =$
n_o		—	$= n_o + n_o\alpha = n_o(1+\alpha)$
$n_o(1-\alpha)$		$2n_o\alpha$	

$$Kp(1600K) = \frac{P_{Br}^2}{P_{Br_2}} = \frac{P_T^2 \cdot \frac{n(Br)}{n_T}}{P_T \cdot \frac{n(Br_2)}{n_T}} = \frac{10^4 \cdot \frac{2n_o\alpha}{n_o(1+\alpha)}}{\frac{n_o(1-\alpha)}{n_o(1+\alpha)}} \Rightarrow$$

$$\Rightarrow 2'58 \cdot 10^4 = 10^4 \cdot \frac{2\alpha(1+\alpha)}{(1+\alpha)(1-\alpha)} = \frac{2 \cdot 10^4 \alpha}{(1-\alpha)}$$

$$2'58 \cdot 10^4(1-\alpha) = 2 \cdot 10^4 \alpha \Rightarrow 2'58 \cdot 10^4 - 2,58 \cdot 10^4 \alpha = 2 \cdot 10^4 \alpha$$

$$2'58 \cdot 10^4 = 4'58 \cdot 10^4 \alpha \rightarrow \alpha = 0,563 \rightarrow 56,3\%$$

b) Aplicando la ecuación de Van't Hoff:

$$\ln \frac{Kp_2}{Kp_1} = -\frac{\Delta H}{R}\left[\frac{1}{T_2} - \frac{1}{T_1}\right]$$

$$\ln \frac{2'58 \cdot 10^4}{3'07 \cdot 10^3} = -\frac{\Delta H}{8'31}\left[\frac{1}{1600} - \frac{1}{1400}\right] \Rightarrow \Delta H = 198,12 \cdot 10^3 \frac{J}{mol}$$

$\Delta H = 198,12 KJ$