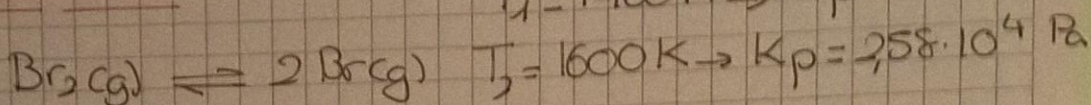


Examen Cataluña 2000.-Ejercicio C.4.-

$$T_1 = 1400 \text{ K} \rightarrow K_p = 307 \cdot 10^3 \text{ Pa}$$



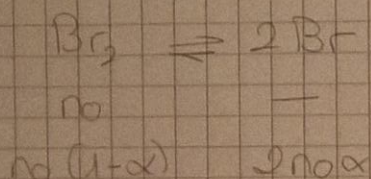
a) α ? $P_T = 10 \text{ kPa}$

$$\ln \frac{K_{p2}}{K_{p1}} = -\frac{\Delta H}{R} \left(\frac{1}{T_2} - \frac{1}{T_1} \right)$$

b) ΔH_r ?

Ec de Van't Hoff

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



$$\begin{aligned} n_T &= n_0 - n_0\alpha + 2n_0\alpha = \\ &= n_0 + n_0\alpha = n_0(1+\alpha) \end{aligned}$$

$$K_p(1600 \text{ K}) = \frac{P_{\text{Br}}^2}{P_{\text{Br}_2}} = \frac{P_T^2 \cdot \frac{n(\text{Br})}{n_T}}{P_T \cdot \frac{n(\text{Br}_2)}{n_T}} = \frac{10^4 \cdot \frac{2n_0\alpha}{n_0(1+\alpha)}}{\frac{n_0(1-\alpha)}{n_0(1+\alpha)}} \Rightarrow$$

$$\Rightarrow 258 \cdot 10^4 = 10^4 \cdot \frac{2\alpha(1+\alpha)}{(1-\alpha)(1+\alpha)} = \frac{2 \cdot 10^4 \alpha}{(1-\alpha)}$$

$$258 \cdot 10^4 (1-\alpha) = 2 \cdot 10^4 \alpha \Rightarrow 258 \cdot 10^4 - 258 \cdot 10^4 \alpha = 2 \cdot 10^4 \alpha$$

$$258 \cdot 10^4 = 458 \cdot 10^3 \alpha \rightarrow \alpha = 0,563 \rightarrow 56,3\%$$

b) Aplicando la ecuación de Van't Hoff:

$$\ln \frac{K_{p2}}{K_{p1}} = -\frac{\Delta H}{R} \left[\frac{1}{T_2} - \frac{1}{T_1} \right]$$

$$\ln \frac{258 \cdot 10^4}{307 \cdot 10^3} = -\frac{\Delta H}{8,31} \left[\frac{1}{1600} - \frac{1}{1400} \right] \Rightarrow \Delta H = 198,12 \cdot 10^3 \frac{\text{J}}{\text{mol}}$$

$$\Delta H = 198,12 \text{ kJ}$$