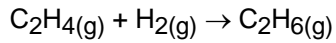


Voor de reactie



bedraagt $E_a = 181 \text{ kJ/mol}$ en is $k = 1,3 \cdot 10^{-3} \text{ L}\cdot\text{mol}^{-1}\cdot\text{s}^{-1}$ bij 700 K. Hoe groot is de waarde van k bij 730 K?

Oplossing

Volgens Arrhenius is $k = A \cdot e^{-\frac{E_a}{RT}}$. Hieruit volgt dat $\log k_2 - \log k_1 = -\frac{E_a}{2,303R} \left(\frac{T_1 - T_2}{T_1 \cdot T_2} \right)$

$$\log k_{730 \text{ K}} - \log k_{700 \text{ K}} = -\frac{E_a}{2,303R} \left(\frac{700 \text{ K} - 730 \text{ K}}{700 \text{ K} \times 730 \text{ K}} \right)$$

$$\log k_{730 \text{ K}} = +\log k_{700 \text{ K}} - \frac{E_a}{2,303R} \left(\frac{700 \text{ K} - 730 \text{ K}}{700 \text{ K} \times 730 \text{ K}} \right)$$

$$\log k_{730 \text{ K}} = -2,886 - \frac{181 \frac{\text{kJ}}{\text{mol}}}{2,303 \times 8,31 \cdot 10^{-3} \frac{\text{kJ}}{\text{mol}\cdot\text{K}}} \cdot \frac{-30 \text{ K}}{5,11 \cdot 10^5 \text{ K}^2}$$

$$\log k_{730 \text{ K}} = -2,886 + 0,555 = -2,331$$

$$k_{730 \text{ K}} = 4,7 \cdot 10^{-3} \frac{\text{L}}{\text{mol}\cdot\text{s}}$$