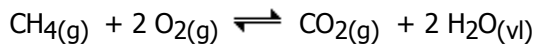


Bereken $\Delta_r G^\circ$ voor de reactie



	CH ₄ (g)	O ₂ (g)	CO ₂ (g)	H ₂ O(vl)
$\Delta_f H^\circ$ (kJ.mol ⁻¹)	-74,81	0	-393,51	-285,84
S° (J.mol ⁻¹ .K ⁻¹)	186,2	205,0	213,6	69,9

Oplossing

$$\begin{aligned}\Delta_r H^\circ &= \left(\Delta_f H^\circ_{\text{CO}_2(\text{g})} + 2 \cdot \Delta_f H^\circ_{\text{H}_2\text{O}(\text{vl})} \right) - \left(\Delta_f H^\circ_{\text{CH}_4(\text{g})} + 2 \cdot \Delta_f H^\circ_{\text{O}_2(\text{g})} \right) \\ &= \left(-393,51 \frac{\text{kJ}}{\text{mol}} + 2 \cdot \left(-285,84 \frac{\text{kJ}}{\text{mol}} \right) \right) - \left(-74,81 \frac{\text{kJ}}{\text{mol}} \right) \\ &= -890,38 \frac{\text{kJ}}{\text{mol}}\end{aligned}$$

$$\begin{aligned}\Delta_r S^\circ &= \left(S^\circ_{\text{CO}_2(\text{g})} + 2 \times S^\circ_{\text{H}_2\text{O}(\text{vl})} \right) - \left(S^\circ_{\text{CH}_4(\text{g})} + 2 \times S^\circ_{\text{O}_2(\text{g})} \right) \\ &= \left(213,6 \frac{\text{J}}{\text{mol.K}} + 2 \times 69,9 \frac{\text{J}}{\text{mol.K}} \right) - \left(186,2 \frac{\text{J}}{\text{mol.K}} + 2 \times 205,0 \frac{\text{J}}{\text{mol.K}} \right) \\ &= -242,8 \frac{\text{J}}{\text{mol.K}}\end{aligned}$$

$$\begin{aligned}\Delta_r G^\circ &= \Delta_r H^\circ - T \cdot \Delta_r S^\circ \\ &= -890,38 \frac{\text{kJ}}{\text{mol}} - 298\text{K} \times \left(-242,8 \frac{\text{J}}{\text{mol.K}} \right) \\ &= -890380 \frac{\text{J}}{\text{mol}} + 72350 \frac{\text{J}}{\text{mol}} \\ &= \mathbf{-818030 \frac{\text{J}}{\text{mol}}}\end{aligned}$$