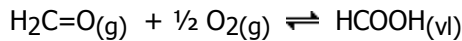


De verbrandingswarmte van formaldehyde $\text{H}_2\text{C=O(g)}$ en mierenzuur $\text{HCOOH}_{(\text{vl})}$ bedragen resp. -563 kJ/mol en -270 kJ/mol . Bereken $\Delta_r H^\circ$ voor:

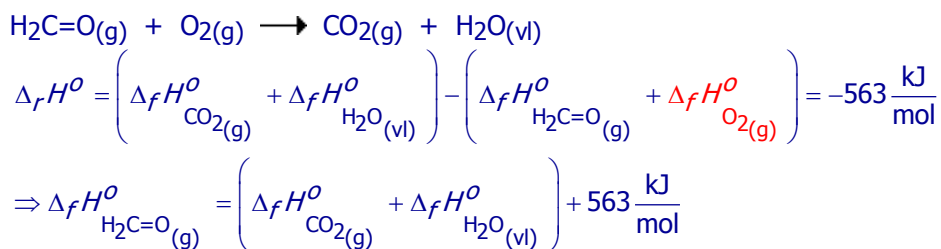


Oplossing

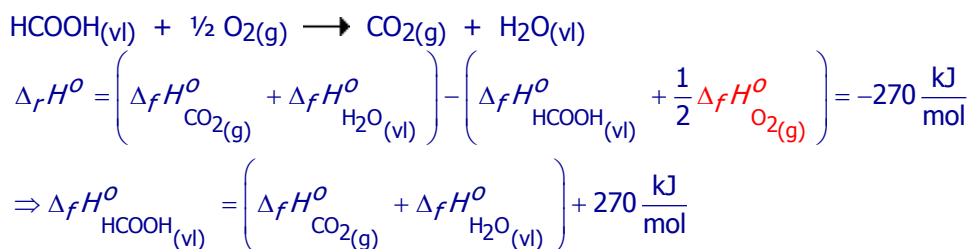
$$\Delta_r H^\circ = \left(\Delta_f H^\circ_{\text{HCOOH}_{(\text{vl})}} \right) - \left(\Delta_f H^\circ_{\text{H}_2\text{C=O(g)}} + \frac{1}{2} \Delta_f H^\circ_{\text{O}_{2(\text{g})}} \right)$$

$$\Delta_r H^\circ = \left(\Delta_f H^\circ_{\text{HCOOH}_{(\text{vl})}} \right) - \left(\Delta_f H^\circ_{\text{H}_2\text{C=O(g)}} \right)$$

Verbranding van formaldehyde:



Verbranding van mierenzuur:



Daaruit volgt dat:

$$\Delta_r H^\circ = \left(\Delta_f H^\circ_{\text{HCOOH}_{(\text{vl})}} \right) - \left(\Delta_f H^\circ_{\text{H}_2\text{C=O(g)}} \right)$$

$$\Delta_r H^\circ = \left[\left(\Delta_f H^\circ_{\text{CO}_{2(\text{g})}} + \Delta_f H^\circ_{\text{H}_2\text{O}_{(\text{vl})}} \right) + 270 \frac{\text{kJ}}{\text{mol}} \right] - \left[\left(\Delta_f H^\circ_{\text{CO}_{2(\text{g})}} + \Delta_f H^\circ_{\text{H}_2\text{O}_{(\text{vl})}} \right) + 563 \frac{\text{kJ}}{\text{mol}} \right]$$

$$\Delta_r H^\circ = 270 \frac{\text{kJ}}{\text{mol}} - 563 \frac{\text{kJ}}{\text{mol}}$$

$$\Delta_r H^\circ = -293 \frac{\text{kJ}}{\text{mol}}$$