

Question #45031 – Chemistry – Other

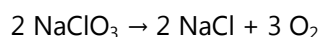
Question:

What is $\Delta H_{\text{reaction}}$ for the decomposition of 1 mole of sodium chlorate (ΔH_f° values $\text{NaClO}_3(\text{s}) = -85.7 \text{ kcal/mol}$, $\text{NaCl}(\text{s}) = -98.2 \text{ kcal/mol}$, $\text{O}_2(\text{g}) = 0 \text{ kcal/mol}$)

- A) -183.9 kcal
- B) -91.9 kcal
- C) +45.3 kcal
- D) +22.5 kcal
- E) -12.5 kcal

Answer:

The equation of the reaction of decomposition:



According to Hess Law, the change of enthalpy of the reaction is the difference between change of enthalpy of products and change of enthalpy of reactants:

$$\Delta H = \sum \Delta H_{\text{products}} - \sum \Delta H_{\text{reactants}} = 3 \times \Delta H(\text{O}_2) + 2 \times \Delta H(\text{NaCl}) - 2 \times \Delta H(\text{NaClO}_3) = 3 \times 0 + 2 \times (-98.2) - 2 \times (-85.7) = -25 \text{ kcal}$$

This value is the enthalpy of decomposition of 2 moles NaClO_3 , so the enthalpy of decomposition of 1 mole NaClO_3 is **-12.5 kcal**.