Question #45031 – Chemistry – Other

Question:

What is ΔHreaction for the decomposition of 1 mole of sodium chlorate (H^0f values NaClO3(s) = -85.7kcal/mol, NaCl(s) = -98.2kcal/mol, O2 (g) = 0kcal/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:

2 $NaClO_3$ → 2 NaCl + 3 O_2

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:

$$\Delta H = \sum \Delta H_{products} - \sum \Delta H_{reactants} = 3 \times \Delta H(O_2) + 2 \times \Delta H(NaCl) - 2 \times \Delta H(NaClO_3) = 3 \times 0 + 2 \times (-98.2) - - 2 \times (-85.7) = -25 kcal$$

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.**