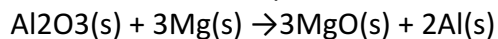


Answer on the question #63410, Chemistry / General Chemistry

Question:

Use standard enthalpies of formation to determine $\Delta H_{\text{reaction}}$ for the following reaction:



kJ

Solution:

According to Hess' law, the enthalpy of reaction can be calculated as:

$$\Delta H_{\text{rxn}}^0 = \sum v_i \Delta H_{f,i}^0(\text{products}) - \sum v_k \Delta H_{f,k}^0(\text{reagents})$$

The standard enthalpy of formation for aluminum and magnesium are zero at standard conditions.

$$\begin{aligned} \Delta H_{\text{rxn}}^0 &= 3\Delta H_{f,\text{MgO}(\text{s})}^0 - \Delta H_{f,\text{Al}_2\text{O}_3(\text{s})}^0 = 3 \cdot (-601.6 \text{ kJ mol}^{-1}) - (-1675.7 \text{ kJ mol}^{-1}) \\ \Delta H_{\text{rxn}}^0 &= -129.1 \text{ kJ mol}^{-1} \end{aligned}$$

Standard enthalpy values were taken in NIST chemistry webbook:

<http://webbook.nist.gov/>

Answer: -129.1 kJ/mol