

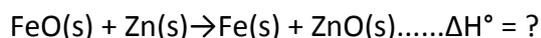
Answer on Question #55780 – Chemistry– General Chemistry

Question:

Given the standard enthalpy changes for the following two reactions:



What is the standard enthalpy change for the reaction?



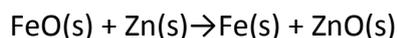
Answer:

The equation for the standard enthalpy *change* of formation is commonly used:

$$\Delta H^\circ_{\text{reaction}} = \sum \Delta H^\circ_f(\text{products}) - \sum \Delta H^\circ_f(\text{Reactants})$$

This equation essentially states that the standard enthalpy *change* of formation is equal to the **sum of the standard enthalpies of formation of the products** minus the **sum of the standard enthalpies of formation of the reactants**.

In our case:



$$\Delta H^\circ_{\text{reaction}} = \Delta H^\circ_f(\text{ZnO}) + \Delta H^\circ_f(\text{Fe}) - \sum \Delta H^\circ_f(\text{Zn}) - \Delta H^\circ_f(\text{FeO})$$

$\Delta H^\circ_f(\text{Fe})=0$; $\Delta H^\circ_f(\text{Zn})=0$ because standard enthalpy of formation of a pure element is in its reference form its standard enthalpy formation is **zero**. Then

$$\Delta H^\circ_{\text{reaction}} = \Delta H^\circ_f(\text{ZnO}) + - \Delta H^\circ_f(\text{FeO}) = -696.6/2 - (-544.0/2) = \mathbf{-76.3 \text{ kJ}}$$