

### Answer on the Question #67760, Chemistry / General chemistry

Calculate  $\Delta H$  of the reaction shown below. Balance the equation before beginning the calculation. DO NOT use the Heat of Formations table! Use the heats of formation shown below.



$$\Delta H(\text{NO}) = 44.5 \text{ kJ/mol}$$

$$\Delta H(\text{H}_2\text{O}) = -180 \text{ kJ/mol}$$

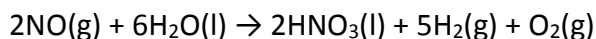
$$\Delta H(\text{HNO}_3) = -213 \text{ kJ/mol}$$

$$\Delta H(\text{H}_2) = 0 \text{ kJ/mol}$$

$$\Delta H(\text{O}_2) = 0 \text{ kJ/mol}$$

#### Solution:

Balanced equation:



Enthalpy of reaction is the difference between the sum of standard heat of formation of products and the sum of standard heat of formation of reactants:

$$\Delta H_{\text{reaction}} = \sum \Delta_f H_{\text{products}} - \sum \Delta_f H_{\text{reactants}}$$

Enthalpy of the reaction studied:

$$\Delta H_{\text{reaction}} = \sum 2 \cdot \Delta_f H_{\text{HNO}_3} + 5 \cdot \Delta_f H_{\text{H}_2} + \Delta_f H_{\text{O}_2} - \sum 2 \cdot \Delta_f H_{\text{NO}} + 6 \cdot \Delta_f H_{\text{H}_2\text{O}}$$

$$\begin{aligned} \Delta H_{\text{reaction}} &= \sum 2 \cdot (-213) + 5 \cdot 0 + 0 - \sum 2 \cdot 44.5 + 6 \cdot (-180) = -421 - (-991) \\ &= 570 \text{ kJ/mol} \end{aligned}$$

**Answer:**  $\Delta H_{\text{reaction}} = 570 \text{ kJ/mol}$

**Answer provided by AssignmentExpert.com**