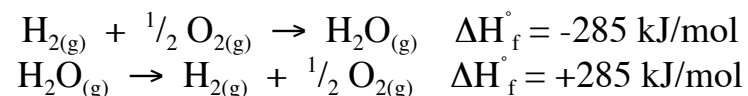
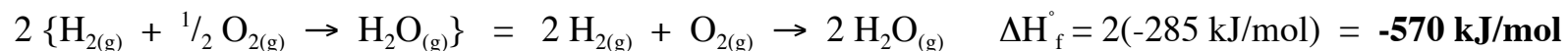


# Key Concepts for Enthalpy Calculations

- When a reaction is reversed, the *magnitude* of  $\Delta H$  remains the same, but the *sign* of  $\Delta H$  changes.



- When a balanced equation for a reaction is multiplied by an integer, the value of  $\Delta H$  for that reaction must be multiplied by the same integer.



- The change in enthalpy for a given reaction can be calculated from the enthalpies of formation of the reactants and products:

$$\Delta H_{\text{reaction}}^{\circ} = \sum n_{\text{p}} \Delta H_{\text{f}}^{\circ}(\text{products}) - \sum n_{\text{r}} \Delta H_{\text{f}}^{\circ}(\text{reactants})$$

- Elements in their *standard states* are not included in the  $\Delta H_{\text{reaction}}^{\circ}$  calculations (*i.e.*  $\Delta H_{\text{f}}^{\circ}$  for an element in its standard state is zero.)
- Reactions may be combined through addition and subtraction to provide **net** values of  $\Delta H_{\text{reaction}}^{\circ}$  (**Hess's Law**).