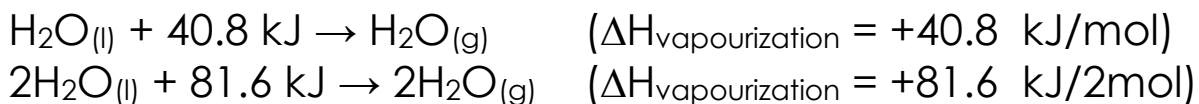


## 5.2 Molar Enthalpies

Homework Practice 1,2,3,4,5,7,9  
Questions 1,2,3,4,5

- Molar enthalpy ( $\Delta H_x$ ): the enthalpy change associated with a physical, chemical, or nuclear change involving one mole of a substance.
- E.g.  $1\text{H}_{2(g)} + \frac{1}{2}\text{O}_{2(g)} \rightarrow 1\text{H}_2\text{O}_{(g)} + 241.8 \text{ kJ}$ 
  - 1 mole of  $\text{H}_2$  will consume  $\frac{1}{2}$  mole of  $\text{O}_2$  and will produce 1 mole water vapour and 241.8 kJ of energy will be liberated (exothermic)
  - $\Delta H_{\text{combustion}} = -241.8 \text{ kJ/mol}$
- Exothermic:  $\Delta H$  is negative (thermal energy leaving the system)
- Endothermic:  $\Delta H$  is positive (thermal energy entering the system)
- Calculating enthalpy for a change of state:



- Use the formula:  $\Delta H = n\Delta H_x$  (x = types of changes p306)

enthalpy change = moles x molar enthalpy of the change
--

- Enthalpy change expressed in KJ
- See sample question on p.307

## Calorimetry of Physical Change

- Usually done in an isolated system (no movement of matter or energy in or out of the system)
- Assumptions:
  - No heat is transferred between the calorimeter and the outside environment.
  - Any heat absorbed or released by the calorimeter material, such as the container, is negligible. Assuming that the material is an insulator, otherwise they must be taken into account.
  - A dilute aqueous solution is assumed to have a density and specific heat capacity equal to that of pure water (1.00 g/mL and 4.18 J/g · °C or 4.18 kJ/kg · °C)
- See sample problem on p.309

## Calorimetry of Chemical Change

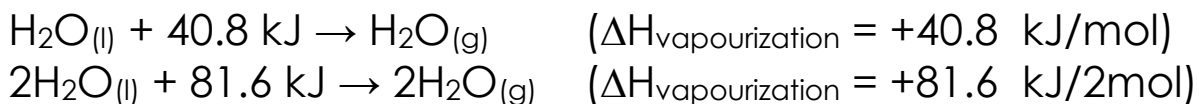
- Usually done with dilute aqueous solutions and calculations are similar to the change of state calculations.
- There are many different ways that chemists describe situations
  - Ex. Molar enthalpy = heat of .... = enthalpy of ....
- Convert gram values into moles [ $m/M$  or  $c \times v$ ]

Formula:  $nH_x = mc\Delta T$

$nH_x$  is referring to the chemical in question

$mc\Delta T$  is referring to the water or total solution

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