17.2 Notes - Measuring and Expressing Enthalpy Changes

Calorimetry - measurement of the heat flow into or out of a system for chemical & physical processes.
* remember: endo (IN), absorbed. exo (EXIT) released

Calorimeter - insulated device used to measure the absorption or release of heat

Enthalpy (H) - accounts for the heat flow of the system at constant pressure. This ΔH is determined by measuring the heat flow of the reaction ($q = \Delta H$)

- take specific heat equation and get q alone to find the heat absorbed/released by surroundings.

$$C = \frac{q}{m \times \Delta T} \rightarrow q_{surr} = C \times m \times \Delta T$$

- ΔH is positive in endothermic reactions, and negative in exo
- If system is endothermic and has positive value for $\Delta H / q$, then the surroundings MUST have a negative value ($-q_{sur}$) and be exothermic.

$$q_{sys} = \Delta H = -q_{sur} = -C \times m \times \Delta T$$

- Enthalpy change in a reaction may be expressed as a reactant or a product. ex) $CaO + H_2O \rightarrow Ca(OH)_2 + 65.2\,kJ$

Thermochemical equations - equations that include or express this enthalpy change.

Heat of reaction - the enthalpy change for the chemical equation (exactly as it is written) - usually seen as ΔH

* In a thermochemical equation, physical state must be shown

$$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(s) + 65.2\,kJ$$

ΔH (heat of reaction) @ 101.3 kPa and 25°C

* Because ΔH is produced in this equation, this must have been an exothermic reaction because heat was given off. Therefore, $\Delta H = -65.2\,kJ$ to represent exothermic