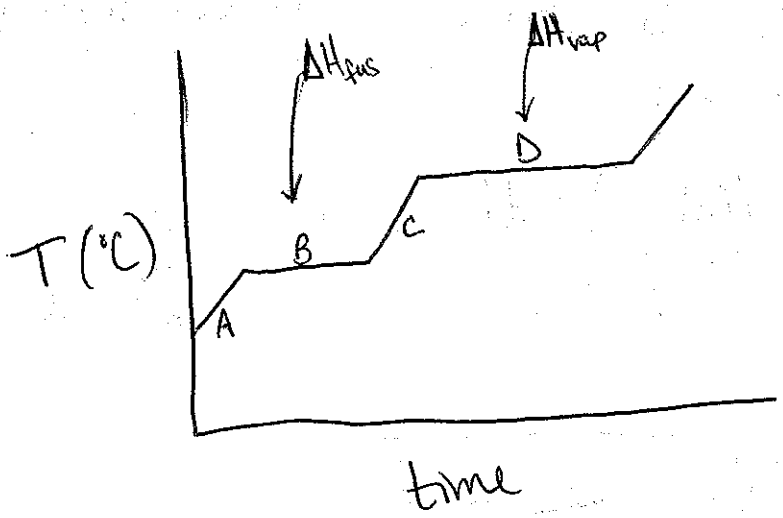
17.3 - Heat in Changes of State



Phase change diagram:
A = solid being warmed up
B = solid → liquid with
NO change in temp
C = liquid being warmed up
D = liquid → gas
NO change in temp

Even though sections B and D are gaining heat energy, they are not rising in temp. This energy is used to change physical state.

Molar heat of fusion (ΔH_{fus}) - the heat absorbed by one mole of a solid substance as it melts to a liquid both at constant temp

Molar heat of solidification (ΔH_{solid}) - the heat lost when one mole of a liquid substance solidifies at constant temp.

$$\Delta H_{fus} = -\Delta H_{solid} \left\{ \text{of same substance (w/ opposite pos/neg values)} \right.$$

ΔH_{fus} of $H_2O(s) \rightarrow H_2O(l) = 6.01$ kJ/mol
ΔH_{solid} of $H_2O(l) \rightarrow H_2O(s) = -6.01$ kJ/mol

Molar heat of vaporization (ΔH_{vap}) - the amount of heat required to vaporize one mole of a given liquid at a constant temperature.

Molar heat of condensation (ΔH_{cond}) - the amount of heat released when one mole of vapor condenses at its normal boiling point.

$\Delta H_{vap} = -\Delta H_{cond}$ } of same substance

Molar heat of solution (ΔH_{soln}) - the enthalpy changed caused by the dissolution of 1 mole of a substance

- ↳ exothermic ΔH_{soln} will be negative
- ↳ endothermic ΔH_{soln} will be positive