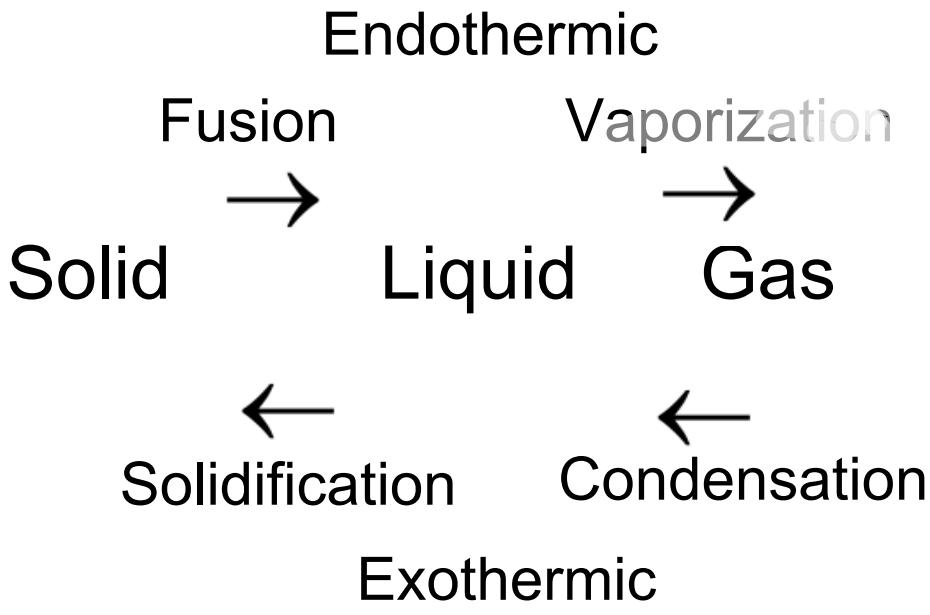
Endothermic
Fusion
Vaporization
Solid
Liquid
Gas
Solidification
Condensation
Exothermic

Endothermic Phase Changes

- the molar enthalpy of fusion (H_{fus}) represents the quantity of heat that the substance absorbs per mole as it changes state from **solid to liquid**.

- the molar enthalpy of vaporization (H_{vap}) represents the quantity of heat that the substance absorbs per mole as it changes state from **liquid to gas**.

Exothermic Phase Changes

- the molar enthalpy of condensation (H_{cond}) represents the quantity of heat that the substance releases per mole as it changes state from **gas to liquid**

- the molar enthalpy of solidification (H_{solid}) represents the quantity of heat that the substance releases per mole as it changes state from **liquid to solid**.

change in enthalpy → $\Delta H = nH$ (# moles) Molar Enthalpy

Example

If 500. g of $CCl_2F_{2(l)}$ is vaporized at SATP, find the enthalpy change of the system (H_{vap} = 34.99 kJ/mol).

$m = 500.\text{g}$

$\Delta H_{vap} = 34.99\ \text{kJ/mol}$

$n = \frac{m}{MM} = \frac{500.\text{g}}{120.91\ \text{g/mol}}$

$= 4.135\ \text{mol}$

$\Delta H = nH$

$= (4.135)(34.9)$

$\approx 145\ \text{KJ}$

$C = 12.01$

$Cl = 2 \times 35.45$

$F = 2 \times 19.00$

120.91

Example Problem

Calculate the energy change that occurs when 28.0g of water is frozen.

$H_{solid} = -6.03\ kJ/mol$

$\Delta H = n H_{solid}$

$= (1.55)(-6.03\ kJ/mol)$

$= -9.36\ KJ$

$H = 2 \times 1.01$

$O = 16.00$

18.02

$n = \frac{m}{MM}$

$= \frac{28.0}{18.02}$

$= 1.55$

$$\Delta H_{fus} = - \Delta H_{solid}$$

$$\Delta H_{vap} = - \Delta H_{cond}$$