covalent bond - a bond in which electrons are shared between atoms

ionic bond - a bond in which electrons are transfered between atoms, forming ions that are then attracted together

The type of bond present between two atoms can be determined by the difference in EN of the two atoms.

Covalent compounds form solids due to their IMF.
Covalent compounds do not necessarily experience dissociation (bond breaking) when they dissolve.

Ionic compounds form solids due to the attractions of ions.

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concentration - a measure of the quantity of solute versus the quantity of solvent or solution,

$$\text{molarity (M)} = \frac{\text{moles solute}}{\text{liters solution}} \qquad n = M \cdot V$$

$$\text{molality (m)} = \frac{\text{moles solute}}{\text{kg solvent}}$$ ← not solution!!

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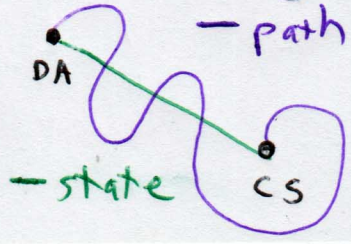
system - an arbitrary frame of reference

enthalpy (ΔH) - heat adjusted for pressure-volume work; used in systems at constant pressure

$\Delta H < 0$ exothermic (heat lost from the system)

$\Delta H > 0$ endothermic (heat absorbed by the system)

state function - a function, the value of which only depends on the initial and final states and not at all on how the system changes



Path function- a function, the value of which entirely depends on how a system changes, not on the initial or final states.

* Energy changes in chemical reactions are state functions, meaning they only depend on the identities of the reactants and products, not on how the rxn occurs.

Hess's law states that if a chemical rxn can occur by two different pathways, the energy change for both pathways will be the same.

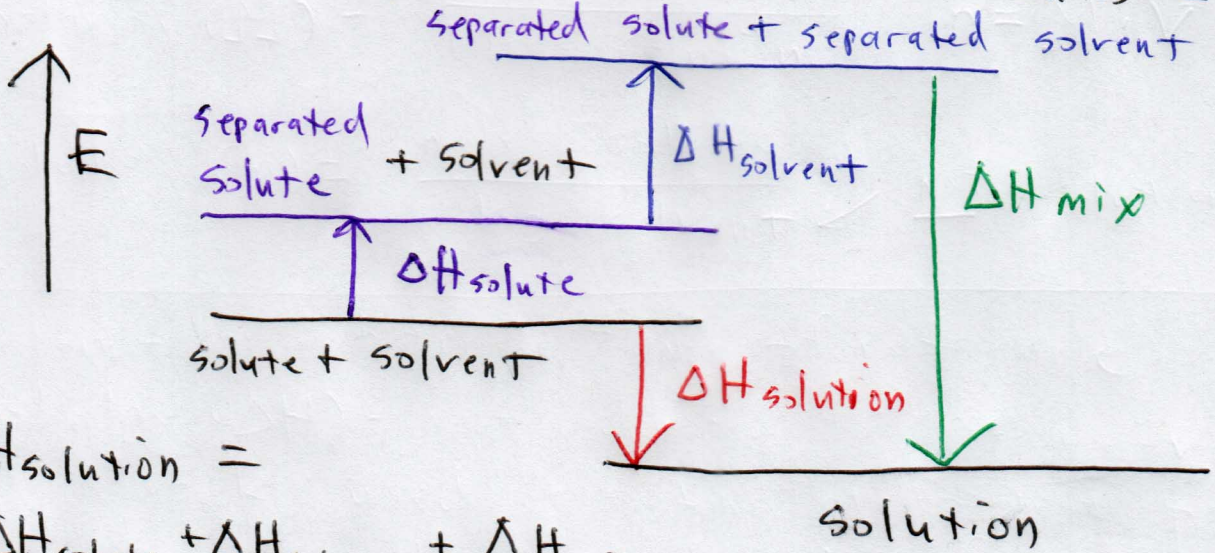
Forming solutions from covalent compounds

Example: water and ethanol ($CH_3CH_2\ddot{O}H$)

I) separation of solute molecules $\Delta H_{solute} > 0$

II) separation of solvent molecules $\Delta H_{solvent} > 0$

III) mixing of solute + solvent molecules $\Delta H_{mix} < 0$



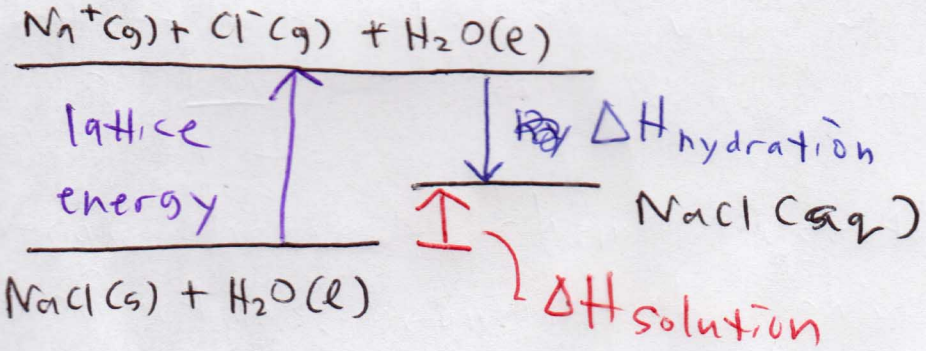
$\Delta H_{solution} = \Delta H_{solute} + \Delta H_{solvent} + \Delta H_{mix}$

Forming ~~[illegible]~~ solutions from ionic compounds

Example: NaCl and water

I) separation of ions → lattice energy > 0

II) surrounding ions with water → hydration < 0


$Na^+(g) + Cl^-(g) + H_2O(\ell)$
lattice energy
$\Delta H_{hydration}$
$NaCl(aq)$
$NaCl(s) + H_2O(\ell)$
$\Delta H_{solution}$