

CHEMISTRY A2 2022

Terms	Explanation
Enthalpy change of atomisation, $\Delta H^\circ_{\text{atm}}$	Enthalpy change when one mole of gaseous atoms is formed from its element under standard conditions (endothermic)
Enthalpy change of formation	Enthalpy change when one mole of an ionic compound is formed from its elements in their standard states under standard conditions (exothermic)
Lattice formation enthalpy (lattice energy)	Energy change when one mole of an ionic compound is formed from its gaseous ions under standard conditions (exothermic)
Lattice dissociation enthalpy	Energy change when one mole of an ionic compound dissociates to form its gaseous ions under standard conditions (endothermic)
1 st Ionisation energy	Energy required to remove one mole of gaseous electrons from one mole of gaseous atoms to form one mole of gaseous +1 ions under standard conditions (endothermic)
1 st Electron affinity, EA_1	Enthalpy change when one mole of electrons is added to one mole of gaseous atoms to form one mole of gaseous -1 ions under standard conditions (exothermic)
2 nd Electron affinity, EA_2	Enthalpy change when one mole of electrons is added to one mole of gaseous -1 ions to form one mole of gaseous -2 ions under standard conditions (endothermic, energy is needed to overcome the repulsion)
Ion polarisation	The distortion of the electron cloud of an anion by a neighbouring cation. The distortion is the greatest when the cation is small and highly charged.
Polarising power	The ability of a cation to attract the electron cloud of an anion and distort it.
Enthalpy change of hydration, $\Delta H^\circ_{\text{hyd}}$	Enthalpy change when one mole of gaseous ion is dissolved in a large amount of water to form an infinitely dilute solution under standard conditions (exothermic)
Enthalpy change of solution, $\Delta H^\circ_{\text{sol}}$	Enthalpy change when one mole of ionic solid is dissolved in a large amount of water to form an infinitely dilute solution under standard conditions
	A compound is more soluble if the $\Delta H^\circ_{\text{sol}}$ is more exothermic since heat energy is released from the formation of bond between ions and water molecules.
Entropy, S	Number of possible arrangements of particles and their energy in a given system

Physical Chemistry

Why does fluorine not fit in the electronegativity trend?

- EA of fluorine is lower than Cl atom
- The atomic size of fluorine is too small
- High electron density causes greater repulsion between electrons within the atom
- This greatly reduces the attractive effect between incoming electrons and the nucleus

Why is the 2nd electron affinity positive?

- Energy must be absorbed to overcome the repulsion between incoming electrons and the negative ion

What is the relationship between solubility and the value of $\Delta H^\circ_{\text{sol}}$?

- The more exothermic the $\Delta H^\circ_{\text{sol}}$ is, the more soluble the compound is.
- This is because energy is released from the formation of bonds between the ions and the water molecules.

Explain the solubility of G2 sulphates when going down the group.

- Solubility decreases when going down the group
- Lattice energy and $\Delta H^\circ_{\text{hyd}}$ become less exothermic when going down the group
- The $\Delta H^\circ_{\text{hyd}}$ decreases more than the lattice energy
- Enthalpy change of solution becomes less exothermic

Explain the solubility of G2 hydroxides when going down the group.

- Solubility increases when going down the group
- Lattice energy and $\Delta H^\circ_{\text{hyd}}$ become less exothermic when going down the group
- The lattice energy decrease more than $\Delta H^\circ_{\text{hyd}}$
- Enthalpy change of solution becomes more exothermic

What factors will cause a rise in entropy?

- Solid $\rightarrow$ liquid $\rightarrow$ gas
- Increase in complexity of molecule
- Decrease in hardness of a substance (e.g. graphite has higher entropy than diamond)
- An increase in the number of atoms in the molecule

Give a characteristic of the voltmeter used in electrolysis.

- High resistance to prevent any current flow

What are the functions of the salt bridge and suggest how it can be prepared.

- Maintains an ionic balance in the two half-cells
- Completes the circuit
- Filter paper soaked in KNO_3