

Hess' law: Enthalpy change for a reaction depends only on difference between enthalpy of products and enthalpy of reactants. It is independent of pathway.

Lattice enthalpy: The endothermic process of converting a crystalline solid into its gaseous ions, or the reverse exothermic process. The lattice enthalpy increases with decreasing size of the ions and increasing charge.

Spontaneous: A reaction that has a natural tendency to occur.

Standard conditions: 298 K and 1 atm.

Temperature: A measure of the average kinetic energy.

Standard enthalpy of vaporisation: The energy required to vaporise one mole of a liquid.

Enthalpy of atomisation: The energy required to produce one mole of gaseous atoms from an element in its standard state.

Bond dissociation enthalpy: The energy change when one mole of a specific bond is broken or created under standard conditions.

Enthalpy of Combustion: The energy released when one mole of a compound is burned in excess oxygen.

Standard enthalpy of formation: The energy change when one mole of a compound is formed under standard conditions from its constituent elements in their standard states.

Standard enthalpy of solution: The energy change when one mole of a substance is dissolved in an infinite amount of water under standard conditions.

Topic 6 – Kinetics

Activated complex: Created during a bimolecular process. Not a chemical substance which can be isolated, but consists of reacting particles in which bonds are in the process of being broken and formed. Can break down to form either the products or back to the original reactants.

Activation energy: The minimum amount of energy required for a reaction to occur between two particles. The prime requirement is that the particles have to have an appropriate geometry of collision.

Arrhenius equation: An equation showing the relationship between the temperature and the rate constant. $K = Ae^{(-E_a/RT)}$

Bimolecular process: A reaction step when two species collide and interact.

Catalyst: Provide an alternative pathway for a reaction such that the activation energy required to reach the activation complex is lowered.

Can be divided into two types: homogenous catalysts are in the same phase as the reactants, while heterogeneous ones are in a different phase. Heterogeneous catalysts tend to work by bringing the reactant particles into close alignment by adsorbing them onto the catalytic surface.

Half-life: The time taken for the concentration of the reactant to fall to half of its initial value.

Molecularity: Number of species taking part in any specified step in the reaction.

Order of reaction: The rate is always proportional to the concentration of a reactant raised to a power, where the power is the order of the reaction with respect to that reactant.

Rate constant: The constant of proportionality in the rate expression.

Rate expression: An equation that shows the relationship between the concentrations of the reactants and the rate of the reaction.

Every species in the rate expression must occur in the rate determining step or in an equilibrium occurring before it.

Rate of reaction: The rate of increase of concentration of one of the products or the rate of decrease of concentration of one of the reactants.