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Kinetics and Equilibrium

Glossary

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Acid dissociation constant (K_a)	The equilibrium constant that measures the degree of dissociation for an acid under specific conditions. For an acid HA: $K_a = \frac{[H^+][A^-]}{[HA]}$
Activated complex	The transition state of a reaction in which old bonds are partially broken and new bonds are partially formed. The activated complex has a higher energy than the reactants or products of the reaction
Activation energy (E_a)	The minimum amount of energy required for a reaction to occur
Catalysis	Increasing a reaction rate by adding a substance (the catalyst) not permanently changed by the reaction. The catalyst lowers the activation energy
Catalyst	A substance that increases the rates of the forward and reverse directions of a specific reaction but is itself left unchanged
Dissociation	The separation of a single species into two separate species; this term is usually used in reference to salts or weak acids or bases
Equilibrium	The state of balance in which the forward and reverse reaction rates are equal. In a system at equilibrium, the concentrations of all species will remain constant over time unless there is a change in the reaction conditions. See Le Chatelier's principle.
Equilibrium constant (K_c or K_{eq})	The ratio of the concentration of the products to the concentration of the reactants for a certain reaction at equilibrium, all raised to their stoichiometric coefficients

Le Chatelier's Principle	The observation that when a system at equilibrium is disturbed or stressed, the system will react in such a way as to relieve the stress and restore equilibrium. See Equilibrium.
Order of reaction	In a calculation of the rate law for a reaction, the sum of the exponents to which the concentrations of reactants must be raised.
Potential energy diagram	An energy diagram that relates the potential energy of the reactants and products of a reaction to details of the reaction pathway. By convention, the x axis shows the progression of the reaction, and the y axis shows potential energy.
Rate constant	The proportionality constant in the rate law of a reaction; specific to a particular reaction under particular conditions.
Rate law	A mathematical expression giving the rate of a reaction as a function of the concentrations of the reactants. The rate law of a given reaction must be determined experimentally.
Rate-determining step	The slowest step of a reaction mechanism. The rate of this step limits the over-all rate of the reaction.
Reaction intermediate	A species that does not appear among the final products of a reaction but is present temporarily during the course of the reaction
Reaction mechanism	The series of steps that occur in the course of a chemical reaction, often including the formation and destruction of reaction intermediates
Reaction rate	The speed at which a substance is produced or consumed by a reaction
Water dissociation constant (K_w)	The equilibrium constant of the water dissociation reaction at a given temperature; 1.00×10^{-14} at 25.00°C