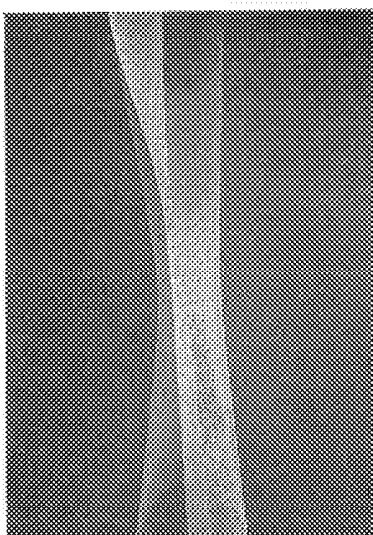


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Chemistry



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To my parents and to Eunice, Whitney, and Leslie.

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- Accuracy** the agreement of a particular value with the true value. (1.3)
- Acid** a substance that produces hydrogen ions in solution; a proton donor. (4.2)
- Acid-base indicator** a substance that marks the end point of an acid-base titration by changing color. (15.4)
- Acid rain** a result of air pollution by sulfur dioxide. (5.9)
- Acid dissociation constant (K_a)** the equilibrium constant for a reaction in which a proton is removed from an acid by H_2O to form the conjugate base and H_3O^+ . (14.1)
- Acidic oxide** a covalent oxide that dissolves in water to give an acidic solution. (14.10)
- Actinide series** a group of fourteen elements following actinium in the periodic table, in which the $5f$ orbitals are being filled. (7.11; 18.1)
- Activated complex (transition state)** the arrangement of atoms found at the top of the potential energy barrier as a reaction proceeds from reactants to products. (12.5)
- Activation energy** the threshold energy that must be overcome to produce a chemical reaction. (12.5)
- Addition polymerization** a type of polymerization in which the monomers simply add together to form the polymer, with no other products. (22.5)
- Addition reaction** a reaction in which atoms add to a carbon-carbon multiple bond. (22.2)
- Adsorption** the collection of one substance on the surface of another. (12.6)
- Air pollution** contamination of the atmosphere, mainly by the gaseous products of transportation and production of electricity. (5.9)
- Alcohol** an organic compound in which the hydroxyl group is a substituent on a hydrocarbon. (22.4)
- Aldehyde** an organic compound containing the carbonyl group bonded to at least one hydrogen atom. (22.4)
- Alkali metal** a Group 1A metal. (2.7; 18.2)
- Alkaline earth metal** a Group 2A metal. (2.7; 18.4)
- Alkane** a saturated hydrocarbon with the general formula C_nH_{2n+2} . (22.1)
- Alkene** an unsaturated hydrocarbon containing a carbon-carbon double bond. The general formula is C_nH_{2n} . (22.2)
- Alkyne** an unsaturated hydrocarbon containing a triple carbon-carbon bond. The general formula is C_nH_{2n-2} . (22.2)
- Alloy** a substance that contains a mixture of elements and has metallic properties. (10.4)
- Alloy steel** a form of steel containing carbon plus other metals such as chromium, cobalt, manganese, and molybdenum. (24.4)
- Alpha (α) particle** a helium nucleus. (21.1)
- Alpha particle production** a common mode of decay for radioactive nuclides in which the mass number changes. (21.1)
- Amine** an organic base derived from ammonia in which one or more of the hydrogen atoms are replaced by organic groups. (14.6; 22.4)
- α -Amino acid** an organic acid in which an amino group and an R group are attached to the carbon atom next to the carboxyl group. (23.1)
- Amorphous solid** a solid with considerable disorder in its structure. (10.3)
- Ampere** the unit of electrical current equal to one coulomb of charge per second. (17.7)
- Amphoteric substance** a substance that can behave either as an acid or as a base. (14.2)
- Anion** a negative ion. (2.6)
- Anode** the electrode in a galvanic cell at which oxidation occurs. (17.1)
- Antibonding molecular orbital** an orbital higher in energy than the atomic orbitals of which it is composed. (9.2)
- Aromatic hydrocarbon** one of a special class of cyclic unsaturated hydrocarbons, the simplest of which is benzene. (22.3)
- Arrhenius concept** a concept postulating that acids produce hydrogen ions in aqueous solution, while bases produce hydroxide ions. (14.1)
- Arrhenius equation** the equation representing the rate constant as $k = Ae^{-E_a/RT}$ where A represents the product of the collision frequency and the steric factor, and $e^{-E_a/RT}$ is the fraction of collisions with sufficient energy to produce a reaction. (12.5)
- Aqueous solution** a solution in which water is the dissolving medium or solvent. (4.0)
- Atactic chain** a polymer chain in which the substituent groups such as CH_3 are randomly distributed along the chain. (24.2)
- Atmosphere** the mixture of gases that surrounds the earth's surface. (5.9)
- Atomic number** the number of protons in the nucleus of an atom. (2.5; 21)

- particle is formed having the same mass as an electron but opposite charge. The net effect is to change a proton to a neutron. (21.1)
- Potential energy** energy due to position or composition. (6.1)
- Precipitation reaction** a reaction in which an insoluble substance forms and separates from the solution. (4.5)
- Precision** the degree of agreement among several measurements of the same quantity; the reproducibility of a measurement. (1.3)
- Primary structure (of a protein)** the order (sequence) of amino acids in the protein chain. (23.1)
- Principal quantum number** the quantum number relating to the size and energy of an orbital; it can have any positive integer value. (7.6)
- Probability distribution** the square of the wave function indicating the probability of finding an electron at a particular point in space. (7.5)
- Product** a substance resulting from a chemical reaction. It is shown to the right of the arrow in a chemical equation. (3.6)
- Protein** a natural high-molecular-weight polymer formed by condensation reactions between amino acids. (23.1)
- Proton** a positively charged particle in an atomic nucleus. (2.5; 21)
- Pure substance** a substance with constant composition. (1.8)
- Pyrometallurgy** recovery of a metal from its ore by treatment at high temperatures. (24.4)
- Qualitative analysis** the separation and identification of individual ions from a mixture. (4.6)
- Quantitative analysis** a process in which the amounts of the components of a mixture are determined. (4.7)
- Quantization** the fact that energy can occur only in discrete units called quanta. (7.2)
- Rad** a unit of radiation dosage corresponding to 10^{-2} J of energy deposited per kilogram of tissue (from radiation absorbed dose). (21.7)
- Radioactive decay (radioactivity)** the spontaneous decomposition of a nucleus to form a different nucleus. (21.1)
- Radiocarbon dating (carbon-14 dating)** a method for dating ancient wood or cloth based on the rate of radioactive decay of the nuclide ^{14}C . (21.4)
- Radiotracer** a radioactive nuclide, introduced into an organism for diagnostic purposes, whose pathway can be traced by monitoring its radioactivity. (21.4)
- Random error** an error that has an equal probability of being high or low. (1.3)
- Raoult's law** the vapor pressure of a solution is directly proportional to the mole fraction of solvent present. (11.4)
- Rate constant** the proportionality constant in the relationship between reaction rate and reactant concentrations. (12.2)
- Rate of decay** the change in the number of radioactive nuclides in a sample per unit time. (21.2)
- Rate-determining step** the slowest step in a reaction mechanism, the one determining the overall rate. (12.4)
- Rate law** an expression that shows how the rate of reaction depends on the concentration of reactants. (12.2)
- Reactant** a starting substance in a chemical reaction. It appears to the left of the arrow in a chemical equation. (3.6)
- Reaction mechanism** the series of elementary steps involved in a chemical reaction. (12.4)
- Reaction quotient** a quotient obtained by applying the law of mass action to initial concentrations rather than to equilibrium concentrations. (13.5)
- Reaction rate** the change in concentration of a reactant or product per unit time. (12.1)
- Reactor core** the part of a nuclear reactor where the fission reaction takes place. (21.6)
- Reducing agent (electron donor)** a reactant that donates electrons to another substance to reduce the oxidation state of one of its atoms. (4.9; 17.1)
- Reduction** a decrease in oxidation state (a gain of electrons). (4.9; 17.1)
- Rem** a unit of radiation dosage that accounts for both the energy of the dose and its effectiveness in causing biological damage (from roentgen equivalent for man). The number of rems = (number of rads) \times RBE, where RBE represents the relative effectiveness of the radiation in causing biological damage. (21.7)
- Resonance** a condition occurring when more than one valid Lewis structure can be written for a particular molecule. The actual electronic structure is not represented by any one of the Lewis structures but by the average of all of them. (8.12)
- Reverse osmosis** the process occurring when the external pressure on a solution causes a net flow of solvent through a semipermeable membrane from the solution to the solvent. (11.6)
- Reversible process** a cyclic process carried out by a hypothetical pathway, which leaves the universe exactly the same as it was before the process. No real process is reversible. (16.9)
- Ribonucleic acid (RNA)** a nucleotide polymer that transmits the genetic information stored in DNA to the ribosomes for protein synthesis. (23.3)
- Roasting** a process of converting sulfide minerals to oxides by heating in air at temperatures below their melting points. (24.4)
- Root mean square velocity** the square root of the average of the squares of the individual velocities of gas particles. (5.6)
- Salt** an ionic compound. (14.8)
- Salt bridge** a U-tube containing an electrolyte that connects the two compartments of a galvanic cell, allowing ion flow without extensive mixing of the different solutions. (17.1)