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GLOSSARY OF TERMS USED IN NUCLEAR ANALYTICAL CHEMISTRY

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Comments on these recommendations are welcome and should be sent within 8 months from August 1982 to the present Secretary of the Commission

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Comments from the viewpoint of languages other than English are especially encouraged. These may have special significance regarding the publication in various countries of translations of the nomenclature eventually approved by IUPAC.

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GLOSSARY OF TERMS USED IN NUCLEAR ANALYTICAL CHEMISTRY

This glossary lists close to 400 terms and definitions commonly used in radiochemistry, with emphasis on radioanalytical chemistry. Part of the definitions have been taken, sometimes with minor modifications, from existing glossaries of such organizations as the International Organization for Standardization and the International Electrotechnical Commission. In cases where no acceptable definition could be found, a new definition is proposed.

DIRECTIONS FOR USE

The terms are listed in alphabetical order. A term may consist of more than one word. The meanings of the different types of notation are as follows:

Carrier, isotopic. The term consists of two parts separated by a comma. This notation is used for terms in which the part after the comma normally precedes the part before the comma; the words are rearranged in order to facilitate the search. Both forms of these terms are listed in the glossary: 'Carrier, isotopic' and 'isotopic carrier'.

Geometry (counting). The term consists of two parts, the second part, preceded by a comma, being placed between parentheses. This notation is used for terms which basically consist of the first part, which is sometimes preceded by the part between parentheses. Terms in this notation are listed only once.

Energy (of a radiation). The term consists of two parts, the second part being placed between parentheses. This notation is used for terms which basically consist of the first part which is sometimes followed by the part between parentheses.

THE GLOSSARY

Absolute counting. A measurement under such well-defined conditions that the activity of a sample can be derived directly from the observed count rate.

Absolute full energy peak efficiency. see: full energy peak efficiency, absolute

Absolute photopeak efficiency. see: photopeak efficiency, absolute

Absorbed dose. see: dose, absorbed

Absorber. A substance used to absorb energy from any type of radiation.

Absorption (energy). A phenomenon in which radiation transfers to matter which it traverses some or all its energy.

Absorption coefficient (energy). Of a substance, for a parallel beam of electromagnetic radiation of specified energy: the quantity \( \mu \) in the expression \( \mu \Delta x \) for the fraction of the energy removed by absorption in passing through a thin layer of thickness \( \Delta x \) of that substance. In general, a specification is added of the type of interaction in the energy absorption process (e.g. photoelectric, Compton, pair, total). For radiation consisting of charged particles, stopping power is preferred.

Note: A list of existing glossaries consulted during the preparation of these recommendations is given at the end.
Abundance, isotopic. The relative number of atoms of a particular isotope in a mixture of the isotopes of an element, expressed as a fraction of all the atoms of the element.

Abundance, natural isotopic. Of a specified isotope of an element, the isotopic abundance in the element as found in nature.

Accuracy. A quantity referring to the differences between the mean of a set of results or an individual result and the value which is accepted as the true or correct value for the quantity measured.

Activation. The process of inducing radioactivity by irradiation. In general, a specification is added of the type of incident radiation (e.g. nuclear, neutron, photon) or its energy (e.g. thermal, fast).

Activation analysis (nuclear). A method of elemental analysis based on the measurement of characteristic radiation from nuclides formed directly or indirectly by activation. In general, a specification is added of the type of the incident radiation (e.g. neutron, photon) and its energy (e.g. thermal, fast).

Activation analysis, instrumental. A method of activation analysis in which element specificity is obtained by using appropriate irradiation conditions, radiation measurement techniques and mathematical techniques for the interpretation of the measurement results.

Activation analysis, non destructive. An activation analysis procedure in which after the irradiation, no chemical and physical operations are applied which cause a change of any properties of the sample.

Activity. The number of nuclear decays occurring in a given quantity of material in a small time interval, divided by that time interval.

Activity concentration. For a specified isotope, the activity of a material divided by its volume.

Activity, specific. For a specified isotope, the activity of a material divided by its mass.

Alpha decay. Radioactive decay in which an alpha particle is emitted.

Alpha particle. A helium-4 nucleus emitted during a nuclear transformation.

Amplifier, biased linear pulse. A pulse amplifier which, within the limits of its normal operating characteristics, has a constant gain for that portion of an input pulse that exceeds the threshold value and that produces no output for pulses whose amplitude is below the threshold.

Amplifier, linear pulse. A pulse amplifier which, within the limits of its normal operating characteristics, delivers an output pulse of amplitude proportional to that of the input pulse.

Analog to digital converter (pulse). A pulse amplitude analyser which, for each pulse processed, produces an integer proportional to the height of that pulse.

Analytical quality control. Procedures which give insight in the precision and accuracy of analysis results.

Analytical radiochemistry. That part of analytical chemistry in which the application of radioactivity is an essential step in the analytical procedures.

Annihilation. An interaction between a particle and its antiparticle in which they both disappear.

Annihilation radiation. Radiation resulting from annihilation.

Anti-Compton gamma-ray spectrometer. see: spectrometer, anti-Compton gamma-ray

Antiparticle. Of a given particle, a particle with the same rest mass, where the two can annihilate.

Artificial radioactivity. see: induced radioactivity

Atom. The smallest part of an element, with no net electric charge, which can enter into chemical combinations.
Atomic mass. Rest mass of an atom in its nuclear and atomic ground state.

Atomic mass, relative. The ratio of the mass per atom of an element, averaged over a specified nuclidic composition, to 1/12 of the mass of an atom of nuclide $^{12}$C. The term atomic weight is also used for this quantity.

Atomic mass unit. A special unit of mass, equal to 1/12 of the rest mass of an atom of nuclide $^{12}$C in its nuclear and atomic ground state.

Atomic number. Number of protons contained in a nucleus.

Attenuation. The reduction of a radiation quantity upon passage of radiation through matter resulting from interactions of the radiation with the matter it traverses.

Attenuation coefficient. Of a substance, for a parallel beam of specified radiation: the quantity $\mu$ in the expression $\mu_\Delta x$ for the fraction removed by attenuation in passing through a thin layer of thickness $\Delta x$ of that substance. According as $\Delta x$ is expressed in terms of length, mass per unit area, moles or atoms per unit, $\mu$ is called respectively the linear, mass, molar, or atomic attenuation coefficient.

Auger effect. The emission of an electron from an atom accompanying the filling of a vacancy in an inner electron shell.

Auger electron. Electron originating in the Auger effect.

Auger yield. For a given excited state of a specified atom, the probability that the de-excitation occurs by the Auger effect.

Autoradiograph. A radiograph of an object containing radioactive substance, produced by itself when placed upon photographic plate or film.

Average life. The average life of an atom or nuclear system in a specified state. For an exponentially decaying system, it is the average time for the number of atoms or nuclei in a specified state to decrease by a factor e.

Synonymous with: mean life.

Background (of a device). The term employed to designate the value indicated by a radiation measuring device in the absence of the source whose radiation is to be measured, when the device is placed under its normal conditions of operation.

Background radiation. Radiation from any source other than the one it is desired to detect or measure.

Backscatter. Scattering of radiation in a generally backward direction. In the assay of radioactivity, it applies to the scattering of radiation into the radiation detector from any material except the sample and the detector.

Barn. A unit of area used in expressing nuclear cross-sections; 1 barn = $10^{-28}$ m$^2$.

Becquerel. SI unit of activity equal to one nuclear decay per second (symbol Bq).

Beta decay. Nuclear decay in which a beta particle is emitted or in which orbital electron capture occurs.

Beta particle. A negative or positive electron which has been emitted by a nuclear particle in a nuclear transformation.

Biased linear pulse amplifier. see: amplifier, biased linear pulse

Biological half-life. For a substance the time required for the amount of that substance in a biological system to be reduced to one half of its value by biological processes, when the rate of removal is approximately exponential.

Branching decay. Nuclear decay which can proceed in two or more different ways.

Branching fraction. In branching decay the fraction of nuclei which decay in a specified way.

Branching ratio. The ratio of the branching fractions for two or more specified modes of decay.
Bremsstrahlung. The electromagnetic radiation associated with the acceleration or deceleration of charged particles.

Bremsstrahlung, inner. Bremsstrahlung which may accompany the emission or absorption of a charged particle by a nucleus.

Burn-up. Induced nuclear transformation of atoms during reactor operation.

Burn-up fraction. The fraction of an initial quantity of a given nuclide that has undergone burn-up.

Burn-up, specific. The total energy released through induced nuclear transformations divided by the mass of a nuclear fuel.

Capture. A process in which an atomic or nuclear system acquires an additional particle. In general a specification is added of the type of the captured particle or its energy.

Capture cross-section. The cross-section for capture.

Capture, electron. A nuclear transformation in which the nucleus captures an orbital electron. Often the shell, from which the electron is captured, is indicated. (K-, L-, etc.).

Capture gamma radiation. The gamma radiation emitted in radiative capture.

Capture, radiative. Capture of a particle by a nucleus followed by immediate emission of gamma radiation.

Carrier. A substance in appreciable amount which, when associated with a trace of a specified substance, will carry the trace with it through a chemical or physical process.

Carrier free. A preparation of a radioactive isotope which is free from stable isotopes of the element in question.

Carrier, hold back. A carrier used to prevent a particular species from following other species in a chemical operation.

Carrier, isotopic. A carrier which differs only in isotopic composition from the trace it has to carry.

Cerenkov detector. A charged particle detector based on the Cerenkov effect.

Cerenkov effect. Emission of radiation in the visible and ultraviolet spectrum arising when a charged particle crosses a medium with a velocity greater than that of light in the same medium.

Cerenkov radiation. Radiation resulting from the Cerenkov effect.

Chain fission yield. The fraction of fissions giving rise to nuclides of a particle mass number.

Characteristic X-radiation. X-radiation consisting of discrete wavelengths which are characteristic for the emitting element.

Chemical dosemeter. A dosemeter in which the dose is measured by observing the extent, under specified conditions, of a chemical reaction caused by the ionising radiation to be measured.

Chemical isotope exchange. Exchange of isotopes between different types of molecules or ions in the course of a chemical reaction.

Chemical yield. The fraction of the amount of an element or chemical compound following a specified chemical reaction or separation.

Chemistry, nuclear. That part of chemistry which deals with the study of nuclides and nuclear reactions using chemical methods.

Chemistry, radiation. see: radiation chemistry

Coincidence, prompt. The occurrence of two or more events separated by a time interval which is less than a specified small value.
**Coincidence circuit.** An electronic circuit which produces a usable output pulse only when each of its inputs receives a pulse within a specified time interval.

**Coincidence, delayed.** The occurrence of two or more events separated by a short but measurable time interval.

**Coincidence, true.** A coincidence of events occurring in the same atom or in physically connected atoms.

**Coincidence resolving time.** The greatest time interval that can elapse between the occurrence of two or more consecutive signal pulses, in order that the measuring device processes them as a coincidence.

**Collimation.** The limiting of a beam of radiation to the required dimensions and angular spread.

**Collimator.** An arrangement of absorbers used for collimation.

**Compton effect.** The elastic scattering of a photon by an electron which afterwards occurs as a free electron. Part of the energy and momentum of the incident photon is transferred to the electron and the remaining part is carried away by the scattered photon. Synonymous with: Compton scattering.

**Compton electron.** The energetic electron resulting from the Compton effect.

**Conversion electron.** Electron ejected from the atom in the process of internal conversion.

**Conversion, internal.** A transition between two energy states of a nucleus where the energy difference is given to an orbital electron which is thereby ejected from the atom.

**Conversion coefficient, internal.** For a transition between two specified energy levels of nuclide, the ratio of the transition probabilities for internal conversion and gamma ray emission.

**Cooling, radioactive.** Of a strongly radioactive material, the decrease of its activity by nuclear decay.

**Count.**
1. Information corresponding to a pulse processed for counting.
2. Number of pulses recorded during a measurement.

**Counter tube.** Radiation detector consisting of a gas-filled tube or valve whose gas amplification is much greater than one, and in which the individual ionizing events give rise to discrete electrical pulses. Often an expression is added indicating the geometry (e.g. end window), composition of the gas (e.g. helium) or the physical process essential for its operation (e.g. proton recoil, fission).

**Counter tube, Geiger-Müller.** A counter tube operated under such conditions that the magnitude of each pulse is independent of the amount of energy deposited in it.

**Counter tube, proportional.** A counter tube operated under such conditions that the magnitude of each pulse is proportional to the amount of energy deposited in it.

**Counter, radiation.** Radiation measuring assembly comprising a radiation detector in which individual ionizing events cause electrical pulses and the associated equipment for processing and counting the pulses. Often an expression is added indicating the type of the radiation detector (e.g. scintillation, semiconductor).

**Counting efficiency.** The ratio between the number of particles or photons counted with a radiation counter and the number of similar particles or photons emitted by the radiation source.

**Counting loss.** A reduction of the counting rate resulting from phenomena such as the resolving time or the dead time.

**Counting rate.** The number of counts occurring in unit time.
Cross-section (microscopic). A measure of the probability of a specified interaction or reaction between an incident radiation and a target particle or system of particles. It is the reaction rate per target particle for a specified process divided by the flux density of the incident radiation. In general, a specification is added of the type of radiation (e.g. neutron, photon), the energy of the incident radiation (e.g. thermal, epithermal, fast) and the type of interaction or reaction (e.g. activation, fission, scattering).

Cross-section, activation. The cross-section for the formation of a radionuclide by a specified reaction.

Cross-section, capture. The cross-section for capture.

Cross-section, effective thermal. A fictitious cross-section for a specified reaction which, when multiplied by the 2200-metre-per-second flux density, gives the correct reaction rate.

Synonymous with: Westcott cross-section.

Cross-section, macroscopic. The cross-section per unit volume of a given material for a specified process. For a pure nuclide, it is the product of the microscopic cross-section and the number of target nuclei per unit volume; for a mixture of nuclides, it is the sum of such products.

Cross-section, Westcott. see: cross-section, effective thermal

Crystal diffraction spectrometer. see: spectrometer, crystal diffraction

Cumulative fission yield. The fraction of fissions which have resulted in the production of a given nuclide, either directly or indirectly, up to a specified time. If no time is specified, the yield is considered to be the asymptotic value.

Curie. A unit of activity equal to exactly 3.7 x 10¹⁰ nuclear decays per second or 3.7 x 10¹⁵ Becquerel.

Cyclotron. A particle accelerator in which the particles travel in a succession of semicircular orbits of increasing radii under the influence of a magnetic field and are accelerated at the beginning of each such orbit by traversing an electric field produced by a high-frequency generator.

Dating, radioactive. The determination of the radioactive age of an object from its content of radioactive substances and of their daughter products.

Daughter product. Any nuclide which follows a specified radionuclide in a decay chain.

Dead time. Constant and known value imposed on the resolving time by a paralysis circuit, usually in order to make the correction for resolving time losses more accurate.

Dead time correction. Correction to be applied to the observed number of pulses in order to take into account the number of pulses lost during the resolving or dead time.

Decay chain. A series of nuclides in which each member transforms into the next through nuclear decay until a stable nuclide has been formed.

Synonymous with: radioactive chain and radioactive series.

Decay constant. For a radionuclide: the probability $\lambda$ for the nuclear decay of one of its nuclei in unit time. It is given by $\lambda = -\frac{1}{N_t} \frac{dN_t}{dt}$, in which $N_t$ is the number of nuclei of concern existing at time $t$.

Synonymous with: disintegration constant.

Decay curve. A graph showing the relative amount of radioactive substance remaining after any time interval.

Decay, radioactive. Nuclear decay in which particles or gamma radiation are emitted or the nucleus undergoes spontaneous fission.

Decay, nuclear. A spontaneous nuclear transformation.

Decay, scheme. A graphical representation of the energy levels of the members of a decay chain showing the way along which nuclear decay occurs.

Detection efficiency. The ratio between the number of particles or photons detected and the number of similar particles or photons emitted by the radiation source.
Detector, 1/v. A neutron detector for which the cross-section of the detection reaction varies inversely with neutron speed.

Detector, diffused junction semiconductor. A semiconductor detector in which the P-N or N-P junction is produced by diffusion of donor or acceptor impurities.

Detector efficiency (intrinsic). The ratio of the number of particles or photons detected to the number of similar particles or photons which have struck the envelope limiting the sensitive volume of a radiation detector.

Detector, foil. see: foil detector

Detector, liquid scintillator. A scintillator detector of which the scintillating medium is a liquid. The sample is often dissolved in the scintillating liquid.

Detector, radiation. An apparatus or substance for the conversion of radiation energy to a form of energy which is suitable for indication and or measurement.

Detector, scintillation. see: scintillation detector

Detector, semiconductor. see: semiconductor detector

Diffused junction semiconductor detector. see: semiconductor detector, diffused junction

Discriminator. A basic function unit comprising an electronic circuit which gives an output pulse for each input pulse whose amplitude lies above a given threshold value.

Disintegration constant. see: decay constant

Disintegration, nuclear. Nuclear decay involving a splitting into more nuclei or the emission of particles.

Disintegration rate. see: activity

Dose. A general term denoting the quantity of radiation or energy absorbed. For special purposes, it must be appropriately qualified c.q. absorbed, maximum permissible, mean lethal.

Dose, absorbed. The energy imparted to matter by ionizing radiation in a suitable small element of volume divided by the mass of that element of volume.

Dose equivalent (effective). The absorbed dose multiplied by the quality factor and the product of all other modifying factors N, aimed at expressing on a common scale, for different types of radiations and distributions of absorbed dose, the biological effects associated with an exposure.

Effective cadmium cut-off (energy). In a given experimental configuration, the energy value determined by the condition that the detector response would be unchanged if the cadmium cover surrounding the detector was replaced by a fictitious cover opaque to neutrons with energy below this value and transparent to neutrons with energy above this value.

Effective thermal cross-section. see: cross-section, effective thermal

Efficiency (of a counter). see: counting efficiency

Efficiency, intrinsic. see: detector efficiency

Effluent, radioactive. Any solid, liquid or gaseous radioactive waste material discharged from a system.

Elastic scattering. see: scattering, elastic

Electron. A stable elementary particle having an electric charge of \( \pm 1.60219 \times 10^{-19} \text{C} \) and a rest mass of \( 9.1095 \times 10^{-31} \text{kg} \). When used without specification the term means the negatively charged electron, which is also called the negaton. Its anti-particle, the positively charged electron, is called positron.

Electron capture. see: capture, electron

Electron, Compton. see: Compton electron

Electron, conversion. see: conversion electron
Elementary particle. see: particle, elementary

Energy (of a radiation). Energy of the individual particles or photons of which a radiation consists.

Energy dispersive X-ray fluorescence analysis. A method of X-ray fluorescence analysis where element specificity is obtained by measuring the energy spectrum of the induced X-radiation.

Energy flux density. see: flux density, energy

Energy resolution. A measure, at given energy, of the smallest difference between the energies of two particles or photons capable of being distinguished by a radiation spectrometer.

Energy threshold. The limiting kinetic energy of an incident particle or energy of an incident photon (both expressed in the laboratory system) below which a specified process cannot take place.

Enrichment. Any process by which the isotopic abundance of a specified isotope in a mixture of isotopes of an element is increased.

Enrichment factor. For a material enriched in a specified isotope, the ratio between the isotopic abundance and the natural abundance of that isotope.

Epicadmium neutrons. see: neutrons, epicadmium

Epithermal neutrons. see: neutrons, epithermal

Equilibrium, radioactive. Among the members of a decay chain, the state which prevails when the ratios between the activities of successive members remain constant.

Equilibrium, secular. Radioactive equilibrium where the half life of the precursor isotope is so long that the change of its activity can be ignored during the period of interest and all activities remain constant.

Escape peak, double. In a gamma-ray spectrum, the peak due to pair production in the detector and escape, from the sensitive part of the detector, of two photons of 511 keV resulting from annihilation.

Escape peak, single. In a gamma-ray spectrum, the peak due to pair production in the detector and escape, from the sensitive part of the detector, of one of the photons of 511 keV resulting from annihilation.

Escape peak, X-ray. In a gamma or X-ray spectrum, the peak due to the photoelectric effect in the detector and escape, from the sensitive part of the detector, of the X-ray photon emitted as a result of the photoelectric effect.

Excitation. Process causing the transition of a system from one state to another of higher energy.

Excitation energy. Minimum energy required to bring a system to a specified higher energy level.

Excited state. State of a system with energy higher than that of the ground state.

Exponention decay. Variation of a quantity (generally the activity of a quantity of a radionuclide) according to the law \( A = A_0 e^{-\lambda t} \) where \( A \) and \( A_0 \) are the values of the quantity being considered at time \( t \) and zero respectively, and \( \lambda \) is an appropriate constant.

Exposure. For X- or gamma radiation in air: the sum of the electrical charges of all the ions of one sign produced when all electrons liberated by photon in a suitably small element of volume of air completely stopped, divided by the mass of the air in the volume element.

Extrapolated range. The distance from a radiation source, calculated by extrapolation to zero of the flux density, of the tangent to the flux density versus distance curve, taken at the point where the flux density has decreased to one half of its initial value.

Fall out, radioactive. The deposition on the ground of radioactive substances from nuclear explosions and other injections of radioactive material into the atmosphere.

Fast neutrons. see: neutrons, fast
Fertile.
1. Of a nuclide: capable of being transformed, directly or indirectly, into a fissile nuclide by neutron capture.
2. Of a material: containing one or more fertile nuclides.

Film badge. A package containing one or more small photographic films for approximate measurement of radiation exposure, used for the purpose of monitoring personnel.

Filter (of a radiation). Material interposed in the path of heterogeneous radiation to modify the spectral distribution of the radiation.

Fissile.
1. Of a nuclide: capable of undergoing fission by interaction with (slow) neutrons.
2. Of a material: containing one or more fissile nuclides.

Fission fragments. Nuclei resulting from fission and possessing kinetic energy acquired from the fission process.

Fission neutrons. see: neutrons, fission

Fission, nuclear. The division of a nucleus into two or more parts with masses of equal order of magnitude, usually accompanied by the emission of neutrons, gamma radiation and, rarely, small charged nuclear fragments.

Fission products. Nuclides produced by fission and the daughter products of these nuclides.

Fission, spontaneous. Nuclear fission which occurs without the addition of particles or energy to the nucleus.

Fission, thermal. Fission caused by thermal neutrons.

Fission yield. The fraction of fissions leading to fission products of a given type.

Fission yield, chain. The fraction of fissions giving rise to nuclei of particle mass number.

Fission yield, cumulative. The fraction of fissions which have resulted in the production of a nuclide either directly or indirectly, up to a specified time. If no time is specified, the yield is considered to be the asymptotic value.

Fission yield, direct. The fraction of fissions giving rise to a particular nuclide before any nuclear decay has occurred.

Fissionable. see: fissile

Fluorescence. Luminescence which occurs essentially only during irradiation.

Fluorescence yield. For a given excited state of a specified atom, the ratio of the number of excited atoms which emit a photon to the total number of excited states.

Flux density, energy. For mono-directional radiation, the energy traversing in a time interval a small area perpendicular to the direction of the energy flow, divided by that time interval and by that area.

Flux density, neutron. see: flux density, particle

Flux density, particle, photon. At a given point in space, the number of particles or photons incident in a time interval on a suitably small sphere centered at that point, divided by the cross-sectional area of that sphere and by that time interval. The particle flux density is identical with the product of the particle density and the average speed of the particles.

Flux density, 2200-metre-per-second. A fictitious flux density as the product of the total number of neutrons per cubic metre and a neutron speed of 2200 metres per second.

Flux depression. The lowering of the particle flux density in the neighborhood of a sample due to absorption of particles in the sample.

Flux monitor. A known amount of activatable material irradiated together with a sample; the induced radioactivity is used as a measure for a particular flux density during the irradiation.
Flux perturbation. The lowering of the flux density in a sample as a result of both flux depression and self shielding. Sometimes a specified flux density can increase as a result of the change of the energy of the particles in the sample, e.g., the increase of the thermal neutron flux density in hydrogen containing material.

Foil detector. A small piece of foil used to measure flux densities by activation.

Fuel cycle. The sequence of steps, such as utilization, reprocessing, and refabrication, through which nuclear fuel may pass.

Fuel element. The smallest structurally discrete part of a reactor which has fuel as its principal constituent.

Fuel, nuclear. Material containing fissile nuclides, when placed in a reactor, enables a chain reaction to be achieved.

Fuel reprocessing. The processing of nuclear fuel, after its use in a reactor, to remove fission products and recover fissile and fertile material.

Full energy peak. Of a spectrum of radiation, the part of the spectral response curve corresponding to the total absorption in a detecting material of the energy of the detected radiation.

Full energy peak efficiency, absolute. Of a radiation spectrometer, the counting efficiency when considering only the events recorded in the full energy peak.

Full energy peak efficiency, intrinsic. The detector efficiency when considering only events where the total energy of the radiation is absorbed in the sensitive volume of the detector.

Full width at half maximum. In a distribution curve comprising a single peak, the distance between the abcissa of the two points on the curve whose ordinates are half of the ordinate of the peak.

Fusion, nuclear. The process in which nuclei undergo nuclear fission reactions.

Fusion reaction, nuclear. A reaction between two light nuclei resulting in the production of a nuclear species heavier than either initial nucleus.

Gamma cascade. Two or more different gamma rays emitted successively from one nucleus when it passes through one or more energy levels.

Gamma quantum. A photon of gamma radiation.

Gamma radiation. Electromagnetic radiation emitted in the process of nuclear transformation or particle annihilation.

Gamma radiation, capture. see: capture gamma radiation

Gamma-ray spectrometer. A measuring assembly for determining the energy spectrum of gamma rays.

Gamma-ray spectrometer, Anti-Compton. A gamma-ray spectrometer in which the effect of the Compton scattering is at least partly compensated.

Geiger-Müller counter tube. see: counter tube, Geiger-Müller

Geiger-Müller region. The range of operating voltage of a counter tube in which each ionizing event gives rise to an output pulse having amplitude independent of the number of ions initially produced in the sensitive volume by that ionizing event.

Geiger-Müller threshold. The minimum voltage necessary for a counter tube to operate in the Geiger-Müller region.

Geometric attenuation. The reduction of a radiation quantity due to the effect only of the distance between the point of interest and the source, excluding the effect of any matter present.

Geometry, (counting). A term used colloquially to signify the arrangement in space of the various components in an experiment, particularly the source and the detector in radiation measurements.
Geometry factor. The average solid angle in steradians at the source subtended by the aperture or sensitive volume of the detector, divided by $4 \pi$.

Glove box. An enclosure in which material may be manipulated in isolation from the operator's environment. This manipulation is effected by gauntlet gloves or flexible plastic devices fixed to ports in the walls of the box.

Gray. SI unit of absorbed dose; $1 \text{ Gy} = 1 \text{ J/kg}$.

Ground state. The state of lowest energy of a system.

Growth curve (of activity). Curve giving the activity of a radioactive nuclide as function of time and showing the increase of the activity through the decay of the parent substance or as a result of activation.

$G$-value. The number of specified chemical events in an irradiated substance produced per $100 \text{ eV}$ of energy absorbed from ionizing radiation.

Half life, radioactive. For a single radioactive decay process, the time required for the activity to decrease to half its value by that process.

Half-thickness. The thickness of a specified substance which, when introduced into the path of a given beam of radiation, reduced the value of a specified radiation quantity by one half.

Half-value layer & Half-value thickness. see: half-thickness

Heavy water. Water containing a significant fraction (up to 100%) of deuterium in the form of $\text{D}_2\text{O}$ or $\text{HDO}$.

Hold back carrier. see: carrier, hold back

Hot atom. An atom in an excited energy state or having kinetic energy above the ambient thermal level, usually as a result of nuclear processes.

Hot cell. A heavily shielded enclosure for highly radioactive materials. It may be used for their handling or processing by remote means or for their storage.

Induced radioactivity. Radioactivity induced by irradiation.

Inelastic scattering. Scattering in which the total kinetic energy changes.

Infinite source thickness. For a specified radiation, the minimum thickness of a flat preparation of a radioactive material where the intensity of the specified radiation at the surface does not increase when the thickness is increased by adding more of similar radioactive material.

Inner Bremsstrahlung. see: Bremsstrahlung, inner

Instrumental activation analysis. see: activation analysis, instrumental

Intensity of radiation. The energy per unit time entering a small sphere in a time interval, divided by the area of the great circle of the sphere and the time interval. For monodirectional radiation, this reduces to the energy flux density.

Intercomparison, analytical. A procedure which gives insight in the accuracy of results of analytical procedures by comparing the results obtained in the analyses of identical samples at different laboratories and preferably with different analytical methods.

Internal conversion. see: conversion, internal

Internal conversion coefficient. see: conversion coefficient, internal

Intrinsic efficiency. see: efficiency, intrinsic

Intrinsic full energy peak efficiency. see: full energy peak efficiency, intrinsic

Intrinsic photopeak efficiency. see: photopeak efficiency, intrinsic

Inverse square law. The intensity of radiation from a point source in free space is inversely proportional to the square of the distance from the source. Presence of absorbers necessitates corrections to this law.
Ion. A atomic or molecular particle having a net electric charge.

Ionization. The formation of ions by addition or removal of electrons from atoms, molecules, or groups of molecules or by the division of molecules.

Ionization chamber. A radiation detector which employs an electric field for the collection at the electrodes of charges associated with the ions produced in the sensitive volume by ionizing radiation, without charge multiplication. The solid angle (2π, 4π) subtended when using the detector, is sometimes specified.

Ionization energy. The minimum energy required to ionize an atom or a molecule which is originally in the ground state.

Ionizing radiation. Any radiation consisting of directly or indirectly ionizing particles or a mixture of both or photons with energy higher than the energy of photons of ultraviolet light or a mixture of both such particles and photons.

Irradiation. Exposure to ionizing radiation.

Isobars, nuclear. Nuclides having the same mass number but different atomic numbers.

Isomeric state. An nuclear state having a mean life long enough to be observed.

Isomeric transition. A spontaneous transition between two isomeric states of a nucleus.

Isomers, nuclear. Nuclides having the same mass number and atomic number, but occupying different nuclear energy states.

Isotones. Nuclides having the same neutron number but different atomic numbers.

Isotopes. Nuclides having the same atomic number but different mass numbers.

Isotope dilution. Mixing of a given nuclide with one or more of its isotopes.

Isotope dilution analysis. A method of quantitative analysis based on the measurement of the isotopic abundance of a nuclide after isotopic dilution with the sample to be analyzed.

Isotope dilution analysis, substoichiometric. A method of isotope dilution analysis in which the final isotopic abundance is estimated from the amount of the nuclide present in a well known quantity of the relevant element separated from the sample, where this quantity is smaller than the total amount of that element present in the sample.

Isotope exchange. The exchange of places between isotopes of atoms in different valency states, in different molecules or ions, or in different sites in the molecule or ion.

Isotopic separation. Operation for the purpose of modifying an isotopic abundance in a mixture of isotopes.

Isotopic abundance. see: abundance, isotopic

Isotopic tracer. see: tracer, isotopic

Label. A marker, tag or indicator distinguishable by the observer but not by the system and used to identify a tracer.

Labelled. Made identifiable by a label.

Synonymous with: tagged.

Linear electron accelerator. An evacuated metal tube in which electrons pass through a series of small gaps (usually in the form of cavity resonators in the high frequency range) so arranged and spaced that, at a specific excitation frequency, the stream of electrons on passing through successive gaps gains additional energy from the electric field in each gap.

Linear energy transfer. The average energy locally imparted to a medium by a charged particle of specified energy, per unit distance traversed.

Linear pulse amplifier. see: pulse amplifier, linear

Liquid scintillator counter. A radiation counter comprising a liquid scintillator detector.

Liquid scintillator detector. see: detector, liquid scintillator
Live time. For a measurement, the time during which a radiation measuring assembly is capable of processing events occurring in the radiation detector. It equals the clock time minus the integrated resolving or dead time.

Luminescence. A phenomenon in which the absorption of primary radiation by a substance gives rise to the emission of electromagnetic radiation characteristic for that substance.

Manipulator. A hand-operated or controlled device for remotely handling radioactive materials.

Mean life, radioactive. The average lifetime of a radioactive nuclide.

Mean linear range. see: range, mean linear

Mean mass range. see: range, mean mass

Mean life, radioactive. The average lifetime of a radioactive nuclide.

Mean linear range. see: range, mean linear

Mean mass range. see: range, mean mass

Mean linear range. see: range, mean linear

Mean mass range. see: range, mean mass

Measured spectrum. see: spectrogram

Metastable state. An isomeric state in an energy state higher than the ground state.

Moderation. Reduction of the neutron energy by scattering without appreciable capture.

Moderator. A material used to reduce neutron energy by moderation.

Monitor, flux. see: flux monitor

Mono-energetic radiation. Radiation consisting of particles of a single kinetic energy or photons of a single energy.

Mössbauer effect. Resonance absorption of gamma radiation by nuclei arranged in a crystal lattice in such a way that the recoil momentum is shared by many atoms.

Multiplication neutron. The process in which a neutron produces on the average more than one neutron in a medium containing fission material.

Multichannel pulse height analyzer. see: pulse height analyser, multichannel

N. In dosimetry, the factor designed to take into account all parameters influencing a dose equivalent, except the absorbed dose and type and energy of the radiation.

Natural isotopic abundance. see: abundance, natural isotopic

Natural radioactivity. Radioactivity of naturally occurring nuclides in materials where the isotopic abundance of that nuclide is natural.

Neutron activation. see: activation

Neutron density. The number of free neutrons divided by the containing volume. Partial densities may be defined for neutrons characterized by such parameters as energy and directions.

Neutron temperature. The temperature assigned to a population of neutrons when this population is approximated by a Maxwellian distribution.

Neutrons, cold. Neutrons with a neutron temperature considerably lower than normal room temperature.

Neutrons, delayed. Neutrons emitted by fission products formed by nuclear decay (the observed delay is due to the preceding nuclear decay or decay).

Neutrons, epicadmium. Neutrons of kinetic energy greater than the effective cadmium cut-off.

Neutrons, epithermal. Neutrons of kinetic energy greater than that of thermal agitation. The term is often restricted to energies just above thermal.

Neutrons, fast. Neutrons of kinetic energy greater than some specified value. This value may vary over a wide range and will be dependent upon the application, such as reactor physics, shielding or dosimetry.

Neutrons, fission. Neutrons originating in the fission process which have retained their original energy.
Neutrons, intermediate. Neutrons of kinetic energy between the energies of slow and fast neutrons. In reactor physics, the range might be 1 eV to 0.1 MeV.

Neutrons, prompt. Neutrons accompanying the fission process without measurable delay.

Neutrons, resonance. Neutrons the energy of which corresponds to the resonance energy of a specified nuclide or element. If the nuclide is not specified, the term refers to resonance neutrons of $^{238}\text{U}$.

Neutrons, slow. Neutrons of kinetic energy less than some specified value. This value may vary over a wide range and depends on the application. In reactor physics, the value is frequently chosen to be 1 eV; in dosimetry, the effective cadmium cut-off is used.

Neutrons, thermal. Neutrons in thermal equilibrium with the medium in which they exist.

Non-destructive activation analysis. see: activation analysis (nuclear)

Nuclear activation analysis. see: activation analysis (nuclear)

Nuclear chemistry. see: chemistry, nuclear

Nuclear fission. see: fission, nuclear

Nuclear fusion. see: fusion, nuclear

Nuclear isomers. see: isomers, nuclear

Nuclear level. One of the energy values at which a nuclide can exist for an appreciable time ($>10^{-11}$ s).

Nuclear particle. see: particle, nuclear

Nuclear reactor. see: reactor, nuclear

Nuclear transformation. see: transformation, nuclear

Nuclear transition. see: transition, nuclear

Nucleon. A proton or a neutron.

Nucleon number. Number of nucleons in a nucleus.

Nucleus. The positively charged central portion of an atom, excluding the orbital electrons.

Nuclide. A species of atom characterized by its mass number, atomic number, and nuclear energy state, provided that the mean life in that state is long enough to be observable.

Nuclidic mass. The rest mass of a nuclide expressed in atomic mass units.

Pair attenuation coefficient. The attenuation coefficient when only the pair production process is taken into account.

Pair production. The simultaneous formation of an electron and a positron as a result of the interaction of a photon of sufficient energy ($>1.02$ MeV) with the field of a particle.

Partial decay constant. For a radionuclide: the probability in unit time for the decay of one of its nuclei by one of several modes of decay.

Particle. A nuclear or an elementary particle.

Particle density. The number of particles divided by the containing volume.

Particle flux density. see: flux density, particle

Particle, nuclear. A nucleus or any of its constituents in any of their energy states.

Particle, elementary. A particle in which, at the present, no structure can be observed at moderate energies.

Peak analysis. The extraction of relevant peak parameters (i.e. position, area) from a measured spectrum.
Peak area method. A method of peak analysis in which a peak area is calculated by subtracting an estimate of the underlying continuum in a relevant part of a measured spectrum.

Peak fitting. A method of peak analysis in which a relevant part of a spectrum is fitted with a theoretical response function.

Photoelectric attenuation coefficient. The attenuation coefficient when only the photoelectric process is taken into account.

Photoelectric effect. The complete absorption of a photon by an atom with the emission of an orbital electron.

Photoelectric peak. Of a spectrum of gamma radiation, the part of the spectral response curve corresponding to the absorption in the radiation detector by the photoelectric effect of the detected gamma energy. In most cases the peak also contains events caused by multiple processes and use of the expressions total absorption peak or full energy peak is to be preferred.

Photopeak. see: photoelectric peak

Photopeak efficiency, absolute. Of a gamma-ray spectrometer, the counting efficiency when only considering the events recorded in the photopeak.

Photopeak efficiency, intrinsic. The detector efficiency when only considering counts resulting from the photoelectric effect.

Pile-up. The processing by a radiation spectrometer of pulses resulting from the simultaneous absorption of independent particles or photons in a radiation detector. As a result they are counted as one single particle or photon with energy between the individual energies and the sum of these energies.

P.I.N. semiconductor detector. see: semiconductor detector, P.I.N.

Positron. A positively charged electron.

Precision. A measure for the reproducibility of measurements within a set, that is, of the scatter or dispersion of a set about its central value.

Precursor. Of a nuclide, any radioactive nuclide which precedes that nuclide in a decay chain.

Proportional counter tube. see: counter tube, proportional

Proton number. see: atomic number

Pulse amplitude analyzer. A sub-assembly for determining this distribution function of a set of pulse in terms of their amplitude.

Pulse amplitude selector. A circuit which gives an output pulse for each input pulse whose amplitude lies within a chosen interval.

Pulse height analyzer. see: pulse amplitude analyzer

Pulse height analyzer, multi-channel. A pulse amplitude analyzer which includes a storage function to record the number of pulses received per channel.

Pulse height analyzer, single channel. see: pulse amplitude selector

Purity, isotopic. see: abundance, isotopic
Purity, radionuclidic. Of a material, that fraction of the total activity which is present in the form of the stated radionuclide (including its daughter products).

Purity, radiochemical. For a material, the fraction of the stated isotope present in the stated chemical form.

Quality factor. The linear-energy-transfer-dependent factor by which absorbed dose is multiplied to obtain dose equivalent.

Quenching. The process of inhibiting continuous or multiple discharges following a single ionizing event in certain types of radiation detectors, particularly in Geiger-Müller counter tubes.

Rabbit. A small container propelled pneumatically or hydraulically through a tube leading from the laboratory to a location in a nuclear reactor or other device where irradiation of a sample can take place.

Rad. A unit of absorbed dose. 1 rad = $10^{-2}$ J/kg.

Radiation. A term embracing electromagnetic waves as well as fast moving particles.

Radiation, annihilation. see: annihilation radiation

Radiation, background. see: background radiation

Radiation, Cerenkov. see: Cerenkov radiation

Radiation chemistry. That part of chemistry which deals with the chemical effects of ionizing radiation, as distinguished from photochemistry associated with visible and ultraviolet electromagnetic radiation.

Radiation counter. see: counter, radiation

Radiation detector. see: detector, radiation

Radiation hazard. Hazard that exists in a region where there is a radiation field, other than what is considered to be normal background radiation.

Radiation, ionizing. see: ionizing radiation

Radiation, mono-energetic. see: mono-energetic radiation

Radiation, natural. Radiation originating from natural radioactivity.

Radiation source. An apparatus or material emitting or capable of emitting ionizing radiation.

Radiation spectrum. The components of radiation arranged in order of their wavelengths, frequencies or quantum energies. For particle radiation they are arranged in order of their kinetic energies.

Radiative capture. see: capture, radiative

Radioactive age. Of an object, the time, estimated from measurement of the isotopic composition, during which the content of a radioactive species within that object has remained unchanged except for nuclear decay.

Radioactive chain. see: decay chain

Radioactive contamination. A radioactive substance in a material or place where it is undesirable.

Radioactive dating. see: dating, radioactive

Radioactive decay. see: decay, radioactive

Radioactive equilibrium. see: equilibrium, radioactive

Radioactive fall out. see: fall out, radioactive

Radioactive half-life. see: half-life, radioactive

Radioactive series. see: decay chain
Radioactive source. Any quantity of radioactive material which is intended for use as a source of ionizing radiation.

Radioactive tracer. A tracer containing a radioactive label.

Radioactive waste. Unwanted radioactive materials obtained in the processing or handling of radioactive materials.

Radioactivity. The property of certain nuclides of showing radioactive decay.

Radioactivity, artificial. see: induced radioactivity

Radioactivity, induced. see: induced radioactivity

Radioactivity, natural. see: natural radioactivity

Radioanalytical chemistry. see: analytical radiochemistry

Radiochemical purification. Chemical separation applied to a radioactive preparation in order to improve the radiochemical purity.

Radiochemical purity. see: purity, radiochemical

Radiochemical separation. Separation by a chemical means of the radioactive isotopes of (a) specified element(s) from a mixture of isotopes.

Radiochemical yield. For the isotopes of a specified element, the yield of a radiochemical separation, expressed as a fraction of the activity originally present.

Radiochemistry. That part of chemistry which deals with radioactive materials. It includes the production of radionuclides and their compounds by processing irradiation or naturally occurring radioactive materials, the application of chemical techniques to nuclear studies, and the application of radioactivity to the investigation of chemical problems.

Radiochromatograph. A measuring assembly designed to measure the spatial or time distribution of the activity of a mixture of radioactive components after separation by a chromatographic method.

Radiocolloid. A colloid in which some atoms are radioactive.

Radioisotope. A radioactive isotope of a specified element.

Radiolysis. The chemical decomposition of materials by ionizing radiation.

Radionuclidic purity. see: purity, radionuclidic

Random coincidence. A coincidence of events occurring in not physically connected nuclei.

Range, extrapolated. see: extrapolated range

Range, mean linear. In a given material, for specified charged particles of a specified energy, the average displacement of the particles before they stop.

Range, mean mass. The mean linear range multiplied by the mass density of the material.

Ratemeter. An electronic sub-assembly which gives a continuous indication proportional to the average counting rate over a predetermined time interval (time constant).

Reactor, nuclear. A device in which a self-sustaining nuclear fission chain reaction can be maintained and controlled. The term is sometimes applied to a device in which a nuclear fusion reaction can be produced and controlled.

Recoil. The motion acquired by a particle through a collision with or the emission of another particle or electromagnetic radiation.

Reference material. A homogeneous material, available in sufficient amounts, which can be used for comparing analysis results obtained at different laboratories and/or with different techniques.

Relative atomic mass. see: atomic mass, relative

Relative counting. A measurement in which the activity of a sample is derived from the ratio between the count rates observed for the sample and for a source of known activity.
Relative biological effectiveness. The ratio of the appropriate value of the biological effectiveness of the radiation in question to that of X-radiation with an average specific ionization of 100 ion pairs per micron of water, for the particular biological effect under consideration and for the condition under which the radiation is received.

Rem. A unit of dose equivalent. 1 Rem = $10^{-2}$ J/kg.

Resolving power. The central position of the response curve of a spectrometer of monoenergetic radiation divided by the width at one half of its height. Sometimes the width at 1/e-th of its height, sometimes the inverse of the above definition is used.

Resolving time. The smallest time interval which must elapse between the occurrence of two consecutive ionising events or signal pulses, in order that the measuring device be capable of fulfilling its function of each of them separately.

Resolving time, coincidence. see: coincidence resolving time

Resolving time correction. Correction to be applied to the observed number of pulses in order to take into account the number of pulses lost during the resolving time.

Retention. Of atoms undergoing a nuclear transformation, that fraction which remains in or reverts to its initial chemical form.

Roentgen. A unit of exposure. 1 R = $2.58 \times 10^{-2}$ C/kg.

Resonance energy. The energy of a particle entering a nuclear reaction, this energy being just sufficiently high to lead to the formation of reaction products in one of their excited states.

Saturation. Of an irradiated element for a specified isotope, the steady state reached when the disintegration rate of the nuclide formed is equal to its production rate.

Saturation activity. For a specified isotope, the value of the activity of an irradiated element, when a state of saturation is reached.

Scaler. A sub-assembly for counting electrical pulses and containing one or more scaling circuits.

Scattering. A process in which a change in direction or energy of an incident radiation is caused by interaction with a particle, a system of particles, or a photon.

Scattering, Compton. see: Compton effect

Scattering, elastic. Scattering in which the total kinetic energy is unchanged.

Scattering, inelastic. Scattering in which the total kinetic energy changes.

Scavenging.

In radiation chemistry: binding radicals or free electrons with a scavenger.

In radiochemistry: the use of a precipitate to remove from solution by absorption or coprecipitation, a large fraction of one or more radionuclides.

Scavenger. A reagent used for scavenging.

Scintillation. Burst of luminescence of short duration caused by an individual high-energy particle.

Scintillation counter. Radiation counter incorporating a scintillation detector.

Scintillation detector. A radiation detector using a medium in which a burst of luminescence radiation is produced along the path of an ionizing particle.

Scintillation spectrometer. A measuring assembly incorporating a scintillation detector and a pulse amplitude analyser, used for determining the energy spectrum of certain types of radiation.

Scintillator. A finite quantity of scintillating material intended to be the element sensitive to radiation in a scintillation detector.
Scintillating material. Any substance constituting an appropriate medium for the detection of radiation by means of the scintillation phenomenon.

Secondary radiation. Radiation emitted by any matter irradiated with electromagnetic or ionizing radiation.

Secular equilibrium. see: equilibrium, secular

Self-absorption. The absorption of radiation by the emitter.

Self-absorption factor. Of a radiation source, the ratio between a quantity of the radiation emitted by the source and this quantity of the radiation as produced by the radioactive nuclei present in the source.

Synonymous with: source efficiency.

Self shielding. The lowering of the flux density in the inner part of a sample due to absorption in the outer layers of the sample.

Semiconductor. Material whose conductivity, due to charges of both signs, is normally in the range between that of metals and insulators and in which the electric charge carrier density can be changed by external means.

Semiconductor detector. Radiation detector using a semiconductor in which free electric charges are produced along the path of an ionizing particle.

Semiconductor detector, diffused junction. A semiconductor detector in which the P-N or N-P junction is produced by diffusion of donor or acceptor impurities.

Semiconductor detector, P.I.N. A semiconductor detector consisting of a compensated region between a P and a N region. The compensated region is often referred to as 'intrinsic'.

Semiconductor detector, surface barrier. A semiconductor detector utilizing a junction due to a surface inversion layer.

Sensitive volume of a detector. That part of a radiation detector from which an output signal could originate.

Sievert. Unit of dose equivalent. 1 Sv = 1 J/kg.

Single channel pulse height analyzer. see: pulse height analyzer

Specific burn-up. see: burn-up, specific

Source efficiency. see: self-absorption factor

Specific activity. see: activity, specific

Specific ionization. The number of ion pairs formed per unit distance along the track of an ionizing particle passing through matter.

Spectrometer, alpha (beta, gamma-ray). A measuring assembly incorporating a radiation detector and a pulse amplitude analyzer, used for determining the energy spectrum of alpha (beta, gamma) radiation.

Spectrometer, anti-Compton gamma-ray. see: gamma-ray spectrometer, anti-Compton

Spectrometer, crystal diffraction. A spectrometer, in which diffraction by a crystal is used to obtain the energy spectra of electromagnetic radiation as well as of slow neutrons.

Spectrometer, scintillation. see: scintillation spectrometer

Spectrum analysis. The interpretation of the information present in an energy spectrum in terms of radiation energy and intensity.

Spectrum. see: radiation spectrum

Spectrum, measured. see: spectrogram

Spectrogram. A spectrum as recorded by a spectrometer.

Spontaneous fission. see: fission, spontaneous
Standard material. A reference material for which, for specified element concentrations, values are recommended by some official body. These values should be based on the consistent results obtained by using independent analytical techniques.

Standard reference material. Term exclusively used for a standard material issued by the National Bureau of Standards.

Stopping power. Of a substance, for charged particles of specified energy, the average energy loss in passing through a thin layer of that substance, divided by the thickness of that layer.

Surface barrier semiconductor detector. see: semiconductor detector, surface barrier

Szilard—Chalmers effect. The rupture of the chemical bond between an atom and a molecule of which the atom is a part, as a result of a nuclear reaction of that atom.

Tagged. see: labelled

Thermal column. A large body of moderator, adjacent to or inside a reactor to provide thermal neutrons for experiments.

Thermal fission. see: fission, thermal

Threshold energy. see: energy, threshold

Total absorption peak. see: full energy peak

Tracer. Labelled members of a population used to measure certain properties of that population.

Tracer, isotopic. A tracer which only differs in isotopic composition of the substance to be traced.

Track (,nuclear). Of an ionizing particle, its path as revealed by a track detector.

Track detector (,nuclear). A detector which makes the paths of ionizing particles visible, either directly (e.g. cloud chamber) or after suitable treatment (photographic emulsion, polymers).

Transformation, nuclear. The change of one nuclide into another with a different proton number or nucleon number.

Transition, nuclear. For a nucleus a change from one quantized energy state into another or a nuclear transformation.

Transition, isomeric. see: isomeric transition

Titration, radiometric. Titration with a radioactive reagent where the observed activity is used to indicate the equivalence point.

Westcott cross-section. see: cross-section, effective thermal

X-ray fluorescence analysis. A method of analysis based on the measurement of the energies and intensities of characteristic X-radiation emitted by a sample during irradiation.

X-ray fluorescence analysis, energy dispersive. A method of X-ray fluorescence analysis involving the measurement of the energy spectrum of the emitted radiation.

X-ray fluorescence analysis, wavelength dispersive. A method of X-ray fluorescence analysis involving the measurement of the wavelength spectrum of the emitted radiation.

X-ray fluorescence. The emission of X-ray radiation by an atom as a result of the interaction of radiation with its orbital electrons.


