

Package ‘RadData’

May 7, 2026

Version 1.0.2

Type Package

Title Nuclear Decay Data for Dosimetric Calculations - ICRP 107

Description Nuclear Decay Data for Dosimetric Calculations from the International Commission on Radiological Protection from ICRP Publication 107. Ann. ICRP 38 (3). Eckerman, Keith and Endo, Akira 2008 <[doi:10.1016/j.icrp.2008.10.004](https://doi.org/10.1016/j.icrp.2008.10.004)> <<https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>>.

This is a database of the physical data needed in calculations of radionuclide-specific protection and operational quantities. The data is prescribed by the ICRP, the international authority on radiation dose standards, for estimating dose from the intake of or exposure to radionuclides in the workplace and the environment. The database contains information on the half-lives, decay chains, and yields and energies of radiations emitted in nuclear transformations of 1252 radionuclides of 97 elements.

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Encoding UTF-8

LazyData true

LazyDataCompression xz

RoxygenNote 7.3.1

Depends R (>= 3.5.0)

Suggests radsafer

URL <https://github.com/markhogue/RadData>

BugReports <https://github.com/markhogue/RadData/issues>

NeedsCompilation no

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Repository CRAN

Date/Publication 2024-04-12 13:30:02 UTC

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ICRP_07.BET	<i>Beta data</i>
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Description

Beta data

Usage

ICRP_07.BET

Format

A tibble with 3 variables.

RN Nuclide name, e.g. Tc-99m

E_MeV Energy grid point (MeV)

A Number of beta particles per MeV per nuclear transformation at this energy

ICRP_07.NDX	<i>Radionuclide Data Index</i>
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Description

The index file from ICRP-107 Nuclear Decay Data for Dosimetric Calculations

Usage

ICRP_07.NDX

Format

A tibble with 32 variables, 31 original variables from ICRP, plus the derived decay_constant variable.

RN Name of nuclide; e.g. Am-241, Tc-99m
 half_life Half-life of nuclide. Caution - units vary.
 units Half-life units: ls, microsecond; ms, millisecond; s, second; m, minute; d, day; y, year
 decay_mode A, alpha; B-, beta minus; B+, beta plus; EC, electron capture; IT, isomeric transition; SF, spontaneous fission
 pointer_rad Not functional. Originally, location of nuclide in the ICRP_07.RAD file
 pointer_bet Not functional. Originally, location of nuclide in ICRP_07.BET file
 pointer_ack Not functional. Originally, location of nuclide in ICRP_07.ACK file
 pointer_nsf Not functional. Originally, location of nuclide in ICRP_07.NSF file
 progeny_1 Radioactive progeny number 1
 pointer_1 Location of progeny number 1 in RN dataset
 branch_1 Branching fraction to progeny number 1
 progeny_2 Radioactive progeny number 2
 pointer_2 Location of progeny number 2 in RN dataset
 branch_2 Branching fraction to progeny number 2
 progeny_3 Radioactive progeny number 3
 pointer_3 Location of progeny number 3 in RN dataset
 branch_3 Branching fraction to progeny number 3
 progeny_4 Radioactive progeny number 4
 pointer_4 Location of progeny number 4 in RN dataset
 branch_4 Branching fraction to progeny number 4
 E_alpha Energy of alpha emissions (MeV/nuclear transformation)
 E_electron Energy of electrons, including beta (MeV/nuclear transformation)
 E_photon Energy of photon emission (MeV/nuclear transformation)
 num_phot_lt_10k Number of photons of energy less than 10 keV
 num_phot_gt_10k Number of photons of energy greater than 10 keV
 num_betas Number of beta transitions
 num_mono_e Number of mono-energetic electrons
 num_alpha Number of alpha transitions
 AMU Atomic mass of radionuclide (Audi et al., 2003)
 air_kerma_rate_const Air-kerma rate constant ($\text{Gy}\cdot\text{m}^2/\text{Bq s}$)
 air_kerma_coef Point source air-kerma coefficient ($\text{Gy}\cdot\text{m}^2/\text{Bq s}$)
 decay_constant Decay constant in inverse seconds.

 ICRP_07.RAD

Radionuclide file

Description

Data on the energy and yield of each radiation emitted in nuclear transformations of the radionuclide.

Usage

ICRP_07.RAD

Format

A tibble with 6 variables.

RN Nuclide name, e.g. Tc-99m

code_AN Short alphanumeric code for radiation type. See rad_codes for description.

E_MeV Numeric. Energy of the radiation in MeV

prob Numeric. Yield of the radiation (/nuclear transformation)

code_num Numeric code for radiation type. See rad_codes for description.

is_photon Logical. Allows selection of all photons.

 rad_codes

Radiation code table

Description

A small table providing association of code_num, code_AN and description

Usage

rad_codes

Format

A tibble with 3 variables.

A table used for cross-linking numerical, alphabetical and textual references for a radiation emission type, such as: 1, G, Gamma Rays.

code_num Numeric code for radiation type.

code_AN Alphabetical abbreviation, some with + or -.

description Description of radiation emission type.

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