Package 'RadData'

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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://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

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Contents

ICRP_07.BET   *Beta data*

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

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ICRP_07.NDX   *Radionuclide Data Index*

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 (Gy-m^2/Bq s)
>
> `air_kerma_coef` Point source air-kerma coefficient (Gy-m^2/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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