



RADON-219

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Rn-219
Atomic number (Z): 86
Mass number (A): 219
Neutron number (N): 133

RADIOACTIVE DECAY

Decay modes: α
Half-life: 3.96 [s]
Decay constant: $1.7504\text{e-}01$ [1/s]
Daughters: Po-215 (100.0%)
Radioactive daughters: Po-215

DOSIMETRIC CONSTANTS

Mean alpha energy: 6.8801 [MeV]
Mean electron energy: 0.00683 [MeV]
Mean photon energy: 0.05859 [MeV]
Air kerma rate constant, Γ_{10} : $2.543\text{e-}18$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Air kerma coefficient, K_{air} : $2.543\text{e-}18$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $1.103\text{e-}12$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for alphas, Δ_{α} : $1.102\text{e-}12$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]

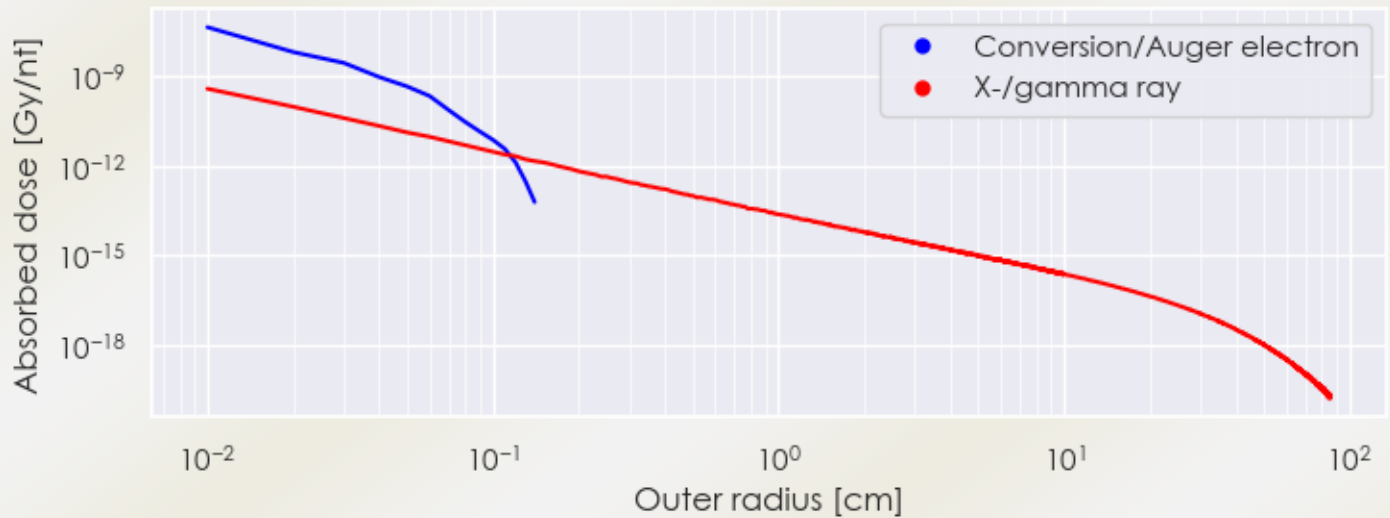
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e-}$: 1.094×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 9.387×10^{-15} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

Dose point kernel source: **Graves, et al. Medical Physics. 2019 Nov.; 46(11):5284-5293.**

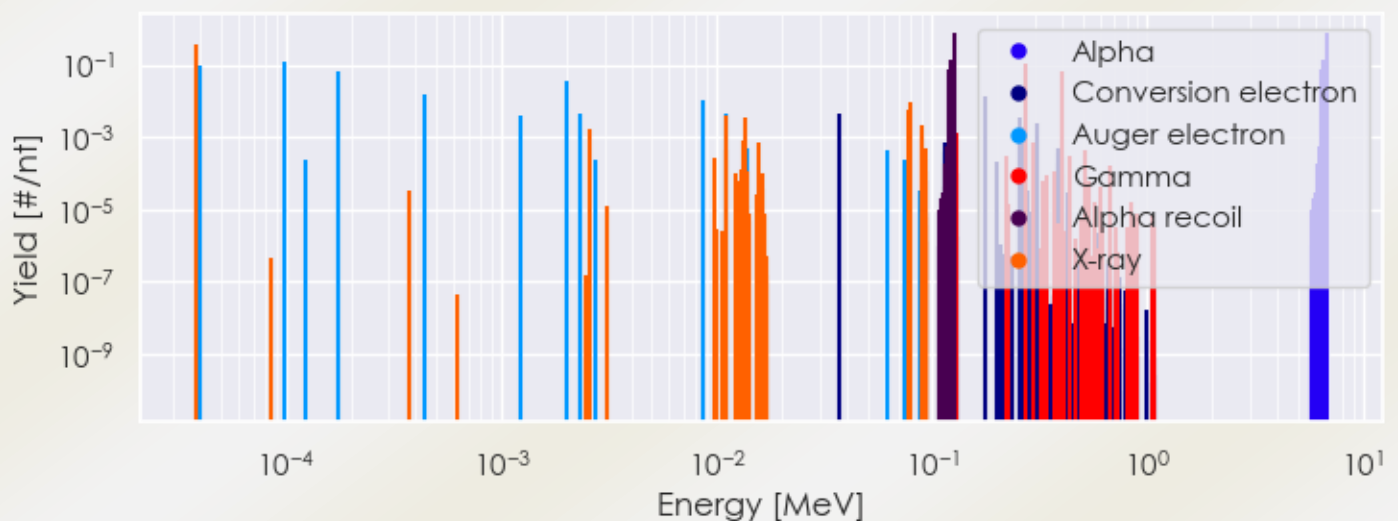
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Rn-219 DPK.csv

SUMMARY SPECTRA (PLOT)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Rn-219 Summary Spectrum.csv

TABULATED DATA

SUMMARY SPECTRA (TABLE)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**

Note: Radiations with yield < 0.01 are excluded from the table, but are available in the linked *.csv data.

Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Rn-219 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Rn-219%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / n _t] if > 0.01	Radiation type
3.84182e-05	3.780e-01	X-ray
2.71230e-01	1.080e-01	Gamma
4.01810e-01	6.588e-02	Gamma
3.95063e-05	9.027e-02	Auger electron
9.72383e-05	1.178e-01	Auger electron
1.74936e-04	6.357e-02	Auger electron
4.38962e-04	1.471e-02	Auger electron
2.01897e-03	3.420e-02	Auger electron
1.77806e-01	1.272e-02	Conversion electron
6.42468e+00	7.500e-02	Alpha
6.55288e+00	1.290e-01	Alpha
6.81915e+00	7.940e-01	Alpha
1.19607e-01	7.500e-02	Alpha recoil
1.21993e-01	1.290e-01	Alpha recoil
1.26950e-01	7.940e-01	Alpha recoil

USEFUL LINKS

Isotope decay characteristics are periodically updated as better measurements can be made - changes that may not be reflected on this page. Please see useful links:

National Nuclear Data Center (NNDC): <https://www.nndc.bnl.gov/nudat3/mird/>

International Atomic Energy Agency (IAEA) Livechart: <https://www-nds.iaea.org/relnsd/vcharthtml/VChartHTML.html>

REFERENCE LINKS

ICRP Report 107: <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>

Graves et al. Dose Point Kernels: <https://doi.org/10.1002/mp.13789>

MIRD Decay Schemes 2nd Edition: https://sites.snmmi.org/SNMMI-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6