



RADON-210

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Rn-210
Atomic number (Z): 86
Mass number (A): 210
Neutron number (N): 124

RADIOACTIVE DECAY

Decay modes: α , Electron capture
Half-life: 2.4 [h]
Decay constant: 8.0225×10^{-5} [1/s]
Daughters: Po-206 (96.0%), At-210 (4.0%)
Radioactive daughters: Po-206, At-210

DOSIMETRIC CONSTANTS

Mean alpha energy: 5.9121 [MeV]
Mean electron energy: 0.00906 [MeV]
Mean photon energy: 0.06095 [MeV]
Air kerma rate constant, Γ_{10} : 3.412×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 3.412×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.487×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 9.472×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]

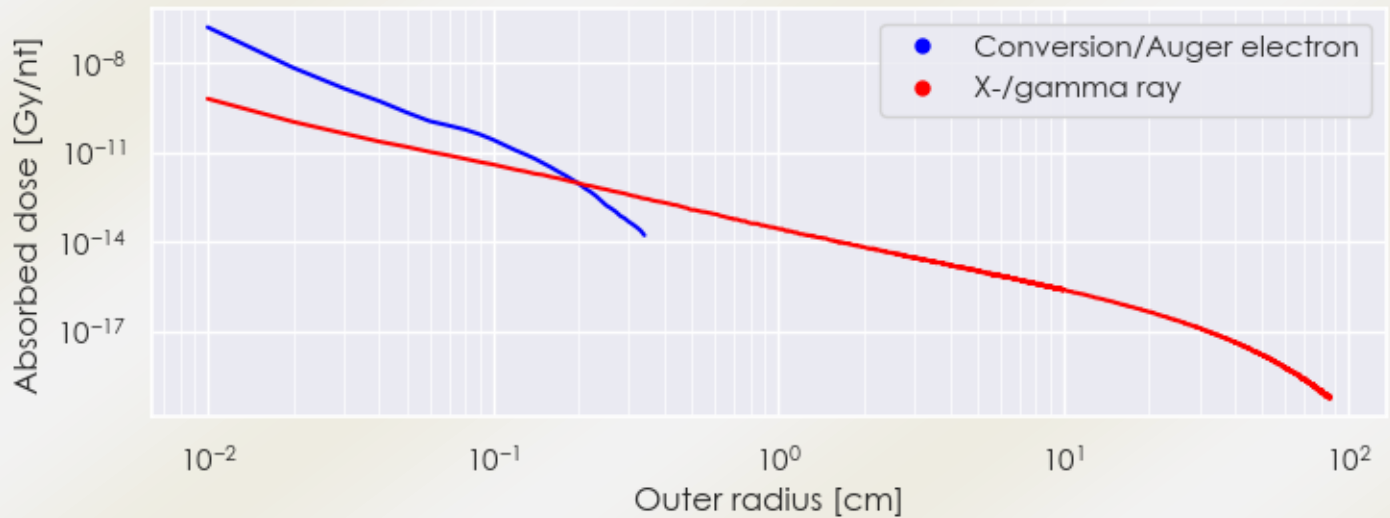
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 1.452×10^{-15} [Gy · kg/Bq · s]

Equilibrium dose constant for photons, Δ_p : 9.765×10^{-15} [Gy · kg/Bq · s]

DOSE POINT KERNELS (PLOT)

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

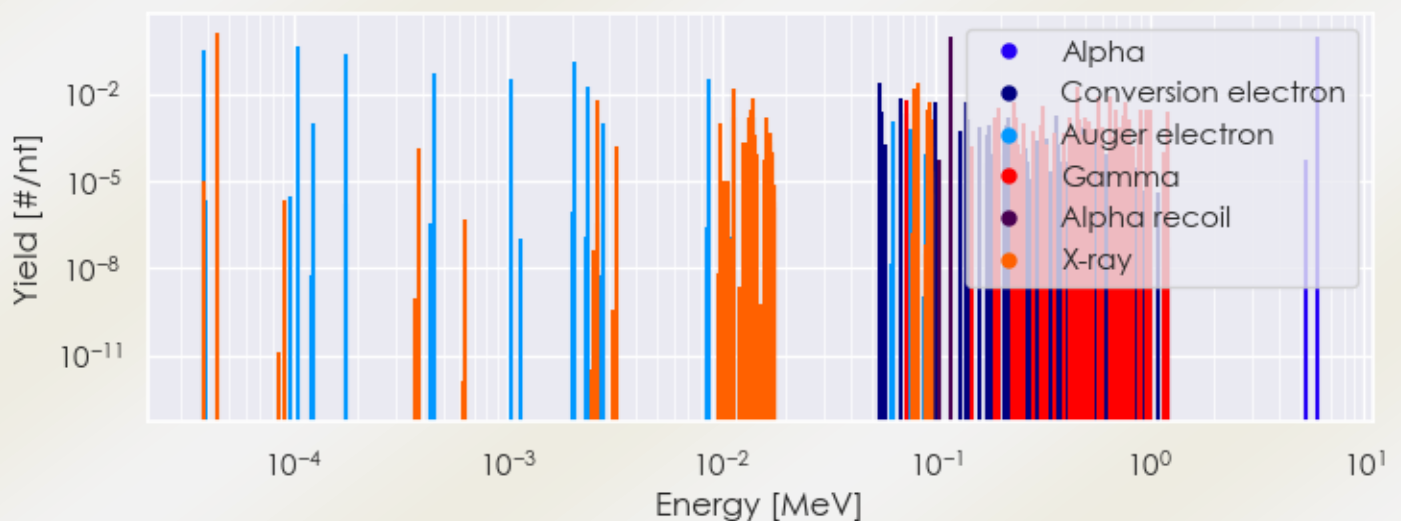
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Rn-210 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-210 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-210 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Rn-210%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
4.42741e-05	1.332e+00	X-ray
1.14288e-02	1.414e-02	X-ray
7.92282e-02	1.409e-02	X-ray
8.18531e-02	2.334e-02	X-ray
4.58250e-01	1.700e-02	Gamma
3.80189e-05	3.313e-01	Auger electron
1.05480e-04	4.037e-01	Auger electron
1.76958e-04	2.187e-01	Auger electron
4.60193e-04	5.337e-02	Auger electron
1.03873e-03	3.081e-02	Auger electron
2.06452e-03	1.192e-01	Auger electron
2.37556e-03	1.709e-02	Auger electron
8.70199e-03	3.138e-02	Auger electron
1.13515e-02	1.456e-02	Auger electron
5.52270e-02	2.520e-02	Conversion electron
6.04112e+00	9.599e-01	Alpha
1.17380e-01	9.599e-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