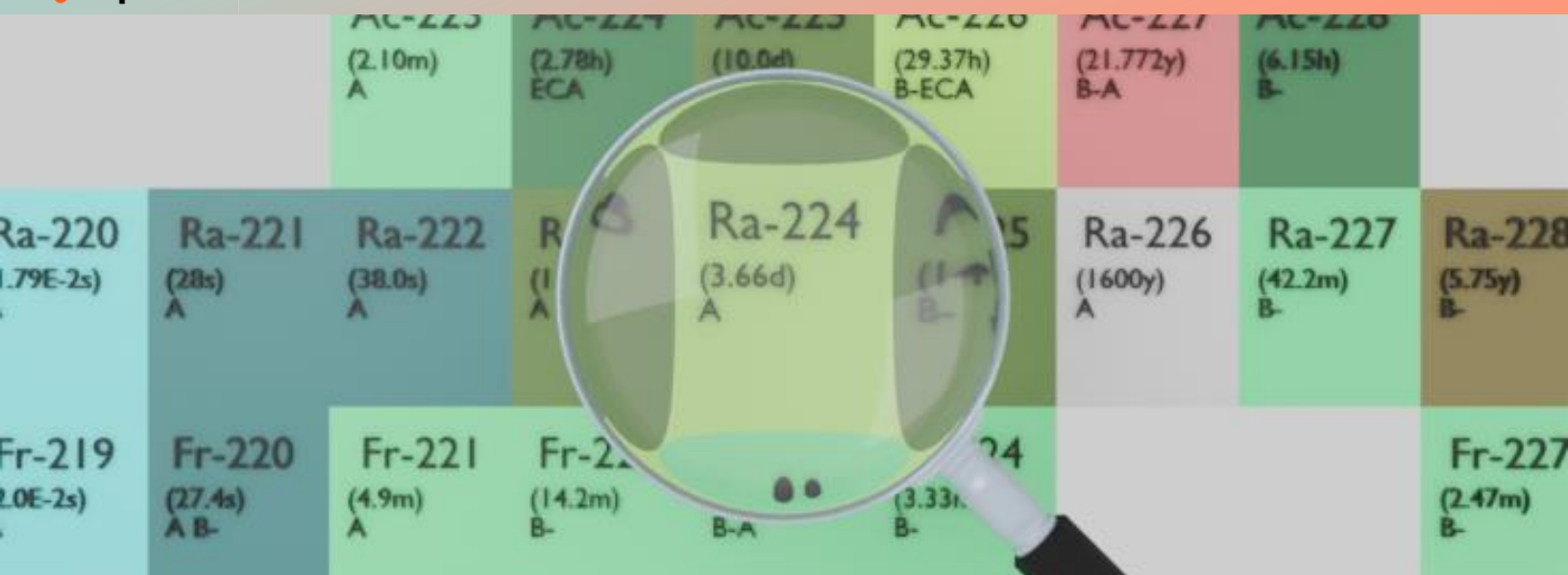




RADIUM-224

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ra-224
Atomic number (Z): 88
Mass number (A): 224
Neutron number (N): 136

RADIOACTIVE DECAY

Decay modes: α
Half-life: 3.66 [d]
Decay constant: 2.1919×10^{-6} [1/s]
Daughters: Rn-220 (100.0%)
Radioactive daughters: Rn-220

DOSIMETRIC CONSTANTS

Mean alpha energy: 5.7765 [MeV]
Mean electron energy: 0.00232 [MeV]
Mean photon energy: 0.01039 [MeV]
Air kerma rate constant, Γ_{10} : 4.962×10^{-19} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 4.962×10^{-19} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.259×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 9.255×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]

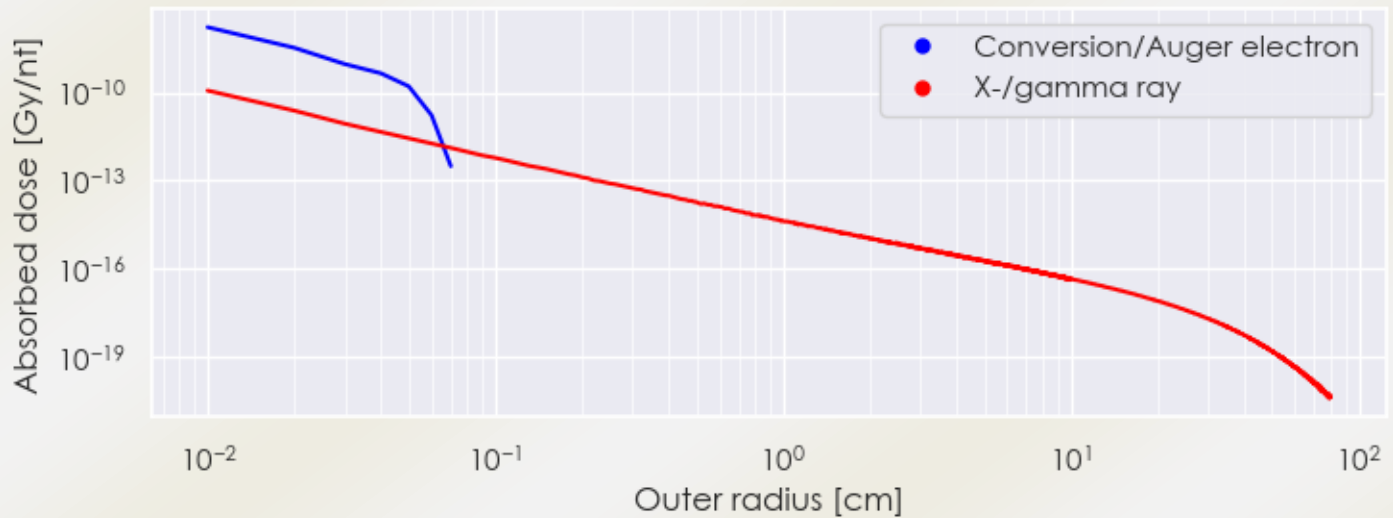
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta+,e-}$: 3.717e-16 [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.665e-15 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

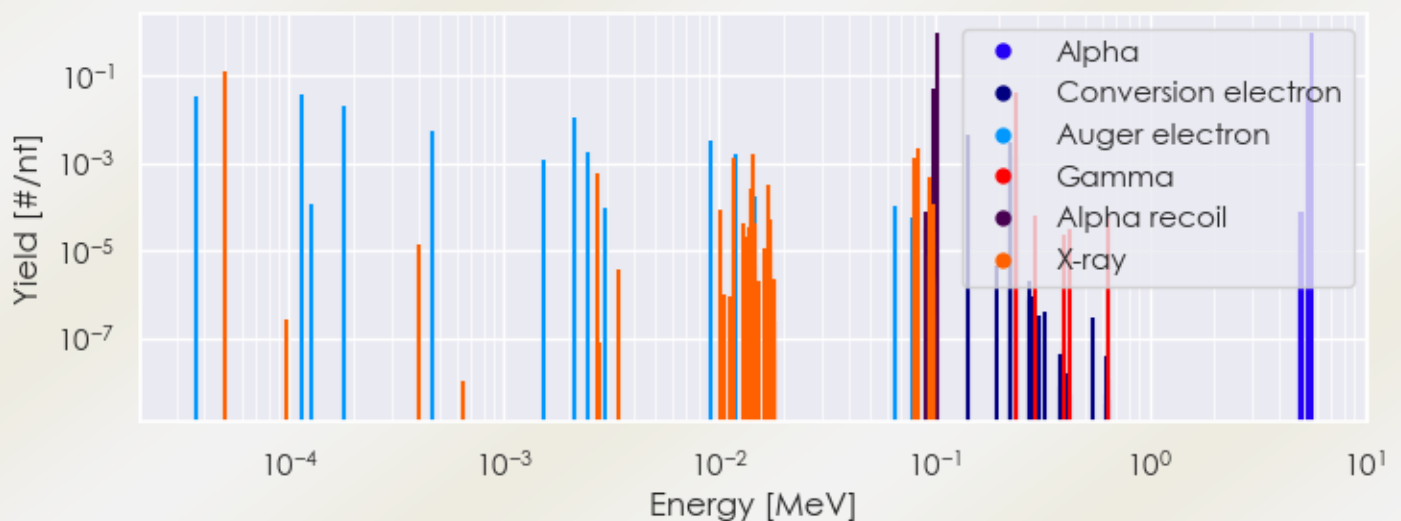
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ra-224 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/Ra-224 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/Ra-224 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ra-224%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# /nt] if > 0.01	Radiation type
5.01067e-05	1.268e-01	X-ray
2.40986e-01	4.100e-02	Gamma
3.69221e-05	3.263e-02	Auger electron
1.13432e-04	3.742e-02	Auger electron
1.80313e-04	2.071e-02	Auger electron
2.12894e-03	1.126e-02	Auger electron
5.44875e+00	5.060e-02	Alpha
5.68543e+00	9.492e-01	Alpha
9.91326e-02	5.060e-02	Alpha recoil
1.03439e-01	9.492e-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