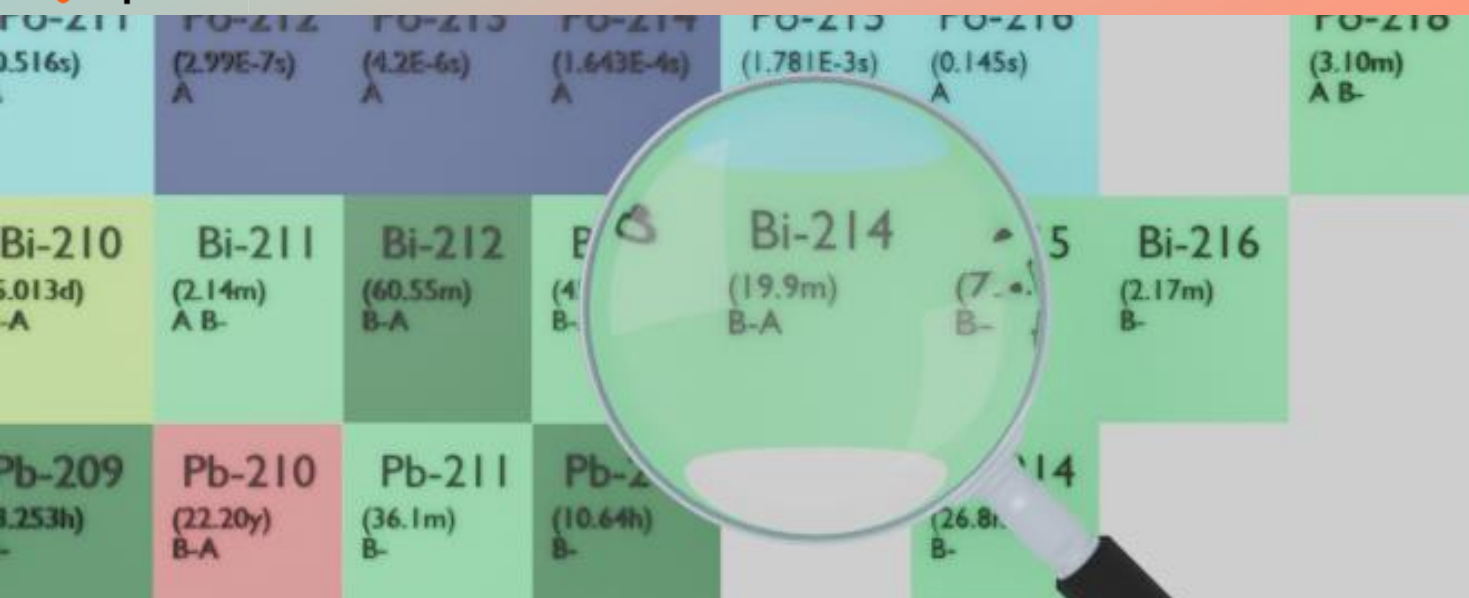




BISMUTH-214

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Bi-214
Atomic number (Z): 83
Mass number (A): 214
Neutron number (N): 131

RADIOACTIVE DECAY

Decay modes: α , β^-
Half-life: 19.9 [m]
Decay constant: $5.8053\text{e-}04$ [1/s]
Daughters: Po-214 (100.0%), Tl-210 (0.021%)
Radioactive daughters: Po-214, Tl-210

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0011 [MeV]
Mean electron energy: 0.66313 [MeV]
Mean photon energy: 1.47933 [MeV]
Air kerma rate constant, Γ_{10} : $4.990\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Air kerma coefficient, K_{air} : $4.990\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $1.064\text{e-}13$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for alphas, Δ_{α} : $1.762\text{e-}16$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 1.062×10^{-13} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.370×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

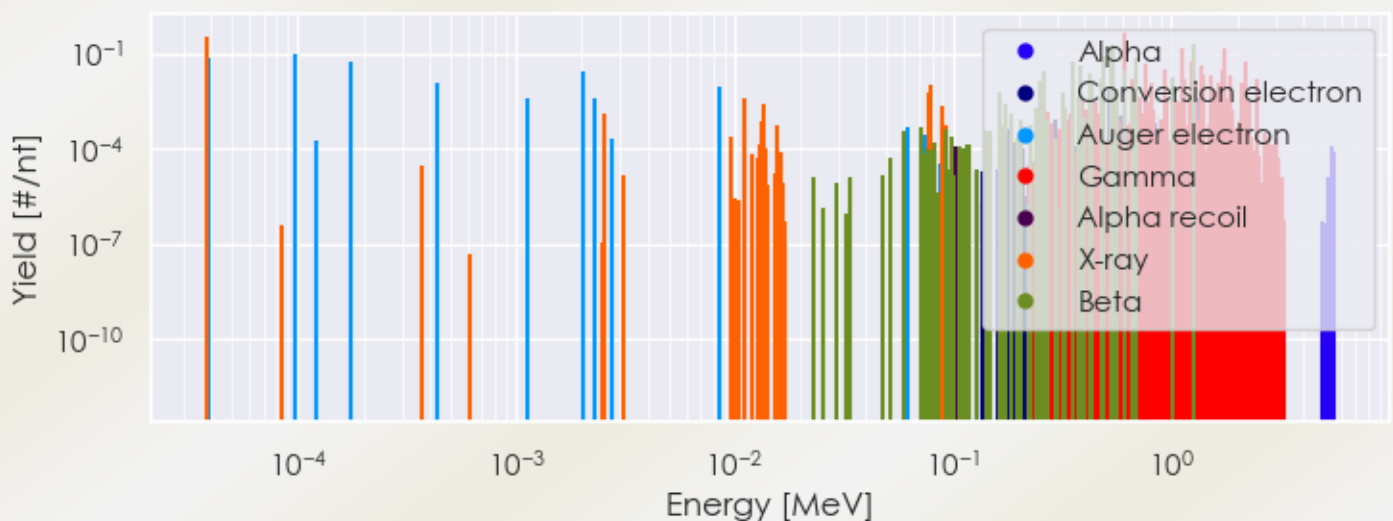
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Bi-214 DPK.csv

SUMMARY SPECTRA (PLOT)

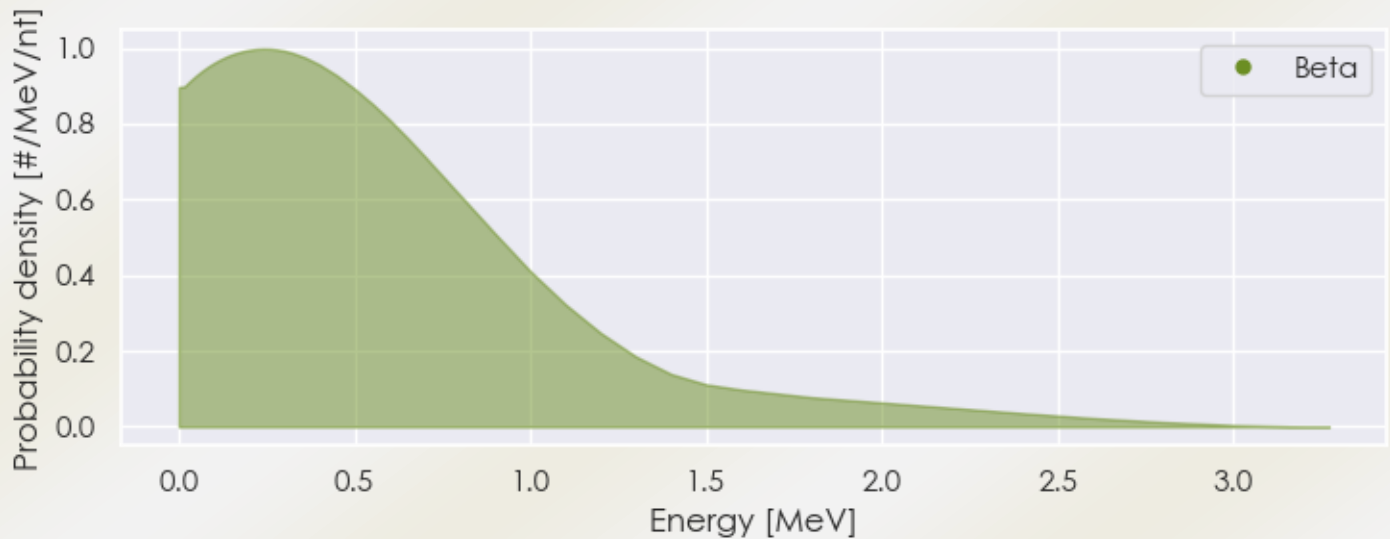
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Bi-214 Summary Spectrum.csv

BETA SPECTRA (PLOT)

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



Download tabulated beta spectra file here: www.mirdsoft.org/products/MIRDspecs/Bi-214 Beta 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/Bi-214 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
3.84122e-05	3.141e-01	X-ray
6.09312e-01	4.610e-01	Gamma
6.65453e-01	1.460e-02	Gamma
7.68356e-01	4.940e-02	Gamma
8.06174e-01	1.220e-02	Gamma
9.34061e-01	3.030e-02	Gamma
1.12029e+00	1.510e-01	Gamma
1.15519e+00	1.630e-02	Gamma
1.23811e+00	5.790e-02	Gamma
1.28096e+00	1.430e-02	Gamma

1.37767e+00	4.000e-02	Gamma
1.40150e+00	1.270e-02	Gamma
1.40798e+00	2.150e-02	Gamma
1.50923e+00	2.110e-02	Gamma
1.66128e+00	1.150e-02	Gamma
1.72960e+00	2.920e-02	Gamma
1.76449e+00	1.540e-01	Gamma
1.84742e+00	2.110e-02	Gamma
2.11855e+00	1.140e-02	Gamma
2.20421e+00	5.080e-02	Gamma
2.44786e+00	1.570e-02	Gamma
2.48861e-01	1.332e-02	Beta
2.61524e-01	2.813e-02	Beta
3.52789e-01	5.727e-02	Beta
3.85762e-01	4.265e-02	Beta
4.25286e-01	2.203e-02	Beta
4.27836e-01	1.372e-02	Beta
4.34205e-01	1.141e-02	Beta
4.75557e-01	1.592e-02	Beta
4.92676e-01	8.190e-02	Beta
5.26005e-01	1.704e-01	Beta
5.40101e-01	1.782e-01	Beta
6.16017e-01	2.954e-02	Beta
6.84383e-01	7.439e-02	Beta
1.00818e+00	1.702e-02	Beta
1.26948e+00	1.822e-01	Beta
3.94623e-05	7.502e-02	Auger electron
9.70765e-05	9.787e-02	Auger electron
1.74661e-04	5.266e-02	Auger electron
4.33238e-04	1.210e-02	Auger electron
2.01476e-03	2.860e-02	Auger electron

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