



POLONIUM-203

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Po-203
Atomic number (Z): 84
Mass number (A): 203
Neutron number (N): 119

RADIOACTIVE DECAY

Decay modes: α , β^+ , Electron capture
Half-life: 36.7 [m]
Decay constant: 3.1478×10^{-4} [1/s]
Daughters: Bi-203 (99.9%), Pb-199 (0.11%)
Radioactive daughters: Bi-203, Pb-199

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.006 [MeV]
Mean electron energy: 0.16716 [MeV]
Mean photon energy: 1.63477 [MeV]
Air kerma rate constant, Γ_{10} : 7.146×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 7.421×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 2.774×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 9.613×10^{-16} [Gy $\cdot$ kg/Bq $\cdot$ s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 2.678×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.619×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

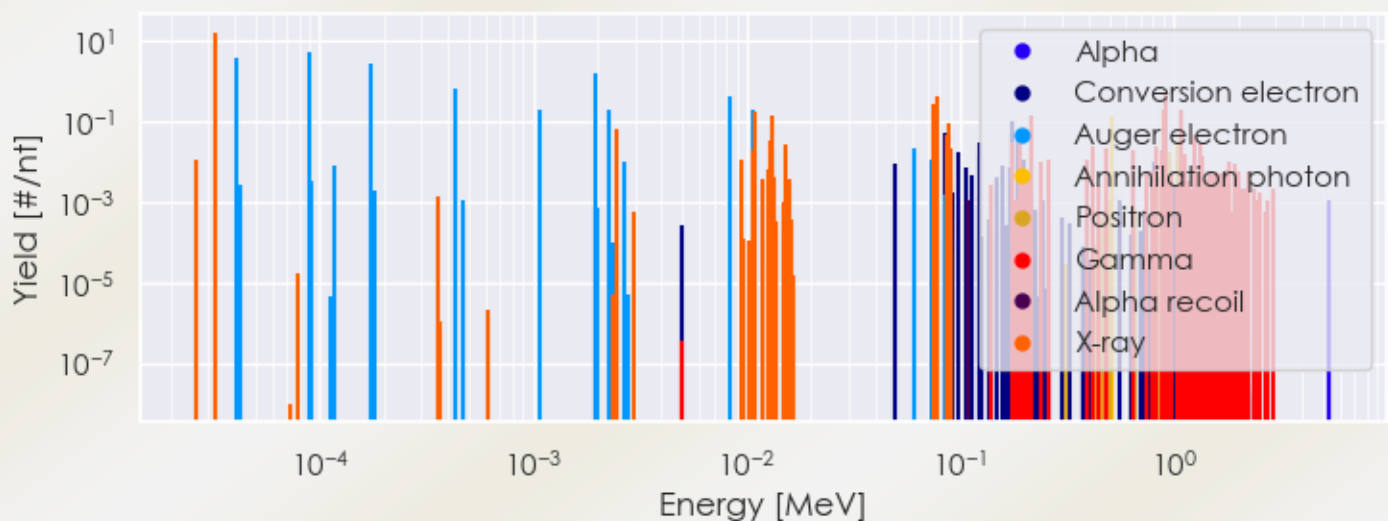
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Po-203 DPK.csv

SUMMARY SPECTRA (PLOT)

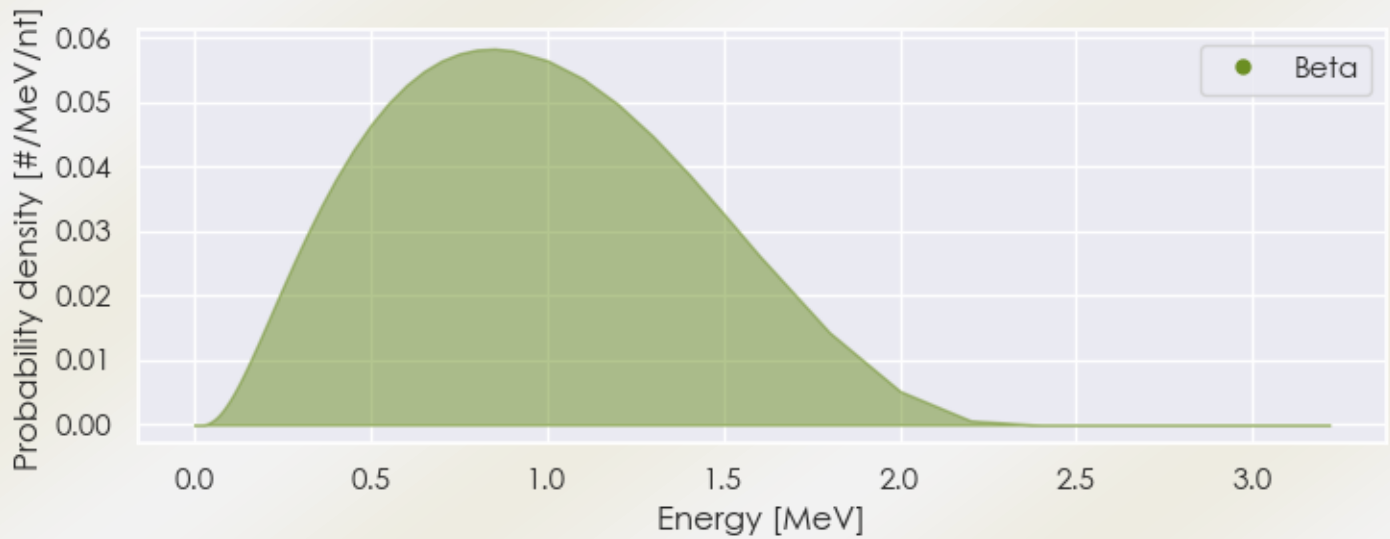
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Po-203 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/Po-203 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/Po-203 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
2.66011e-05	1.121e-02	X-ray
3.24839e-05	1.641e+01	X-ray
2.46227e-03	6.551e-02	X-ray
9.45110e-03	1.112e-02	X-ray
1.07270e-02	1.945e-02	X-ray
1.08390e-02	1.713e-01	X-ray
1.29844e-02	3.325e-02	X-ray
1.30700e-02	1.348e-01	X-ray
1.53031e-02	2.782e-02	X-ray
7.50642e-02	2.573e-01	X-ray

7.74071e-02	4.302e-01	X-ray
8.71393e-02	4.811e-02	X-ray
8.76651e-02	9.324e-02	X-ray
9.00323e-02	1.154e-02	X-ray
9.01629e-02	2.273e-02	X-ray
1.75200e-01	2.967e-02	Gamma
1.89500e-01	3.846e-02	Gamma
2.14800e-01	1.319e-02	Gamma
2.14800e-01	1.428e-01	Gamma
2.40400e-01	1.044e-02	Gamma
2.61800e-01	1.154e-02	Gamma
3.89900e-01	1.099e-02	Gamma
4.19300e-01	2.417e-02	Gamma
4.86100e-01	2.088e-02	Gamma
4.86100e-01	2.088e-02	Gamma
5.11000e-01	1.421e-01	Annihilation photon
6.47700e-01	2.033e-02	Gamma
8.22900e-01	2.362e-02	Gamma
8.83500e-01	1.923e-02	Gamma
8.93500e-01	1.868e-01	Gamma
9.08600e-01	5.494e-01	Gamma
1.09090e+00	1.923e-01	Gamma
1.12390e+00	1.593e-02	Gamma
1.24240e+00	4.615e-02	Gamma
1.33790e+00	2.912e-02	Gamma
1.35290e+00	1.373e-02	Gamma
1.81750e+00	1.044e-02	Gamma
9.62931e-01	1.697e-02	Positron
1.04351e+00	3.493e-02	Positron
4.07556e-05	3.820e+00	Auger electron
8.95774e-05	5.219e+00	Auger electron
1.73908e-04	2.787e+00	Auger electron
4.30284e-04	6.345e-01	Auger electron
1.07931e-03	1.849e-01	Auger electron
1.96473e-03	1.488e+00	Auger electron
2.24240e-03	1.957e-01	Auger electron
2.65260e-03	1.005e-02	Auger electron
8.30960e-03	4.339e-01	Auger electron

1.07752e-02	1.953e-01	Auger electron
1.32700e-02	2.099e-02	Auger electron
6.03003e-02	2.132e-02	Auger electron
7.26460e-02	1.172e-02	Auger electron
8.43680e-02	5.282e-02	Conversion electron
9.86680e-02	1.817e-02	Conversion electron
1.23968e-01	2.923e-02	Conversion electron
1.23968e-01	1.329e-02	Conversion electron
1.73732e-01	9.524e-02	Conversion electron
1.76075e-01	4.622e-02	Conversion electron
1.86333e-01	4.153e-02	Conversion electron
1.89500e-01	1.322e-02	Conversion electron
1.99032e-01	1.176e-02	Conversion electron
8.17768e-01	1.022e-02	Conversion 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