



IODINE-131

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: I-131
Atomic number (Z): 53
Mass number (A): 131
Neutron number (N): 78

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 8.021 [d]
Decay constant: $1.0002e-06$ [1/s]
Daughters: Xe-131m (1.18%), Xe-131 (98.8%)
Radioactive daughters: Xe-131m

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.19184 [MeV]
Mean photon energy: 0.38275 [MeV]
Air kerma rate constant, Γ_{10} : $1.452e-17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : $1.452e-17$ [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $3.074e-14$ [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : $0.000e+00$ [Gy $\cdot$ kg/Bq $\cdot$ s]

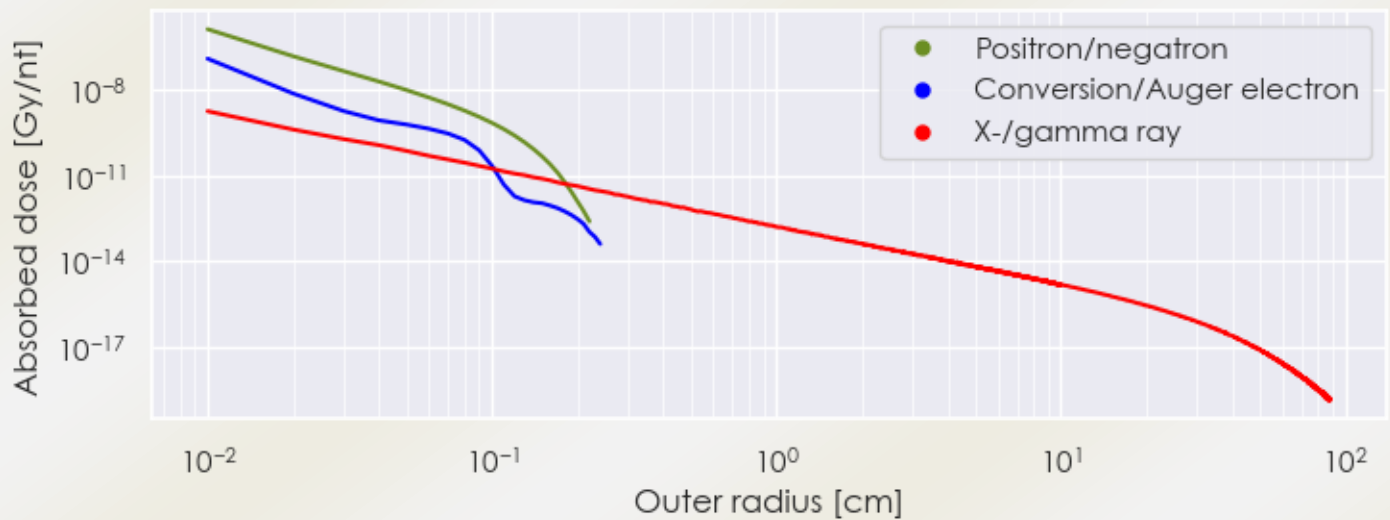
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-, \beta+, e-}$: 3.074×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 6.132×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

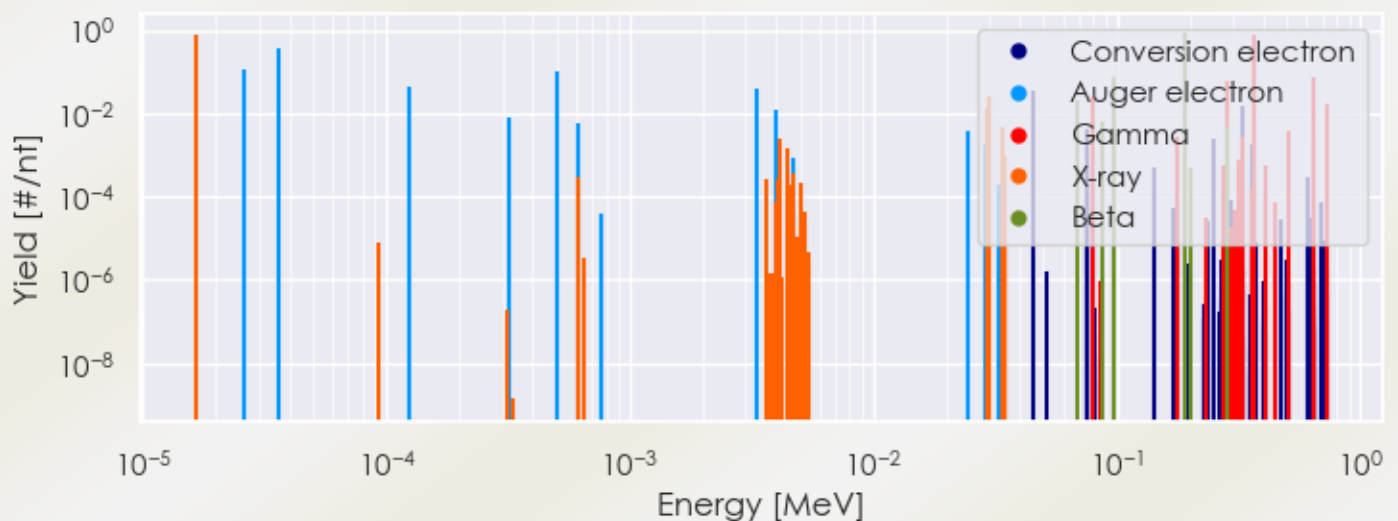
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/I-131 DPK.csv

SUMMARY SPECTRA (PLOT)

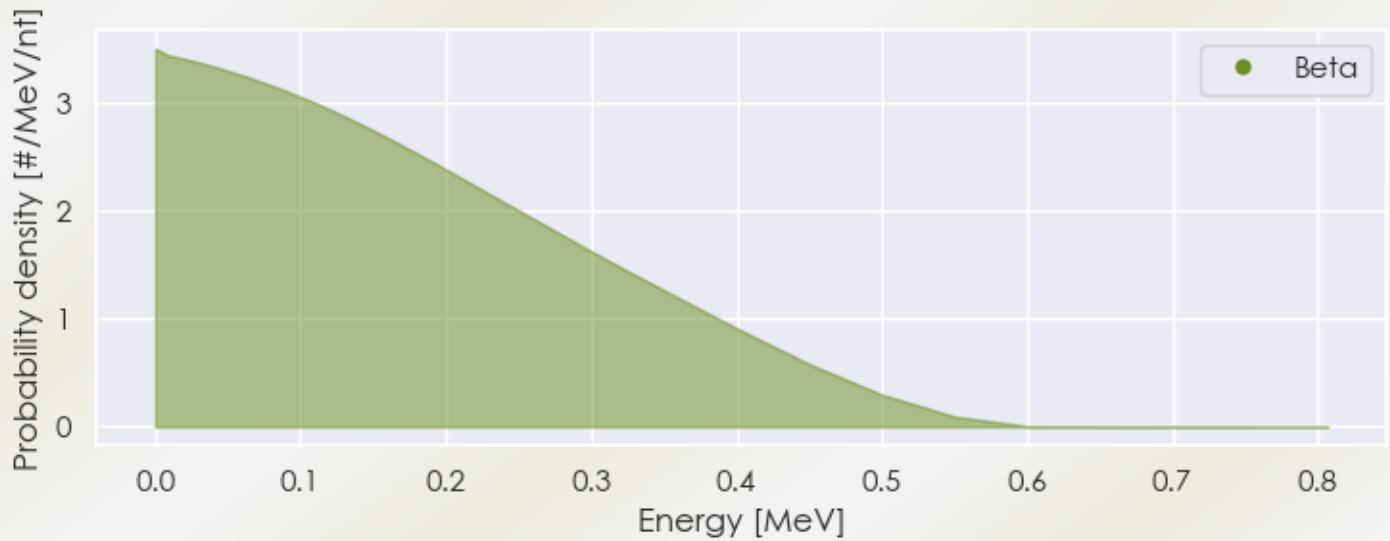
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/I-131 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/I-131 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/I-131 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.66175e-05	7.627e-01	X-ray
2.94521e-02	1.401e-02	X-ray
2.97812e-02	2.594e-02	X-ray
8.01850e-02	2.623e-02	Gamma
2.84305e-01	6.136e-02	Gamma
3.64489e-01	8.170e-01	Gamma
6.36989e-01	7.173e-02	Gamma
7.22911e-01	1.773e-02	Gamma
6.93474e-02	2.091e-02	Beta
9.65904e-02	7.237e-02	Beta

1.91529e-01	8.950e-01	Beta
2.61504e-05	1.187e-01	Auger electron
3.62367e-05	3.628e-01	Auger electron
1.23806e-04	4.455e-02	Auger electron
5.05029e-04	9.966e-02	Auger electron
3.32402e-03	3.930e-02	Auger electron
4.00104e-03	1.166e-02	Auger electron
4.56290e-02	3.553e-02	Conversion electron
3.29933e-01	1.563e-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/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6