



LANTHANUM-131

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: La-131
Atomic number (Z): 57
Mass number (A): 131
Neutron number (N): 74

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 59.0 [m]
Decay constant: $1.9580\text{e-}04$ [1/s]
Daughters: Ba-131 (100.0%)
Radioactive daughters: Ba-131

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.19626 [MeV]
Mean photon energy: 0.66332 [MeV]
Air kerma rate constant, Γ_{10} : $1.842\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Air kerma coefficient, K_{air} : $2.736\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $3.144\text{e-}14$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for alphas, Δ_{α} : $0.000\text{e+}00$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]

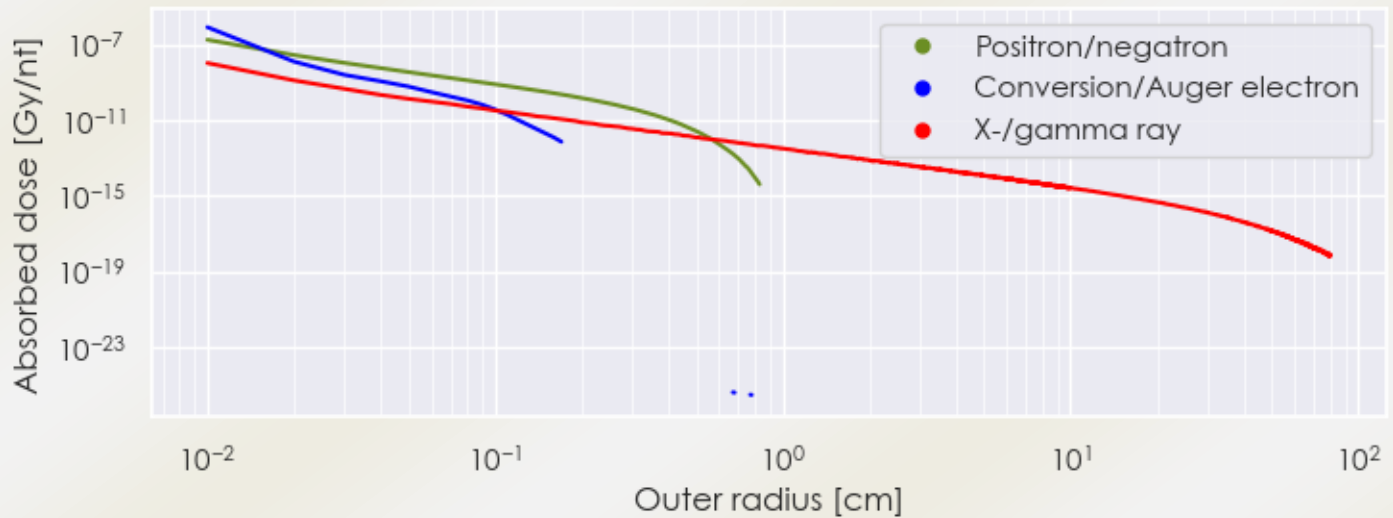
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 3.144×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.063×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

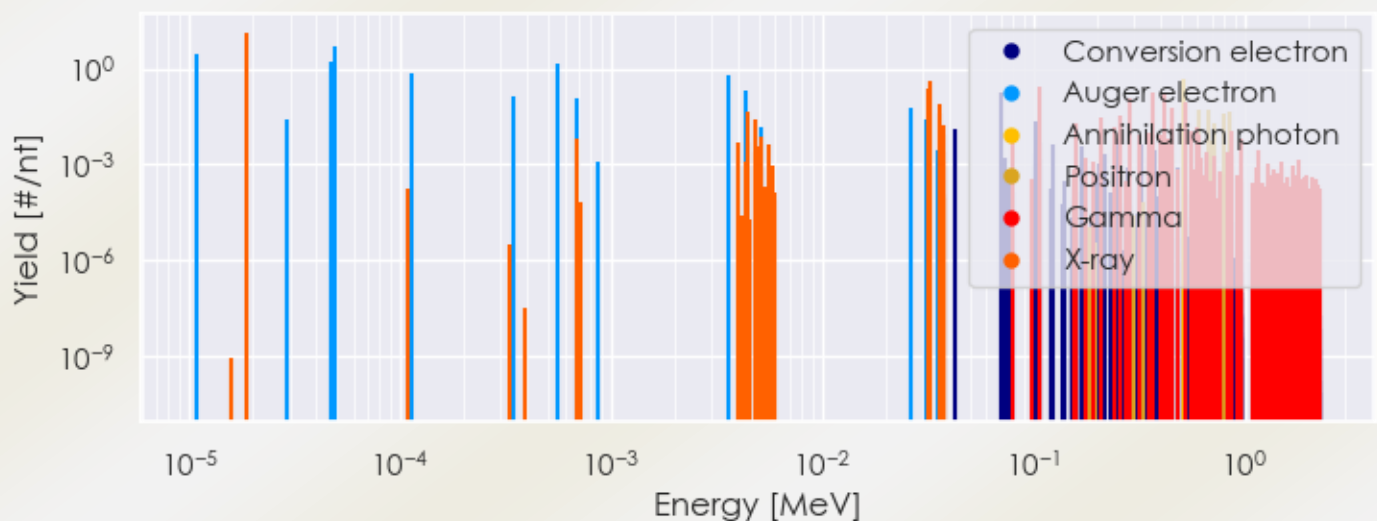
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



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

SUMMARY SPECTRA (PLOT)

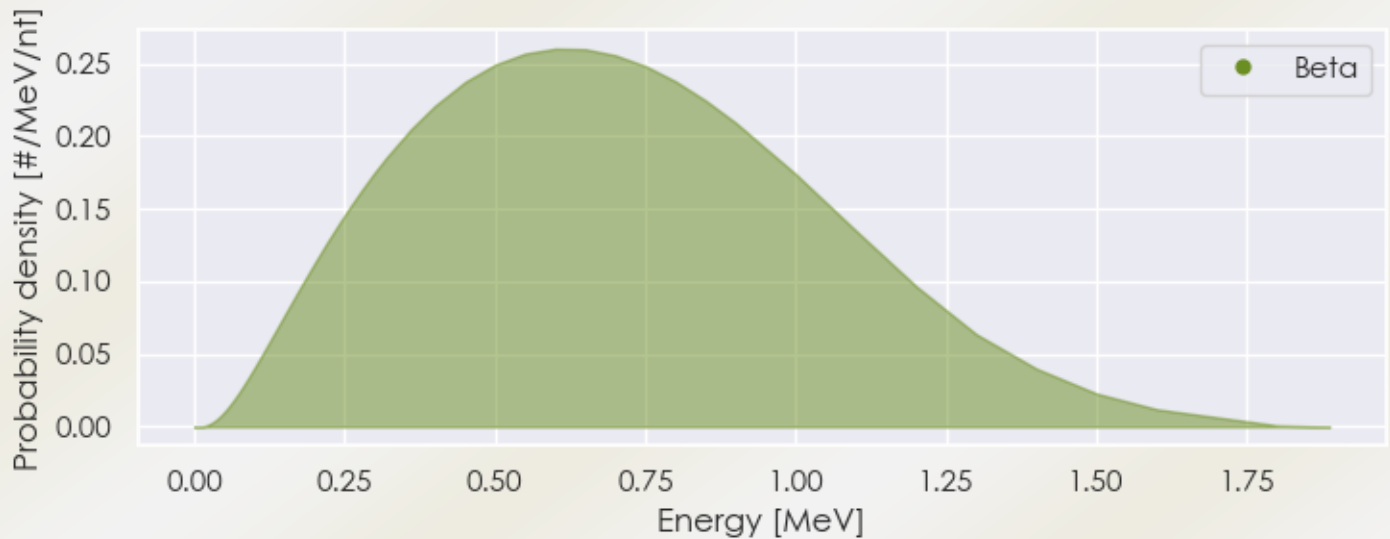
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



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

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.86002e-05	1.368e+01	X-ray
4.45292e-03	4.314e-02	X-ray
4.82366e-03	2.547e-02	X-ray
3.18187e-02	2.255e-01	X-ray
3.22056e-02	4.152e-01	X-ray
3.63167e-02	3.968e-02	X-ray
3.63920e-02	7.689e-02	X-ray
3.72607e-02	1.633e-02	X-ray
1.08081e-01	2.500e-01	Gamma
1.60687e-01	1.802e-02	Gamma

2.08509e-01	3.025e-02	Gamma
2.40593e-01	1.375e-02	Gamma
2.57087e-01	3.427e-02	Gamma
2.85246e-01	1.240e-01	Gamma
3.65162e-01	1.693e-01	Gamma
4.17783e-01	1.795e-01	Gamma
4.53659e-01	5.875e-02	Gamma
5.11000e-01	4.620e-01	Annihilation photon
5.25851e-01	8.725e-02	Gamma
5.61785e-01	1.100e-02	Gamma
5.94080e-01	1.438e-02	Gamma
8.66138e-01	1.047e-02	Gamma
5.96535e-01	1.189e-02	Positron
6.12512e-01	5.407e-02	Positron
6.84252e-01	5.028e-02	Positron
7.20071e-01	1.899e-02	Positron
7.99803e-01	3.798e-02	Positron
8.48651e-01	4.598e-02	Positron
1.08630e-05	2.919e+00	Auger electron
2.91100e-05	2.420e-02	Auger electron
4.69804e-05	1.694e+00	Auger electron
4.88180e-05	4.630e+00	Auger electron
1.14481e-04	6.692e-01	Auger electron
3.41882e-04	1.353e-01	Auger electron
5.52265e-04	1.512e+00	Auger electron
6.90594e-04	1.114e-01	Auger electron
3.56909e-03	5.934e-01	Auger electron
4.33558e-03	1.896e-01	Auger electron
5.13222e-03	1.481e-02	Auger electron
2.63448e-02	5.528e-02	Auger electron
3.09583e-02	2.550e-02	Auger electron
4.24690e-02	1.337e-02	Conversion electron
7.06320e-02	1.741e-01	Conversion electron
1.02120e-01	2.144e-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