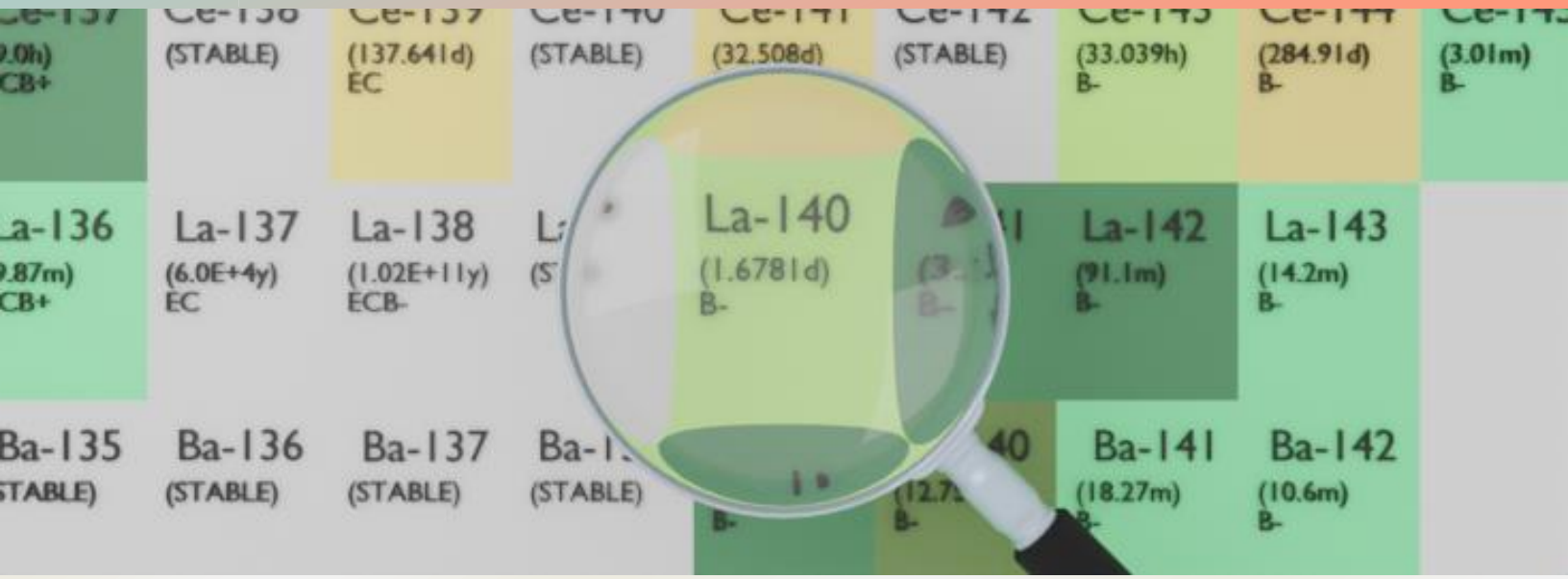


LANTHANUM-140

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: La-140
Atomic number (Z): 57
Mass number (A): 140
Neutron number (N): 83

RADIOACTIVE DECAY

Decay modes: β-
Half-life: 1.678 [d]
Decay constant: 4.7807e-06 [1/s]
Daughters: Ce-140 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

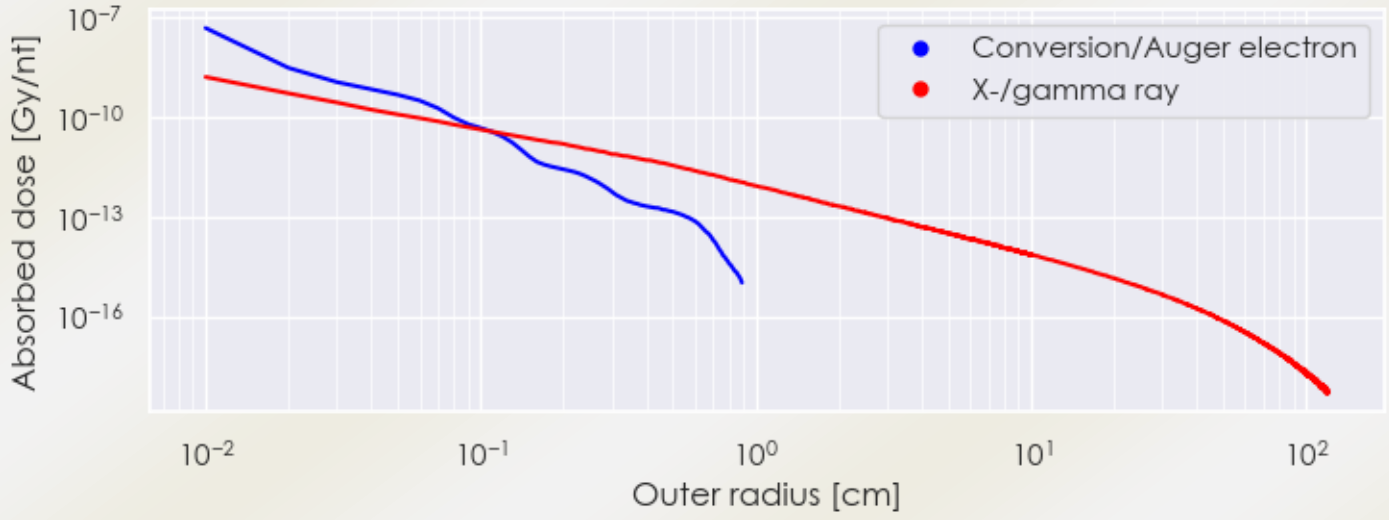
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.53455 [MeV]
Mean photon energy: 2.30837 [MeV]
Air kerma rate constant, Γ_{10}: 7.698e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air}: 7.698e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 8.564e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 8.564e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 3.698e-13 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

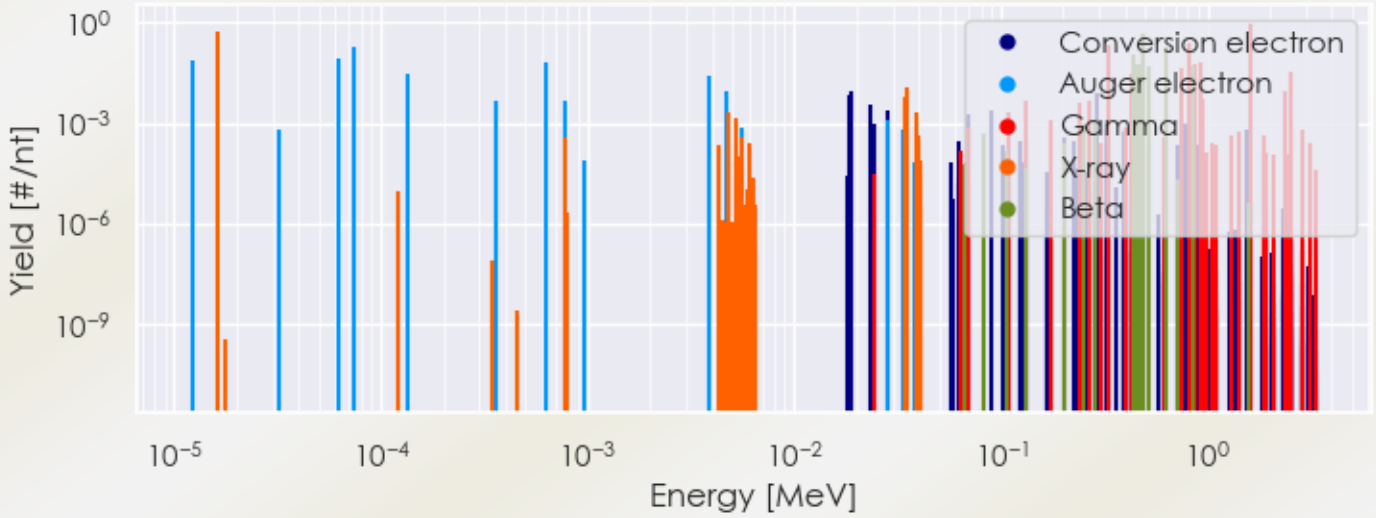
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/La-140 DPK.csv

SUMMARY SPECTRA (PLOT)

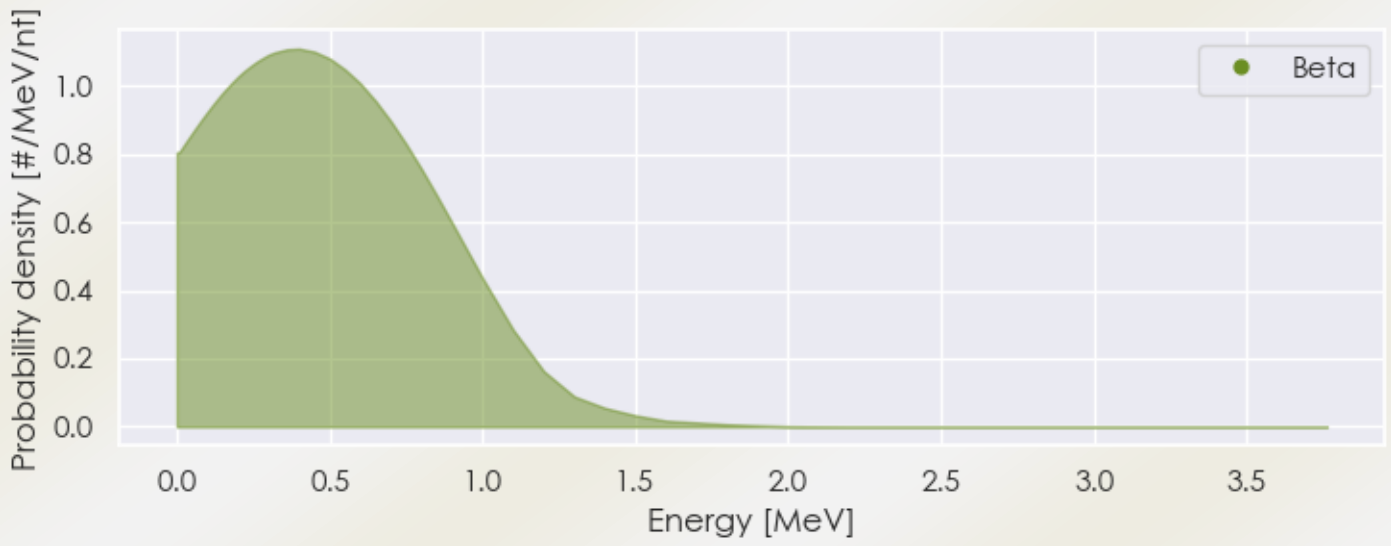
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/La-140 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-140 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-140 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
1.61308e-05	5.335e-01	X-ray
3.47432e-02	1.108e-02	X-ray
3.28762e-01	2.032e-01	Gamma
4.32493e-01	2.900e-02	Gamma
4.87021e-01	4.551e-01	Gamma
7.51637e-01	4.331e-02	Gamma
8.15772e-01	2.328e-01	Gamma
8.67846e-01	5.505e-02	Gamma
9.19550e-01	2.662e-02	Gamma
9.25189e-01	6.897e-02	Gamma

1.59621e+00	9.540e-01	Gamma
2.52140e+00	3.463e-02	Gamma
4.41770e-01	1.120e-01	Beta
4.44150e-01	5.836e-02	Beta
4.58811e-01	1.099e-02	Beta
4.65927e-01	5.600e-02	Beta
4.88006e-01	4.521e-01	Beta
5.15376e-01	5.066e-02	Beta
6.30107e-01	1.973e-01	Beta
8.46820e-01	4.932e-02	Beta
1.22653e-05	7.568e-02	Auger electron
6.23735e-05	8.270e-02	Auger electron
7.40165e-05	1.788e-01	Auger electron
1.36007e-04	2.758e-02	Auger electron
6.26310e-04	6.671e-02	Auger electron
3.84112e-03	2.558e-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