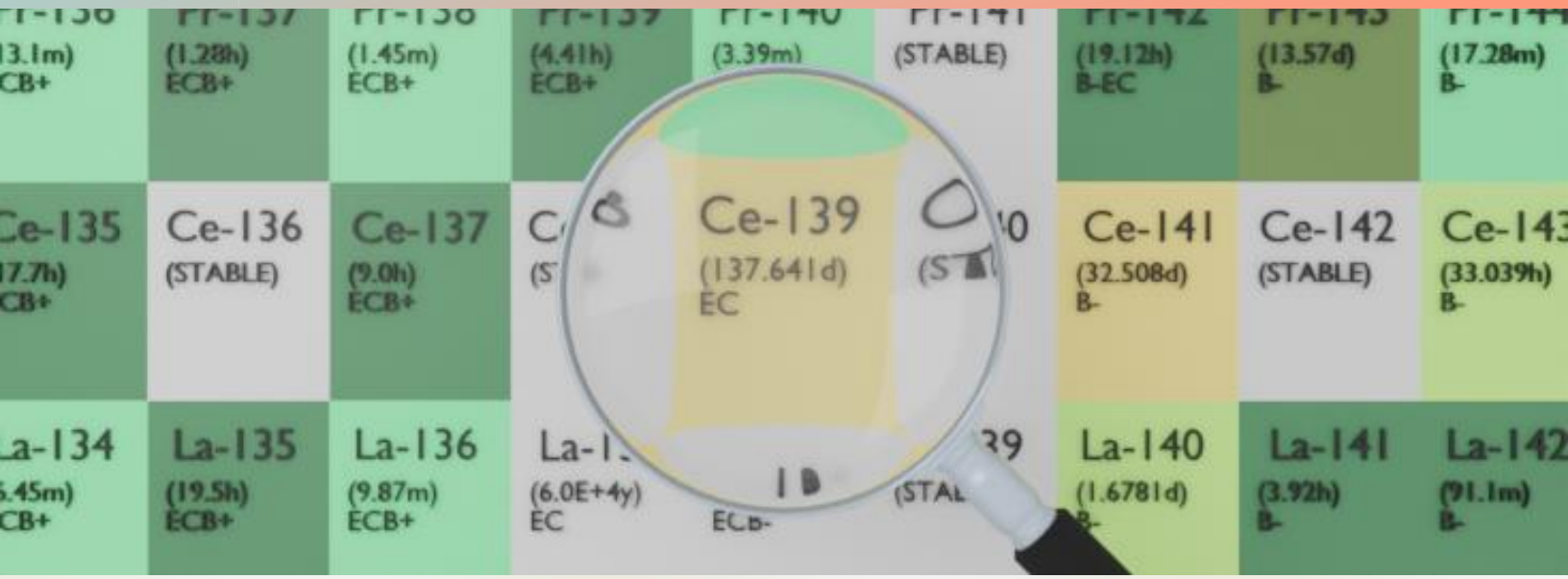


CERIUM-139

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ce-139
Atomic number (Z): 58
Mass number (A): 139
Neutron number (N): 81

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 137.6 [d]
Decay constant: 5.8286e-08 [1/s]
Daughters: La-139 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

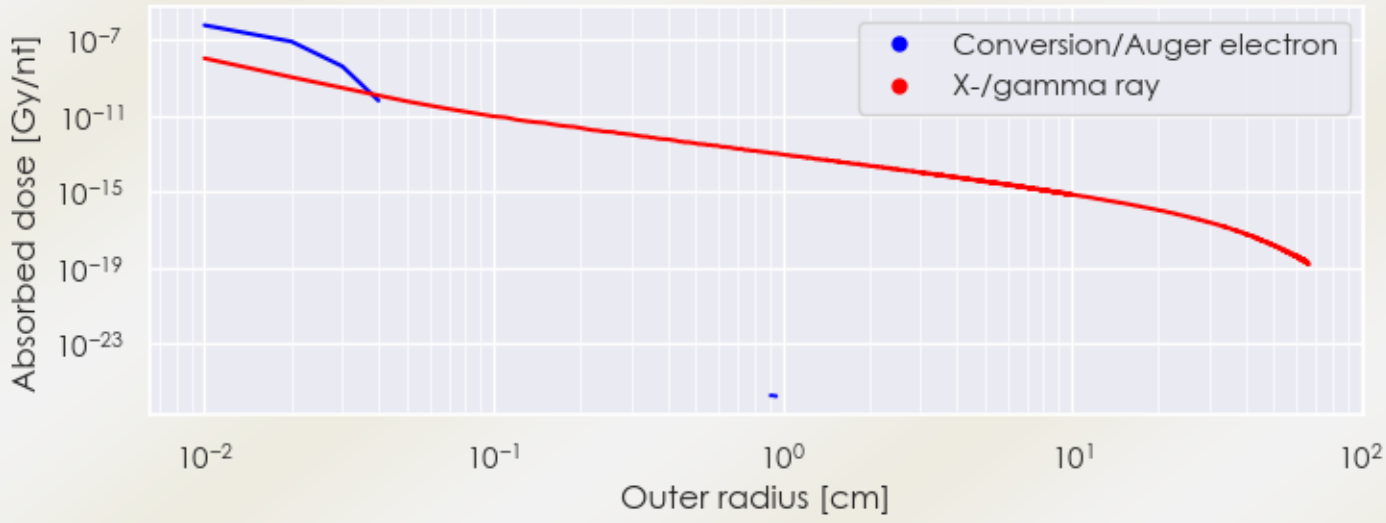
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.0355 [MeV]
Mean photon energy: 0.15992 [MeV]
Air kerma rate constant, Γ_{10}: 8.054e-18 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 8.054e-18 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 5.688e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 5.688e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 2.562e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

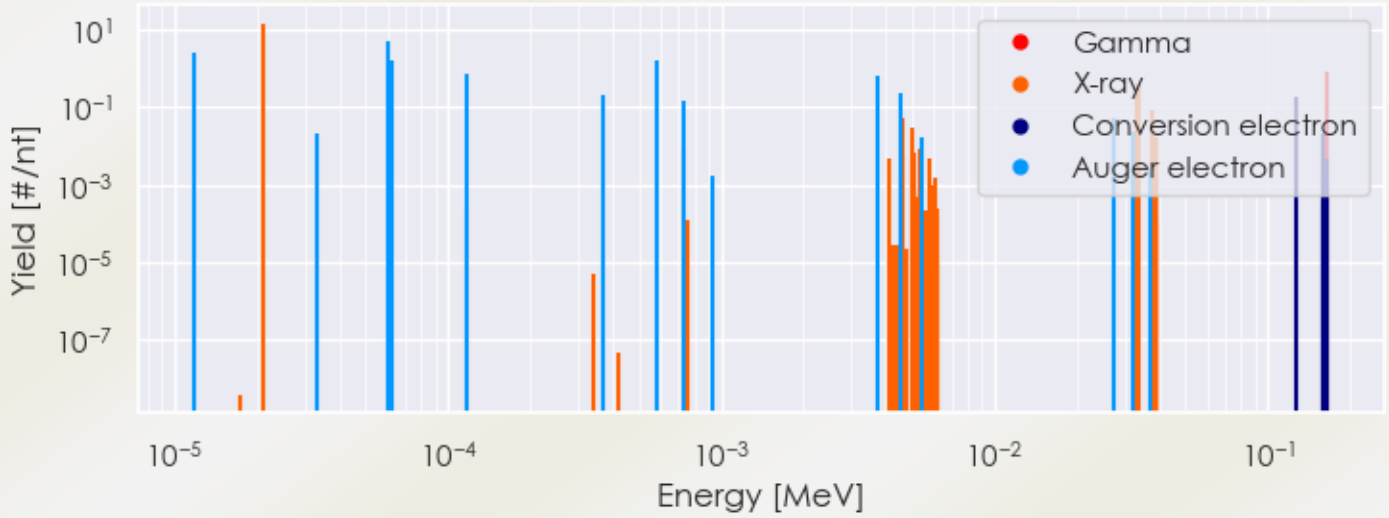
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ce-139 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/Ce-139 Summary 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/Ce-139 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
2.10685e-05	1.504e+01	X-ray
4.63652e-03	5.036e-02	X-ray
5.03753e-03	3.030e-02	X-ray
3.30405e-02	2.354e-01	X-ray
3.34591e-02	4.322e-01	X-ray
3.77381e-02	4.166e-02	X-ray
3.78202e-02	8.071e-02	X-ray
3.87359e-02	1.721e-02	X-ray
1.65858e-01	7.894e-01	Gamma
1.18532e-05	2.632e+00	Auger electron
3.33700e-05	2.168e-02	Auger electron
6.08141e-05	5.223e+00	Auger electron
6.28355e-05	1.682e+00	Auger electron
1.17533e-04	7.659e-01	Auger electron
3.72414e-04	2.032e-01	Auger electron
5.80587e-04	1.722e+00	Auger electron
7.32452e-04	1.490e-01	Auger electron
3.71616e-03	6.740e-01	Auger electron
4.53232e-03	2.232e-01	Auger electron
5.38186e-03	1.762e-02	Auger electron
2.73123e-02	5.407e-02	Auger electron
3.21336e-02	2.530e-02	Auger electron
1.26915e-01	1.799e-01	Conversion electron
1.59616e-01	2.239e-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