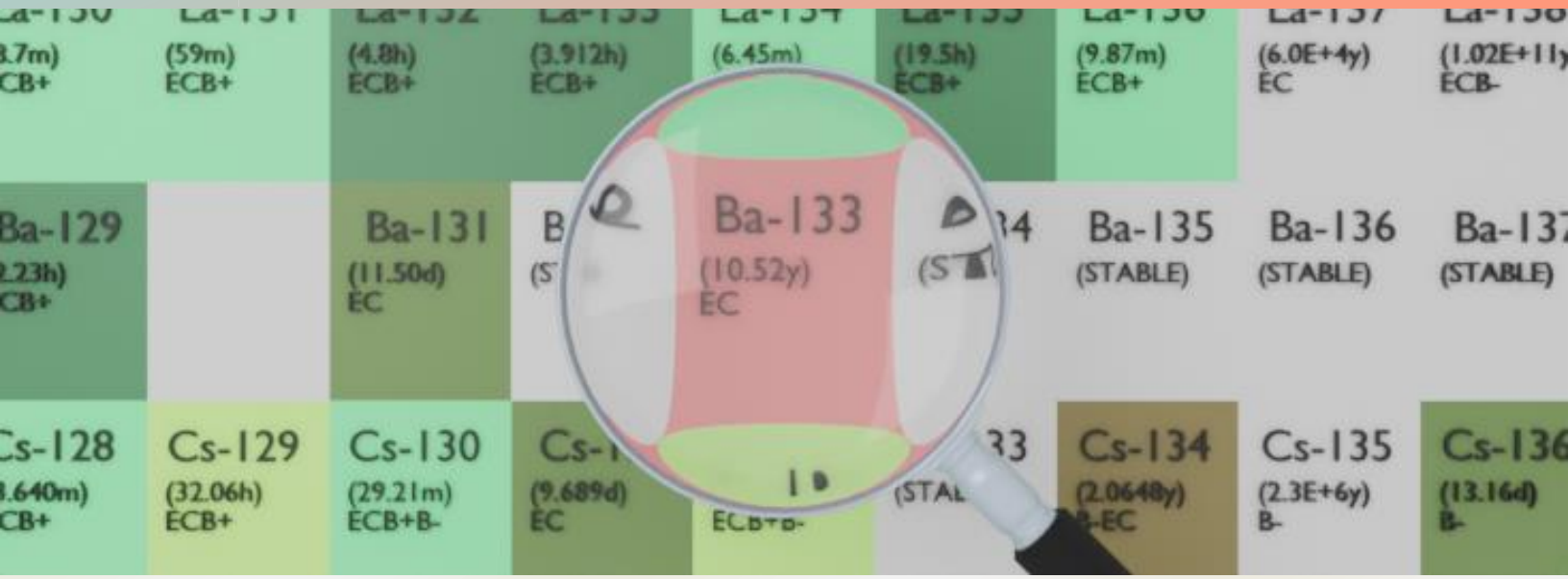


BARIUM-133

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ba-133
Atomic number (Z): 56
Mass number (A): 133
Neutron number (N): 77

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 10.52 [y]
Decay constant: 2.0879e-09 [1/s]
Daughters: Cs-133 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

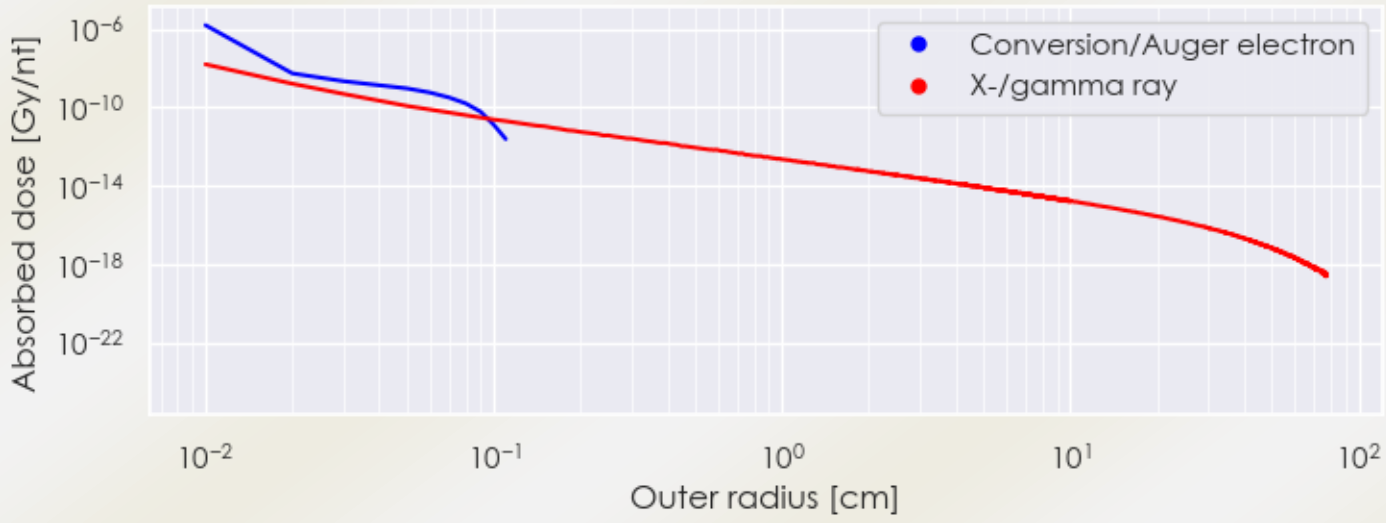
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.05531 [MeV]
Mean photon energy: 0.40295 [MeV]
Air kerma rate constant, Γ_{10}: 1.980e-17 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 1.980e-17 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 8.862e-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, $\Delta_{\beta-,\beta+,e-}$: 8.862e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 6.456e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

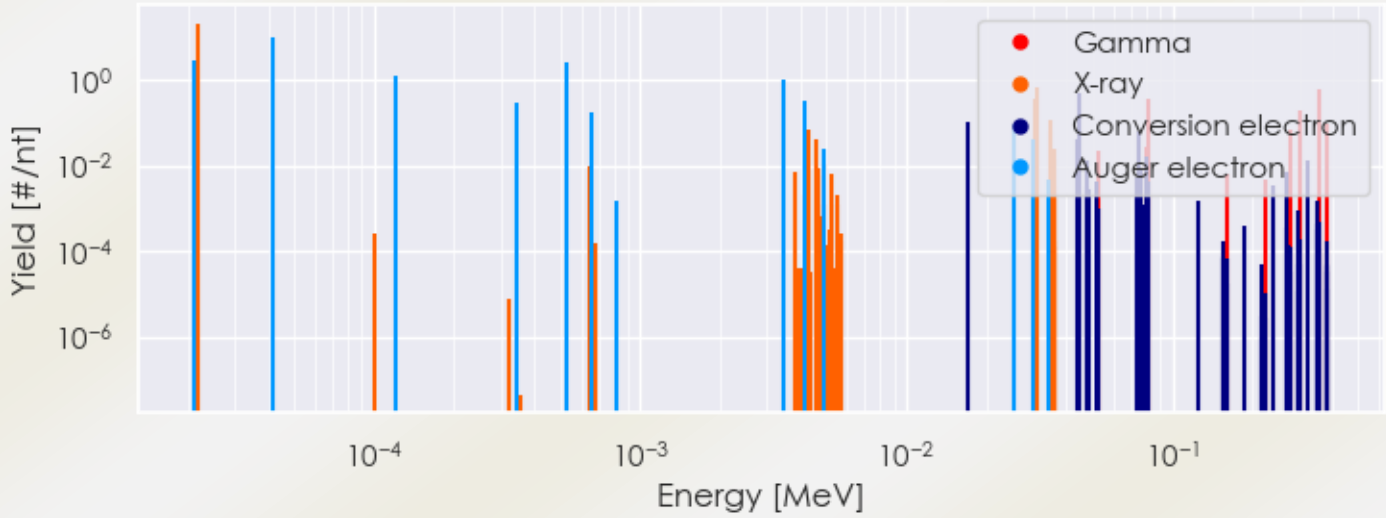
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ba-133 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/Ba-133 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/Ba-133 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
2.18876e-05	2.094e+01	X-ray
4.27312e-03	6.779e-02	X-ray
4.61551e-03	4.037e-02	X-ray
4.92286e-03	1.033e-02	X-ray
3.06218e-02	3.474e-01	X-ray
3.09789e-02	6.416e-01	X-ray
3.49256e-02	6.079e-02	X-ray
3.49943e-02	1.178e-01	X-ray
3.58031e-02	1.279e-02	X-ray
3.58172e-02	2.493e-02	X-ray
5.31625e-02	2.199e-02	Gamma
7.96139e-02	2.620e-02	Gamma
8.09971e-02	3.406e-01	Gamma
2.76400e-01	7.164e-02	Gamma
3.02851e-01	1.833e-01	Gamma
3.56013e-01	6.205e-01	Gamma
3.83848e-01	8.940e-02	Gamma
2.11913e-05	2.822e+00	Auger electron
4.14902e-05	9.926e+00	Auger electron
1.19652e-04	1.253e+00	Auger electron
3.46121e-04	2.950e-01	Auger electron
5.29171e-04	2.684e+00	Auger electron
6.55055e-04	1.766e-01	Auger electron
3.46156e-03	1.052e+00	Auger electron
4.18475e-03	3.248e-01	Auger electron
4.93818e-03	2.509e-02	Auger electron
1.71775e-02	1.083e-01	Conversion electron

2.53980e-02	9.113e-02	Auger electron
2.98089e-02	4.141e-02	Auger electron
4.36289e-02	3.999e-02	Conversion electron
4.50121e-02	4.967e-01	Conversion electron
4.74776e-02	1.321e-02	Conversion electron
7.53122e-02	6.049e-02	Conversion electron
8.00064e-02	1.551e-02	Conversion electron
3.20028e-01	1.309e-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