



Pr-134 (11m) CB+	Pr-135 (24m) ECB+	Pr-136 (13.1m) ECB+	Pr-137 (1.28h) ECB+	Pr-138 (1.45m) ECB+	Pr-139 (4.41h) ECB+	Pr-140 (3.39m) ECB+	Pr-141 (STABLE)	Pr-142 (19.12h) B-EC
Ce-133 (97m) CB+	Ce-134 (3.16d) EC	Ce-135 (17.7h) ECB+	Ce-136 (5.04h) ECB+	Ce-137m (34.4h) ITEC	Ce-138 (1.02E+11y) ECB-	Ce-139 (137.641d) EC	Ce-140 (STABLE)	Ce-141 (32.508d) B-
La-132 (1.8h) CB+	La-133 (3.912h) ECB+	La-134 (6.45m) ECB+	La-135 (19.5h) ECB+	La-136 (6.0E+11y) EC	La-137 (1.02E+11y) ECB-	La-138 (1.02E+11y) ECB-	La-139 (STABLE)	La-140 (1.6781d) B-

CERIUM-137M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ce-137m
Atomic number (Z): 58
Mass number (A): 137
Neutron number (N): 79

RADIOACTIVE DECAY

Decay modes: Electron capture, Internal transition
Half-life: 34.4 [h]
Decay constant: 5.5971e-06 [1/s]
Daughters: Ce-137 (99.2%), La-137 (0.78%)
Radioactive daughters: Ce-137, La-137

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.20674 [MeV]
Mean photon energy: 0.05578 [MeV]
Air kerma rate constant, Γ_{10} : 3.682e-18 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 3.682e-18 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 3.312e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 3.312×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 8.937×10^{-15} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

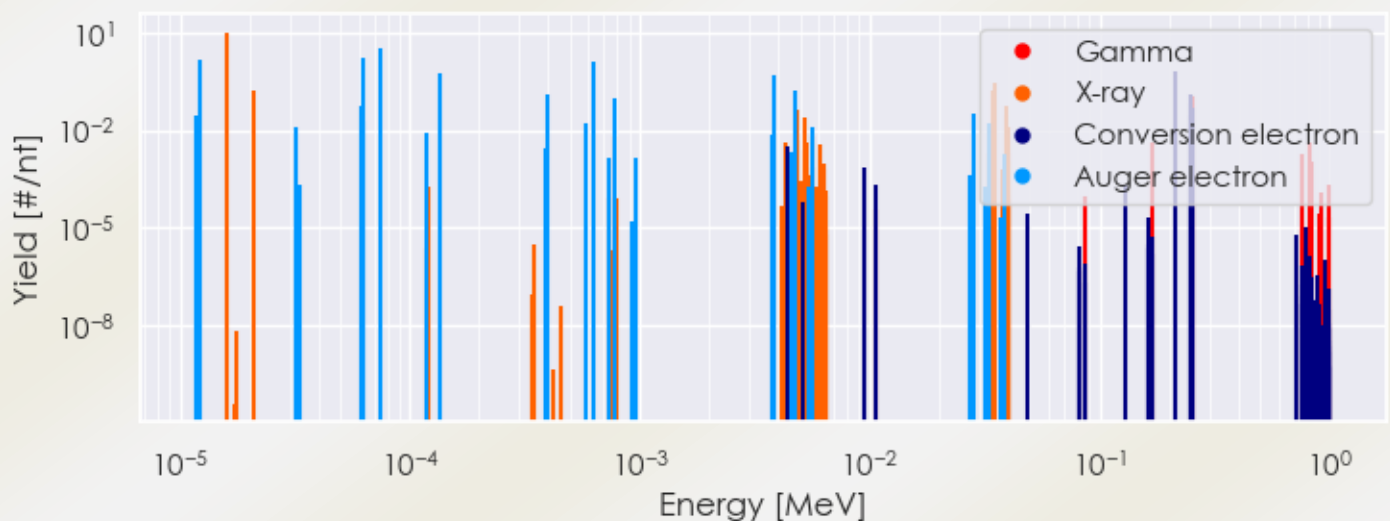
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ce-137m 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-137m 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-137m Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Ce-137m%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.61219e-05	1.033e+01	X-ray
2.10611e-05	1.570e-01	X-ray
4.82666e-03	4.092e-02	X-ray
5.25981e-03	2.348e-02	X-ray
3.42907e-02	1.593e-01	X-ray
3.47432e-02	2.918e-01	X-ray
3.91962e-02	2.836e-02	X-ray
3.92855e-02	5.495e-02	X-ray
4.02466e-02	1.175e-02	X-ray
2.54290e-01	1.104e-01	Gamma
1.18532e-05	2.753e-02	Auger electron
1.22653e-05	1.469e+00	Auger electron
3.21300e-05	1.203e-02	Auger electron
6.09515e-05	5.429e-02	Auger electron
6.25981e-05	1.590e+00	Auger electron
6.27244e-05	1.786e-02	Auger electron
7.40057e-05	3.474e+00	Auger electron
1.34808e-04	5.477e-01	Auger electron
3.95960e-04	1.230e-01	Auger electron
5.82078e-04	1.739e-02	Auger electron
6.27105e-04	1.267e+00	Auger electron
7.80170e-04	9.198e-02	Auger electron
3.85301e-03	4.872e-01	Auger electron
4.71017e-03	1.605e-01	Auger electron
5.60026e-03	1.297e-02	Auger electron
2.83189e-02	3.445e-02	Auger electron
3.33488e-02	1.623e-02	Auger electron

2.13834e-01	6.086e-01	Conversion electron
2.47777e-01	1.242e-01	Conversion electron
2.48125e-01	2.764e-02	Conversion electron
2.48577e-01	6.717e-02	Conversion electron
2.53120e-01	5.099e-02	Conversion electron
2.54290e-01	1.397e-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