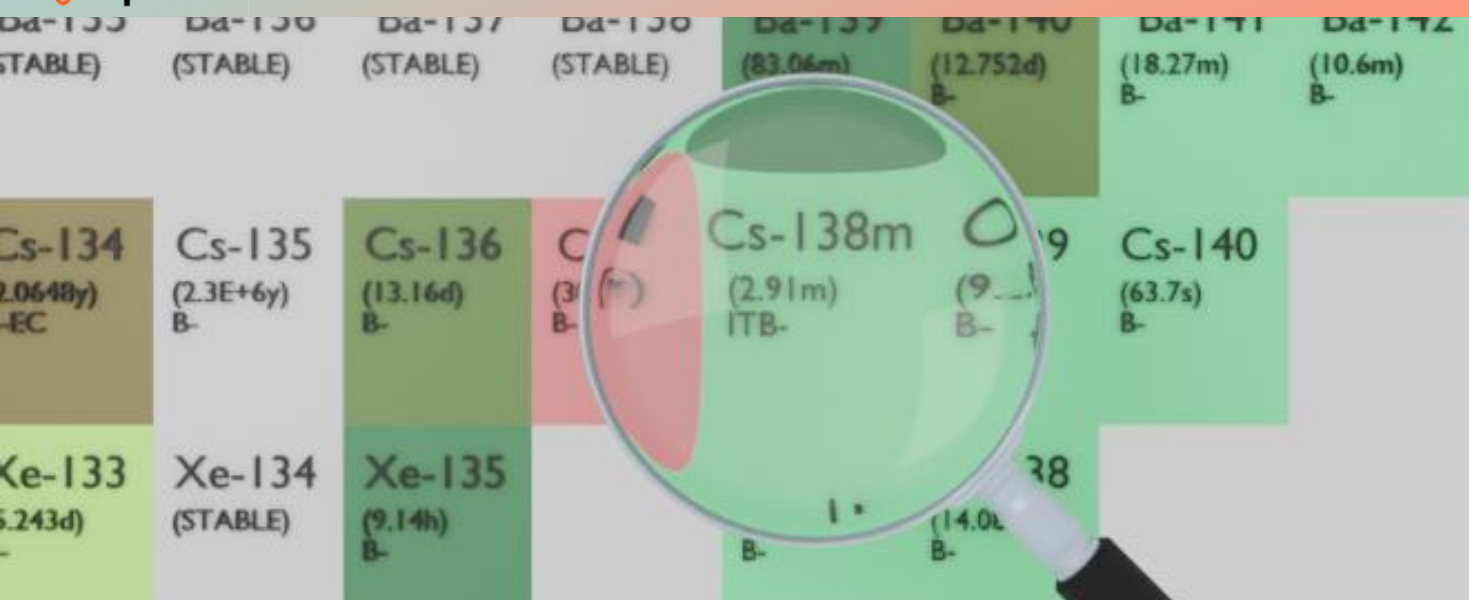




CESIUM-138M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Cs-138m
Atomic number (Z): 55
Mass number (A): 138
Neutron number (N): 83

RADIOACTIVE DECAY

Decay modes: β^- , Internal transition
Half-life: 2.91 [m]
Decay constant: $3.9699\text{e-}03$ [1/s]
Daughters: Cs-138 (81.0%), Ba-138 (19.0%)
Radioactive daughters: Cs-138

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.3201 [MeV]
Mean photon energy: 0.41487 [MeV]
Air kerma rate constant, Γ_{10} : $1.599\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Air kerma coefficient, K_{air} : $1.599\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : $5.129\text{e-}14$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]
Equilibrium dose constant for alphas, Δ_{α} : $0.000\text{e+}00$ [$\text{Gy} \cdot \text{kg}/\text{Bq} \cdot \text{s}$]

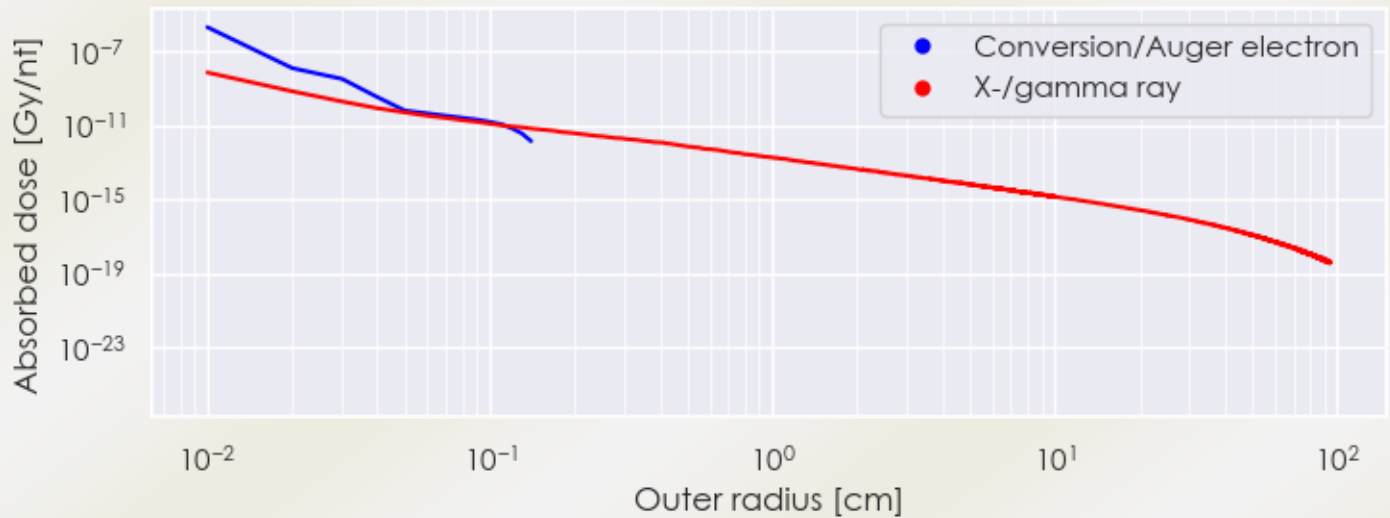
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e-}$: 5.129×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 6.647×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

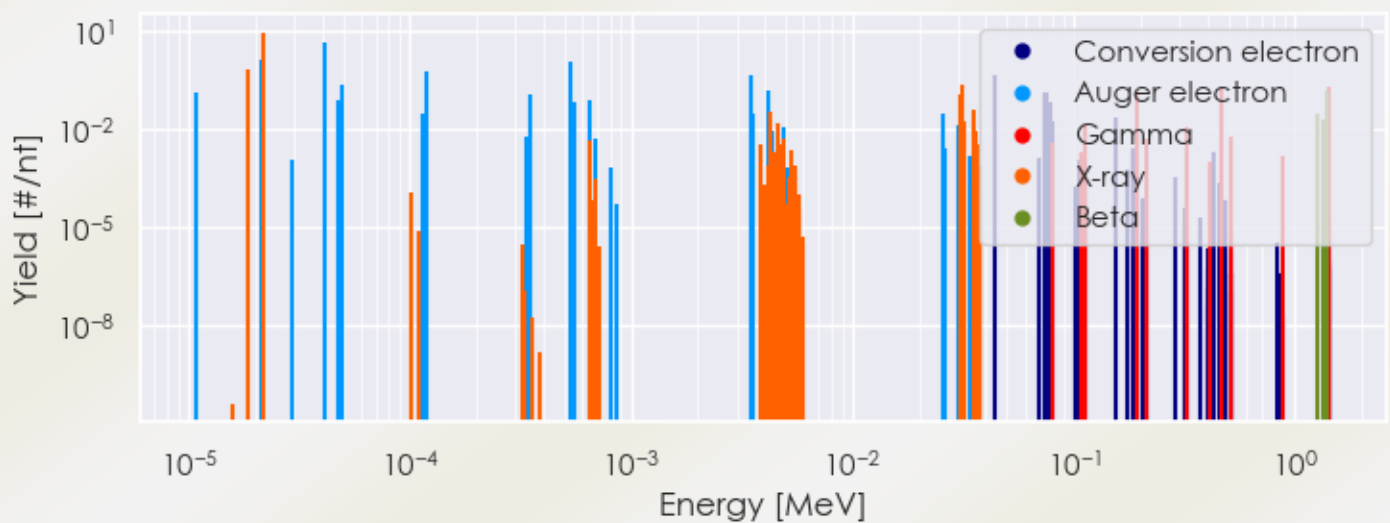
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Cs-138m DPK.csv

SUMMARY SPECTRA (PLOT)

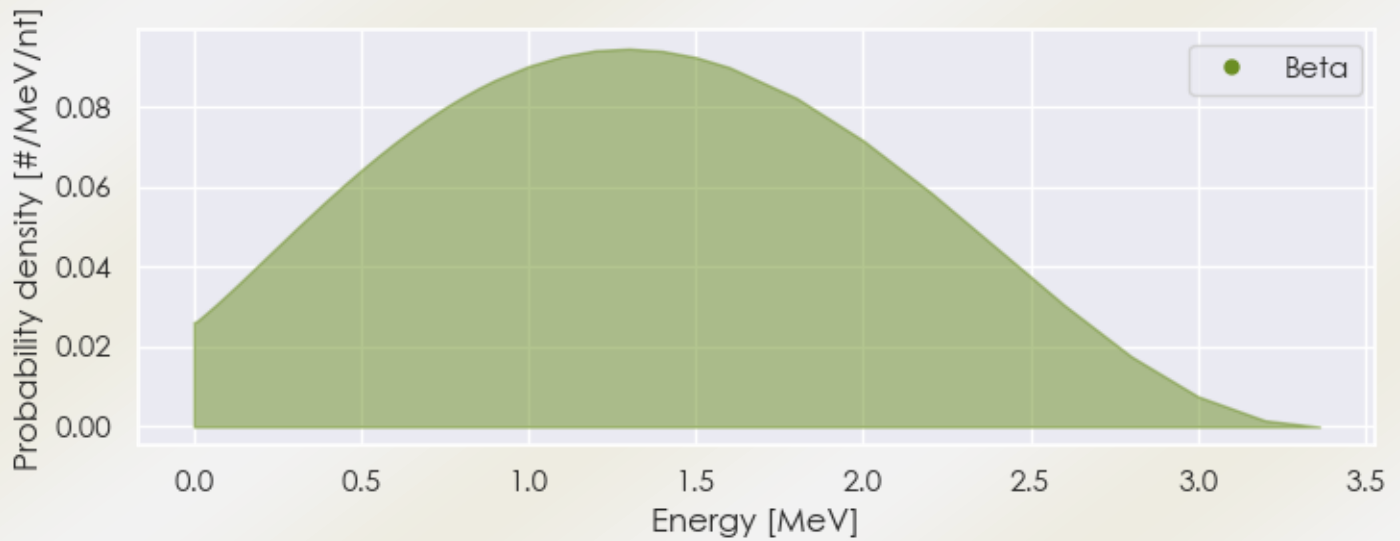
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Cs-138m 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/Cs-138m 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/Cs-138m Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.86018e-05	6.275e-01	X-ray
2.18904e-05	9.094e+00	X-ray
4.27312e-03	3.172e-02	X-ray
4.61551e-03	1.498e-02	X-ray
3.06218e-02	1.145e-01	X-ray
3.09789e-02	2.115e-01	X-ray
3.22056e-02	1.794e-02	X-ray
3.49256e-02	2.004e-02	X-ray
3.49943e-02	3.885e-02	X-ray

1.12500e-01	1.520e-02	Gamma
1.91700e-01	1.539e-01	Gamma
3.24500e-01	1.178e-02	Gamma
4.63000e-01	1.862e-01	Gamma
1.43600e+00	1.900e-01	Gamma
1.25012e+00	2.742e-02	Beta
1.34844e+00	1.959e-02	Beta
1.40074e+00	1.430e-01	Beta
1.08630e-05	1.339e-01	Auger electron
2.10618e-05	1.221e+00	Auger electron
4.14585e-05	4.314e+00	Auger electron
4.69142e-05	7.738e-02	Auger electron
4.87948e-05	2.125e-01	Auger electron
1.14796e-04	3.044e-02	Auger electron
1.18374e-04	5.428e-01	Auger electron
3.48688e-04	1.153e-01	Auger electron
5.28867e-04	1.173e+00	Auger electron
5.52013e-04	6.976e-02	Auger electron
6.54432e-04	7.716e-02	Auger electron
3.44503e-03	4.573e-01	Auger electron
3.56612e-03	2.735e-02	Auger electron
4.16706e-03	1.410e-01	Auger electron
4.91873e-03	1.087e-02	Auger electron
2.53980e-02	3.004e-02	Auger electron
2.98089e-02	1.365e-02	Auger electron
4.39150e-02	4.447e-01	Conversion electron
7.42151e-02	1.329e-01	Conversion electron
7.45368e-02	2.209e-02	Conversion electron
7.48939e-02	1.245e-01	Conversion electron
7.89093e-02	6.544e-02	Conversion electron
7.99000e-02	1.669e-02	Conversion electron
1.54251e-01	2.361e-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