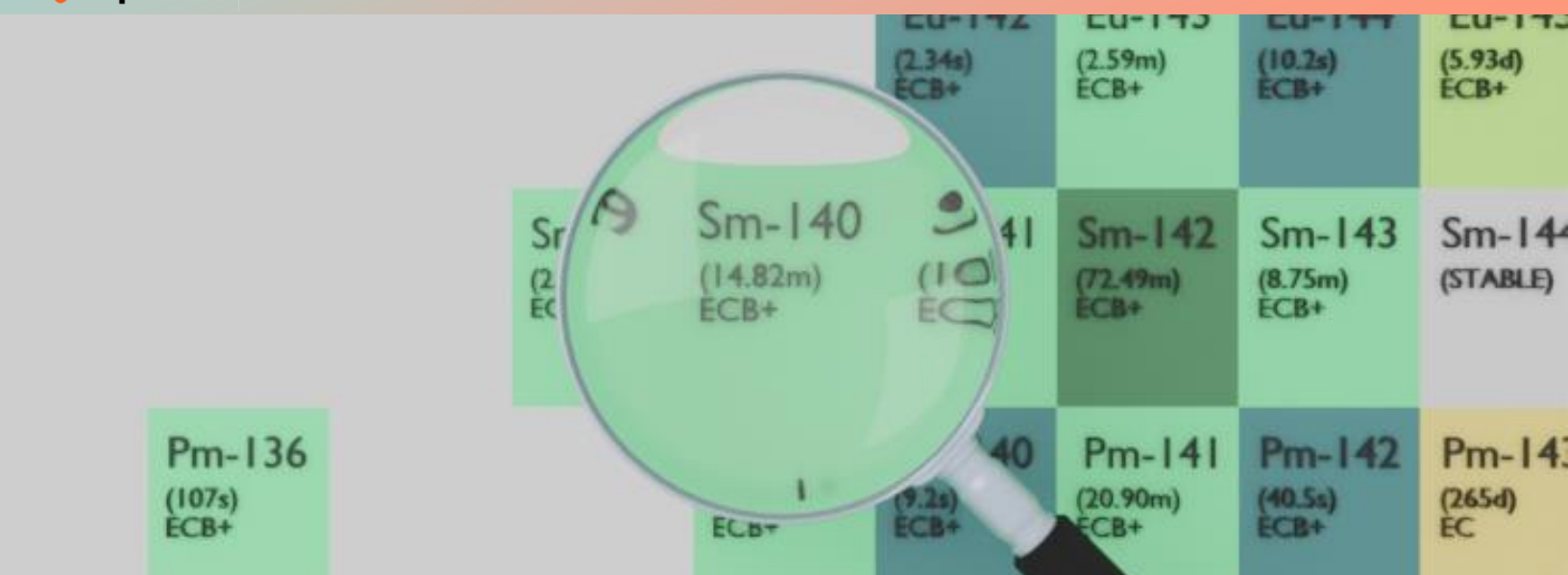




SAMARIUM-140

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Sm-140
Atomic number (Z): 62
Mass number (A): 140
Neutron number (N): 78

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 14.82 [m]
Decay constant: 7.7952×10^{-4} [1/s]
Daughters: Pm-140 (100.0%)
Radioactive daughters: Pm-140

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.17098 [MeV]
Mean photon energy: 0.56773 [MeV]
Air kerma rate constant, Γ_{10} : 1.418×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.178×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 2.739×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000×10^0 [Gy $\cdot$ kg/Bq $\cdot$ s]

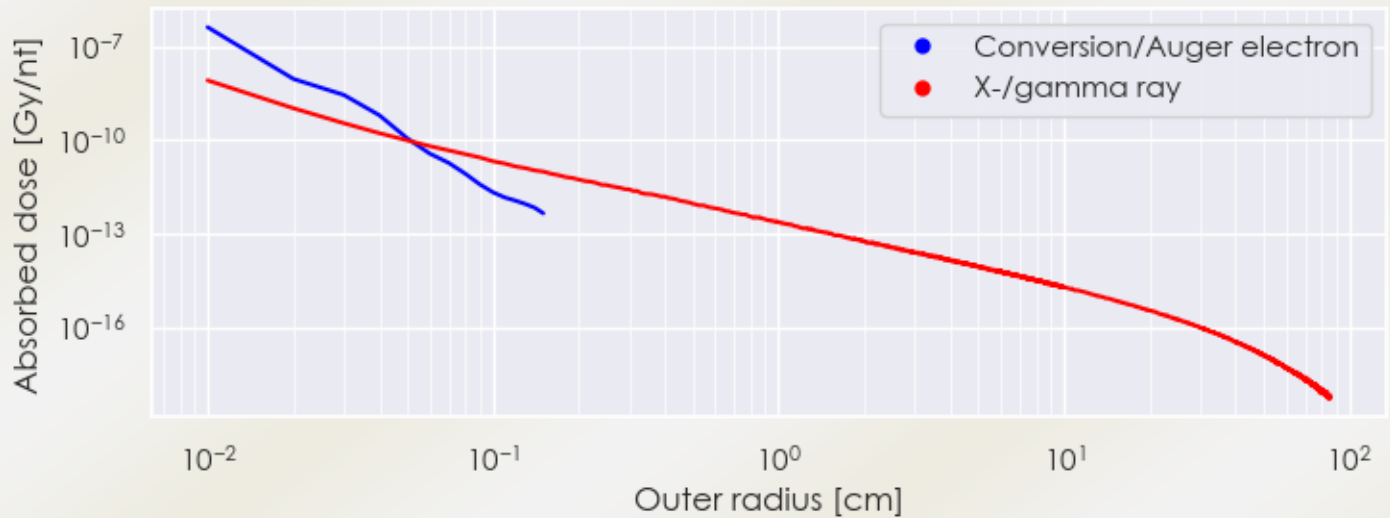
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-, \beta+, e-}$: 2.739×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 9.096×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

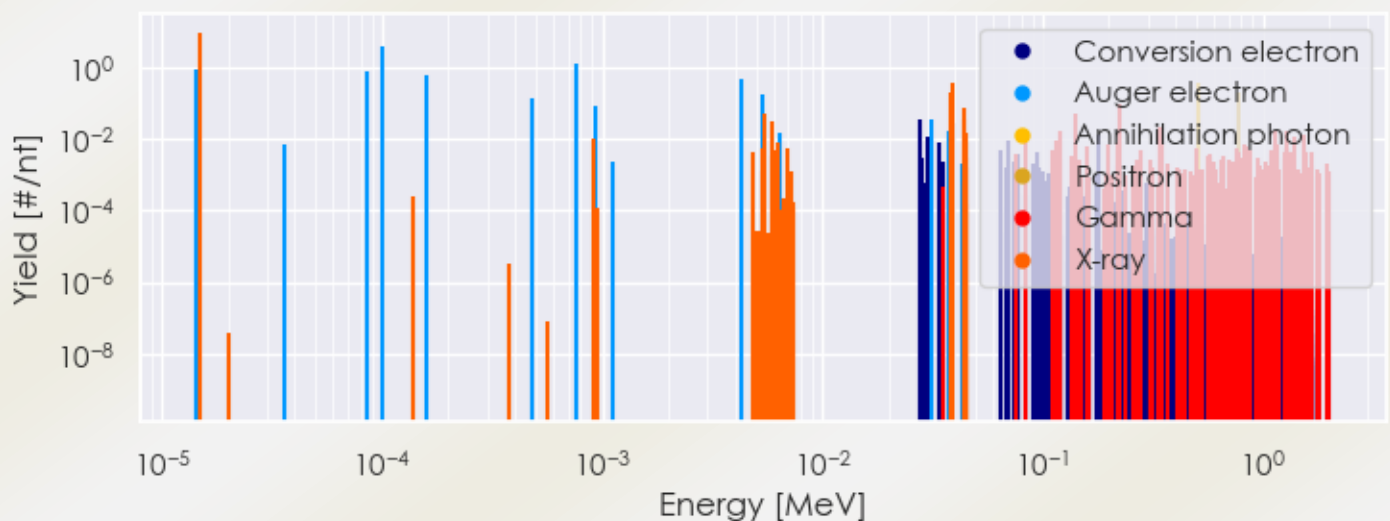
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



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

SUMMARY SPECTRA (PLOT)

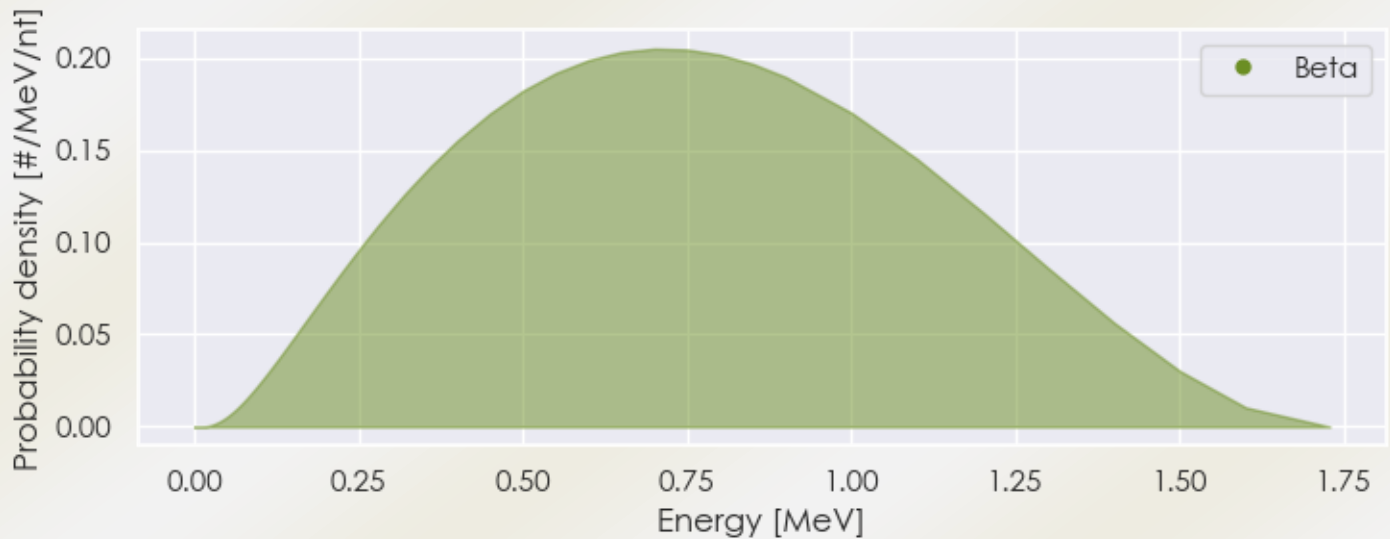
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



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

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.48480e-05	9.786e+00	X-ray
5.41729e-03	5.125e-02	X-ray
5.95960e-03	3.233e-02	X-ray
3.81996e-02	2.039e-01	X-ray
3.87671e-02	3.700e-01	X-ray
4.37575e-02	3.683e-02	X-ray
4.38721e-02	7.127e-02	X-ray
4.49791e-02	1.544e-02	X-ray
8.44000e-02	1.300e-02	Gamma
1.20800e-01	1.700e-02	Gamma

1.40000e-01	5.000e-02	Gamma
2.25400e-01	1.000e-01	Gamma
3.39800e-01	1.800e-02	Gamma
3.41300e-01	2.100e-02	Gamma
5.11000e-01	3.923e-01	Annihilation photon
1.13810e+00	1.800e-02	Gamma
1.27420e+00	1.600e-02	Gamma
1.39350e+00	1.200e-02	Gamma
1.53020e+00	1.300e-02	Gamma
7.79039e-01	1.937e-01	Positron
1.43706e-05	8.569e-01	Auger electron
8.55120e-05	7.974e-01	Auger electron
1.00530e-04	3.916e+00	Auger electron
1.59789e-04	6.372e-01	Auger electron
4.82492e-04	1.396e-01	Auger electron
7.56429e-04	1.351e+00	Auger electron
9.23877e-04	8.983e-02	Auger electron
4.31088e-03	5.079e-01	Auger electron
5.31208e-03	1.724e-01	Auger electron
6.34765e-03	1.454e-02	Auger electron
2.78059e-02	3.619e-02	Conversion electron
3.00810e-02	1.191e-02	Conversion electron
3.14373e-02	3.711e-02	Auger electron
3.71303e-02	1.795e-02	Auger electron
3.91810e-02	2.860e-02	Conversion electron
1.80181e-01	1.395e-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