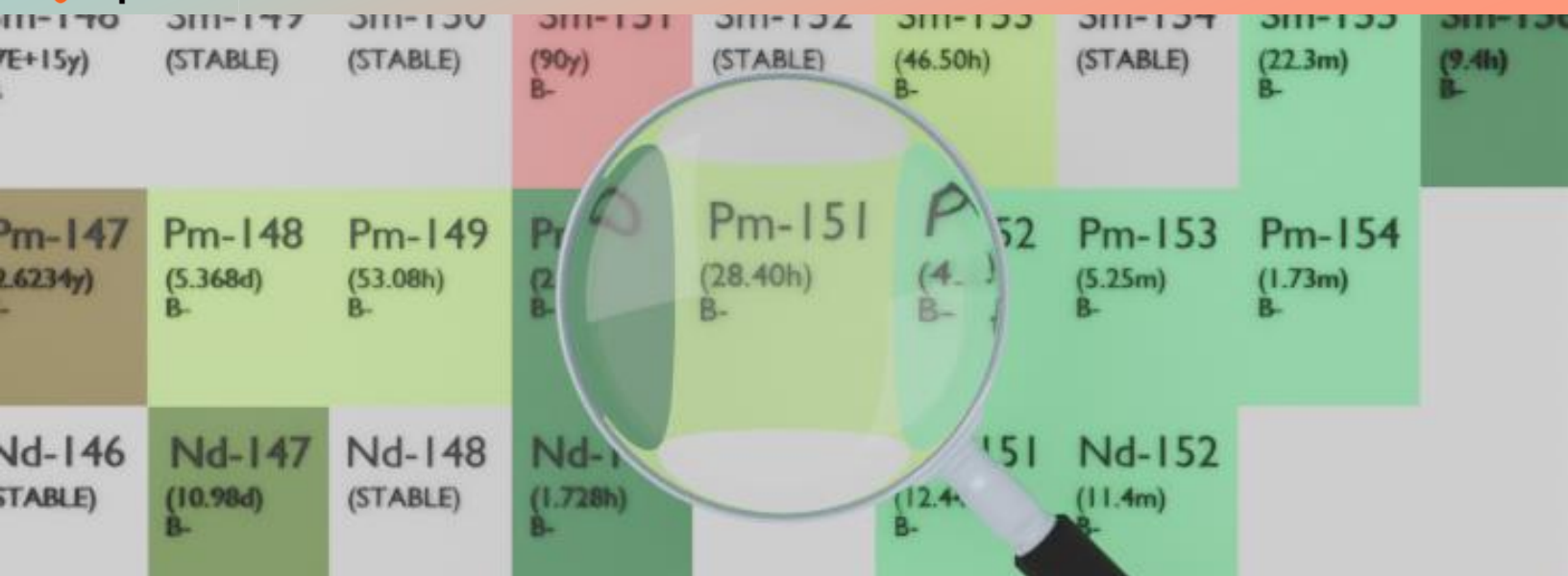




PROMETHIUM-151

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Pm-151
Atomic number (Z): 61
Mass number (A): 151
Neutron number (N): 90

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 28.4 [h]
Decay constant: 6.7796×10^{-6} [1/s]
Daughters: Sm-151 (100.0%)
Radioactive daughters: Sm-151

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.30477 [MeV]
Mean photon energy: 0.3289 [MeV]
Air kerma rate constant, Γ_{10} : 1.257×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 1.257×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 4.883×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

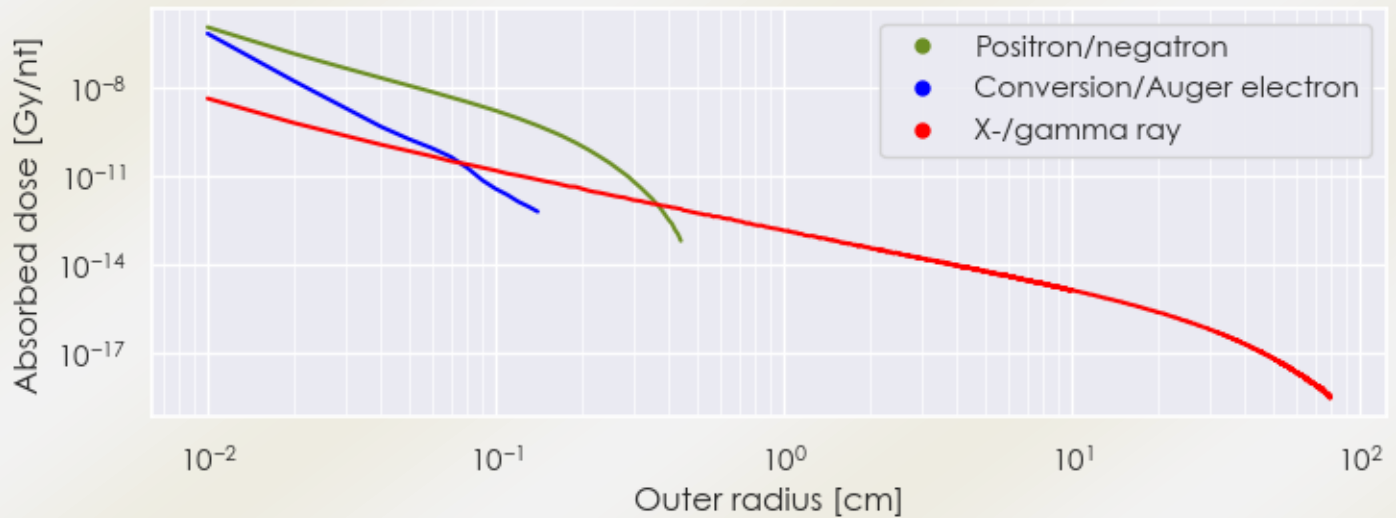
Equilibrium dose constant for betas/electrons, $\Delta_{\beta-, \beta+, e-}$: 4.883×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 5.270×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

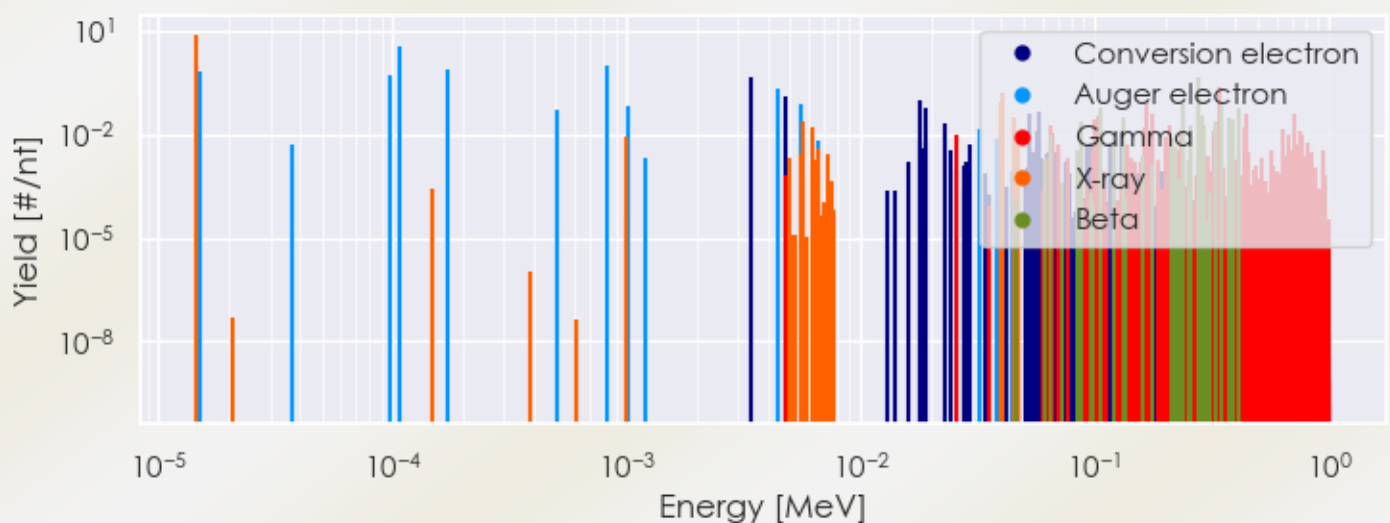
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Pm-151 DPK.csv

SUMMARY SPECTRA (PLOT)

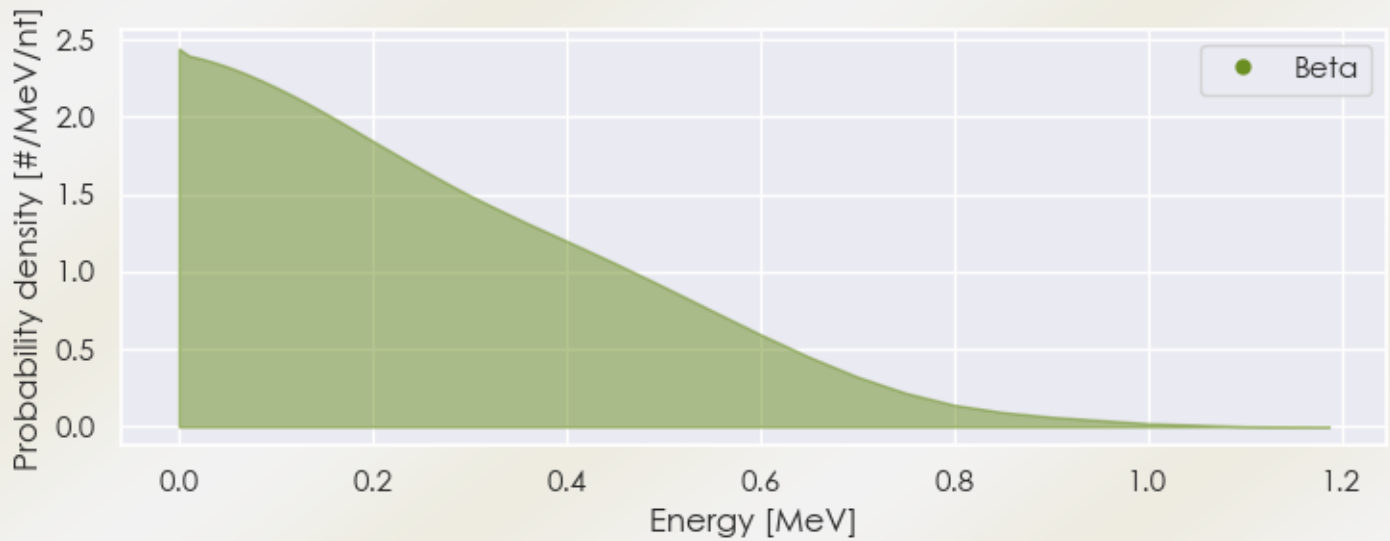
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Pm-151 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/Pm-151 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/Pm-151 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.45864e-05	7.740e+00	X-ray
5.62210e-03	2.316e-02	X-ray
6.20531e-03	1.507e-02	X-ray
3.95578e-02	8.333e-02	X-ray
4.01680e-02	1.508e-01	X-ray
4.53440e-02	1.511e-02	X-ray
4.54683e-02	2.924e-02	X-ray
6.48800e-02	1.890e-02	Gamma
6.58300e-02	1.148e-02	Gamma
1.00020e-01	2.542e-02	Gamma

1.01930e-01	1.282e-02	Gamma
1.04840e-01	3.510e-02	Gamma
1.63580e-01	1.553e-02	Gamma
1.67750e-01	8.325e-02	Gamma
1.77160e-01	3.825e-02	Gamma
2.09000e-01	1.733e-02	Gamma
2.32430e-01	1.035e-02	Gamma
2.40090e-01	3.825e-02	Gamma
2.75210e-01	6.750e-02	Gamma
3.23940e-01	1.215e-02	Gamma
3.40080e-01	2.250e-01	Gamma
3.44900e-01	2.115e-02	Gamma
4.40850e-01	1.507e-02	Gamma
4.45680e-01	4.005e-02	Gamma
6.36200e-01	1.418e-02	Gamma
7.17720e-01	4.050e-02	Gamma
7.52820e-01	1.282e-02	Gamma
8.80961e-02	2.387e-02	Beta
1.05794e-01	6.067e-02	Beta
1.21885e-01	1.134e-02	Beta
1.33003e-01	3.083e-02	Beta
2.39391e-01	7.061e-02	Beta
2.58451e-01	1.890e-02	Beta
2.77978e-01	4.177e-01	Beta
2.86128e-01	3.282e-02	Beta
2.92823e-01	1.691e-02	Beta
3.31471e-01	2.287e-02	Beta
3.47733e-01	1.392e-02	Beta
3.47994e-01	7.857e-02	Beta
3.73437e-01	2.984e-02	Beta
3.87759e-01	2.685e-02	Beta
4.14415e-01	5.967e-02	Beta
4.16406e-01	3.978e-02	Beta
1.51033e-05	6.250e-01	Auger electron
9.74624e-05	4.912e-01	Auger electron
1.06282e-04	3.273e+00	Auger electron
1.73343e-04	7.657e-01	Auger electron
5.06495e-04	5.136e-02	Auger electron

8.19931e-04	9.786e-01	Auger electron
1.00975e-03	6.670e-02	Auger electron
3.41330e-03	4.459e-01	Conversion electron
4.45891e-03	2.113e-01	Auger electron
4.82100e-03	1.187e-01	Conversion electron
5.50888e-03	7.225e-02	Auger electron
1.80040e-02	9.715e-02	Conversion electron
1.89540e-02	5.568e-02	Conversion electron
2.28240e-02	1.953e-02	Conversion electron
3.25196e-02	1.438e-02	Auger electron
5.31440e-02	3.735e-02	Conversion electron
5.71777e-02	1.259e-02	Conversion electron
5.79640e-02	4.494e-02	Conversion electron
1.30284e-01	1.088e-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