



PROMETHIUM-141

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Pm-141
Atomic number (Z): 61
Mass number (A): 141
Neutron number (N): 80

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 20.9 [m]
Decay constant: 5.5275×10^{-4} [1/s]
Daughters: Nd-141 (99.8%), Nd-141m (0.167%)
Radioactive daughters: Nd-141, Nd-141m

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.60535 [MeV]
Mean photon energy: 0.7349 [MeV]
Air kerma rate constant, Γ_{10} : 8.311×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.777×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.699×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

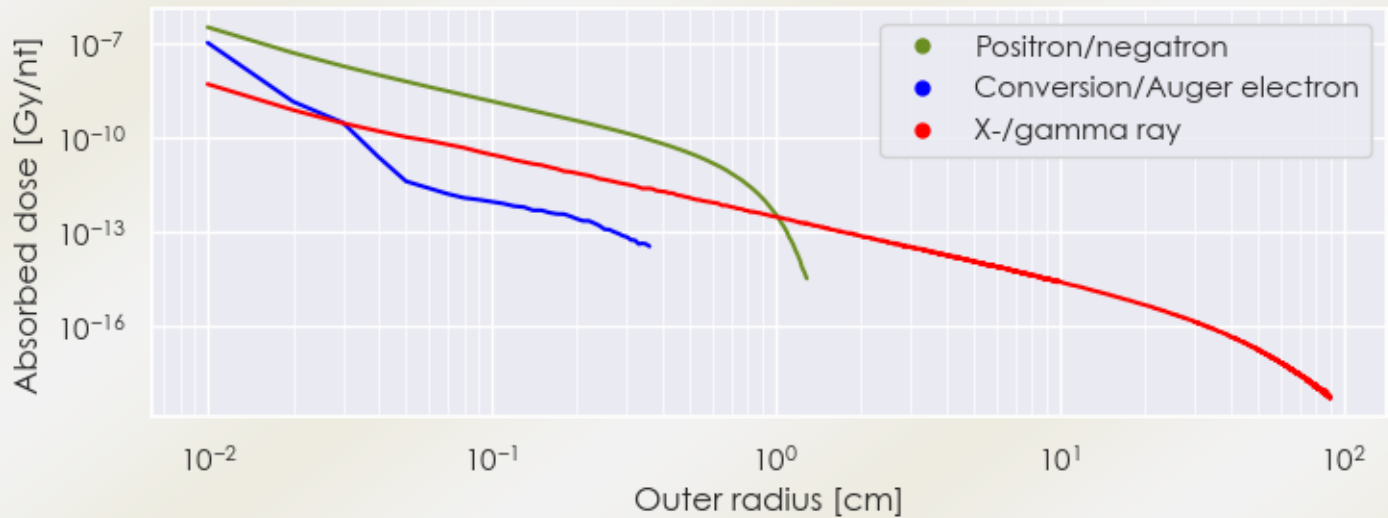
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: $9.699\text{e-}14$ [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : $1.177\text{e-}13$ [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

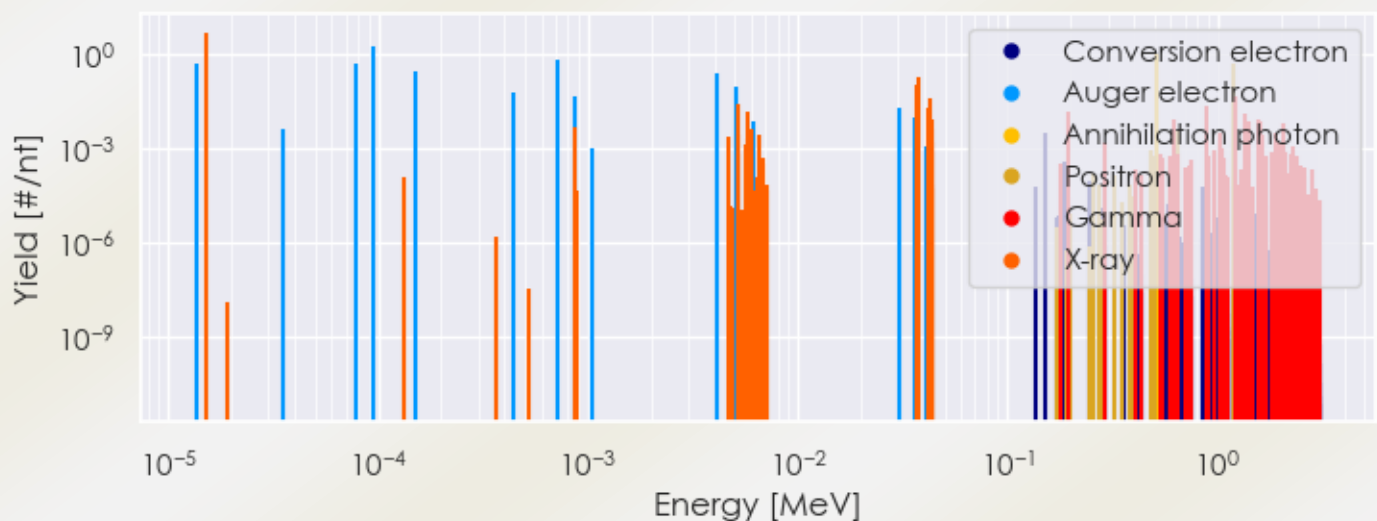
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Pm-141 DPK.csv

SUMMARY SPECTRA (PLOT)

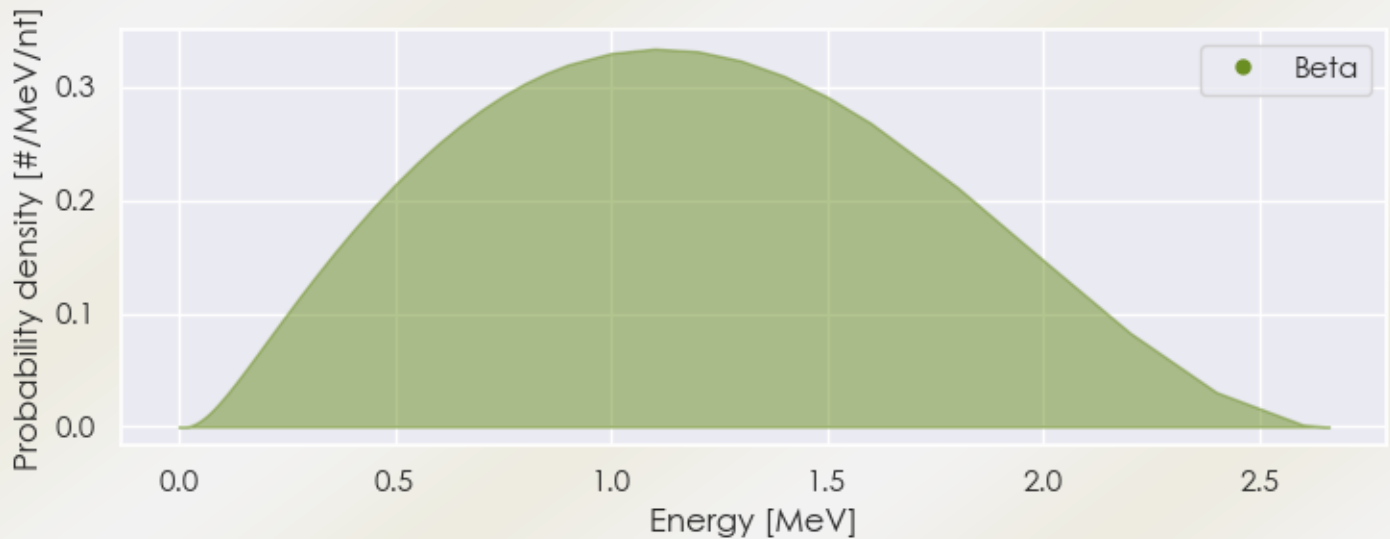
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Pm-141 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-141 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-141 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.51979e-05	5.314e+00	X-ray
5.21638e-03	2.606e-02	X-ray
5.72010e-03	1.604e-02	X-ray
3.68696e-02	1.120e-01	X-ray
3.73962e-02	2.040e-01	X-ray
4.22041e-02	2.015e-02	X-ray
4.23100e-02	3.900e-02	X-ray
1.93670e-01	1.607e-02	Gamma
5.11000e-01	1.005e+00	Annihilation photon
8.86220e-01	2.436e-02	Gamma

1.22326e+00	4.740e-02	Gamma
1.34552e+00	1.327e-02	Gamma
1.20267e+00	4.968e-01	Positron
1.36628e-05	5.318e-01	Auger electron
7.81721e-05	5.407e-01	Auger electron
9.39722e-05	2.015e+00	Auger electron
1.51232e-04	3.101e-01	Auger electron
4.44931e-04	6.515e-02	Auger electron
7.10793e-04	7.127e-01	Auger electron
8.73709e-04	4.897e-02	Auger electron
4.14711e-03	2.705e-01	Auger electron
5.09808e-03	9.094e-02	Auger electron
3.03768e-02	2.156e-02	Auger electron
3.58432e-02	1.034e-02	Auger 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