



TERBIUM-149

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tb-149
Atomic number (Z): 65
Mass number (A): 149
Neutron number (N): 84

RADIOACTIVE DECAY

Decay modes: α , β^+ , Electron capture
Half-life: 4.118 [h]
Decay constant: 4.6756×10^{-5} [1/s]
Daughters: Gd-149 (83.3%), Eu-145 (16.7%)
Radioactive daughters: Gd-149, Eu-145

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.681 [MeV]
Mean electron energy: 0.08706 [MeV]
Mean photon energy: 1.36116 [MeV]
Air kerma rate constant, Γ_{10} : 4.532×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 4.808×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.231×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 1.091×10^{-13} [Gy $\cdot$ kg/Bq $\cdot$ s]

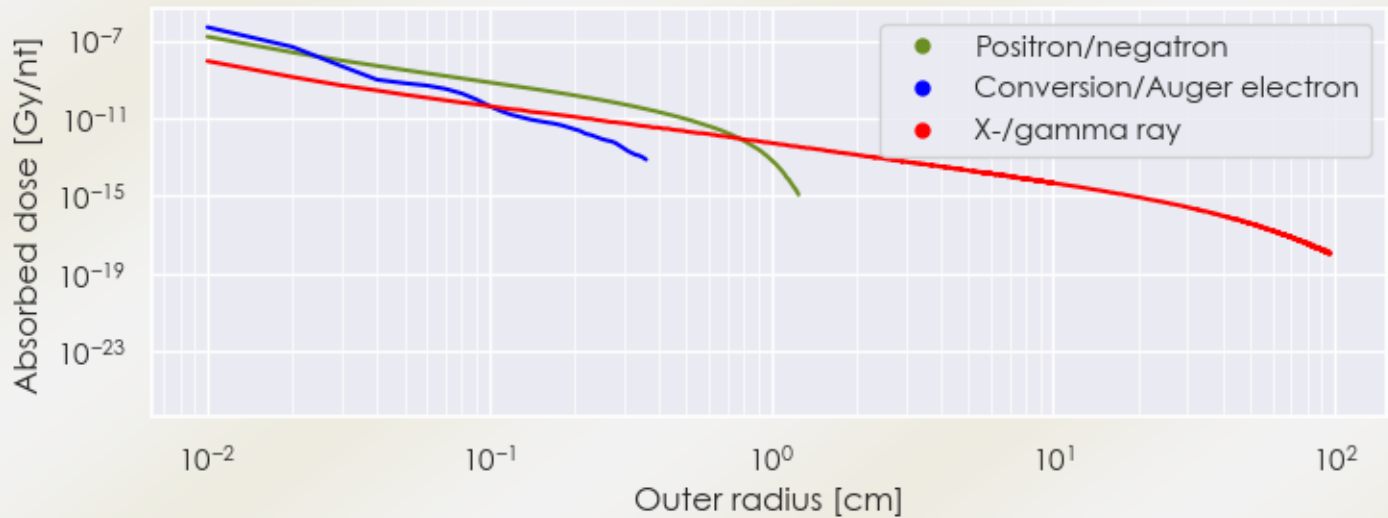
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta^+,e^-}$: 1.395×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.181×10^{-13} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

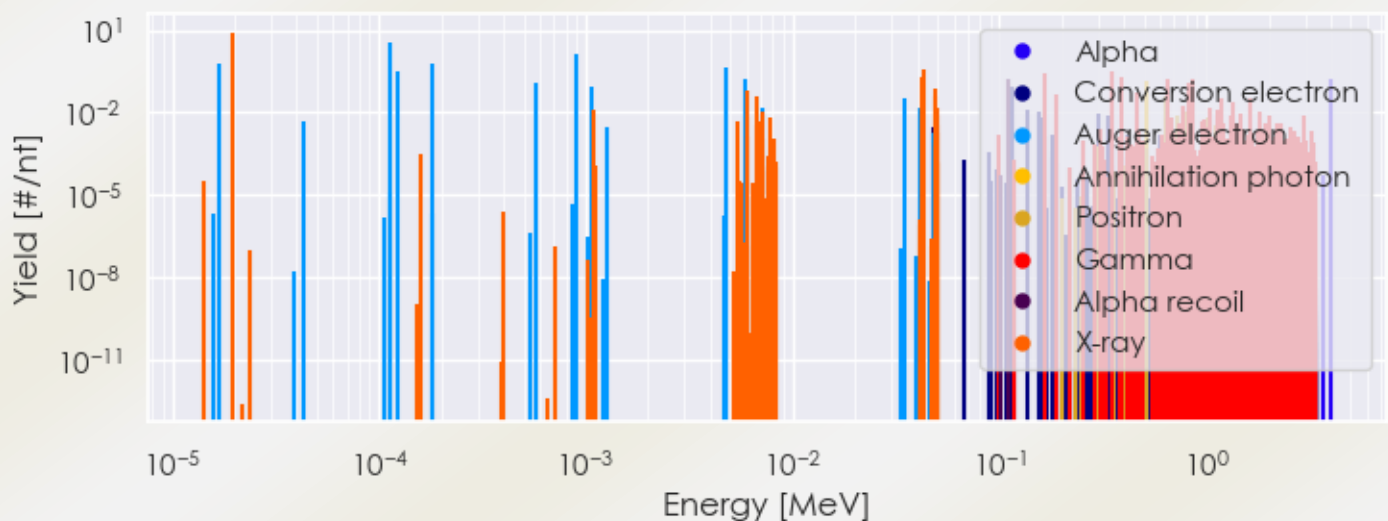
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Tb-149 DPK.csv

SUMMARY SPECTRA (PLOT)

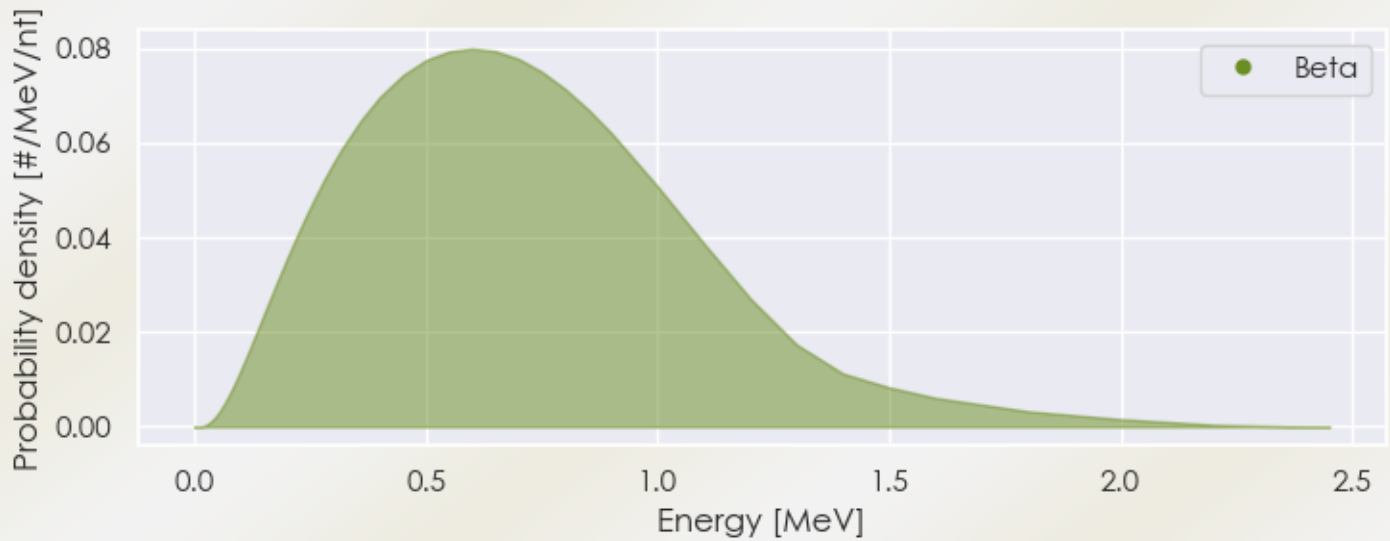
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Tb-149 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/Tb-149 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/Tb-149 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.94296e-05	8.357e+00	X-ray
1.09478e-03	1.274e-02	X-ray
6.04290e-03	5.846e-02	X-ray
6.71540e-03	3.812e-02	X-ray
4.23559e-02	2.055e-01	X-ray
4.30603e-02	3.694e-01	X-ray
4.86161e-02	3.754e-02	X-ray
4.87612e-02	7.261e-02	X-ray
5.00239e-02	1.601e-02	X-ray
1.64980e-01	2.636e-01	Gamma

1.87220e-01	4.300e-02	Gamma
3.52240e-01	2.943e-01	Gamma
3.88570e-01	1.837e-01	Gamma
4.64850e-01	5.651e-02	Gamma
5.11000e-01	1.430e-01	Annihilation photon
6.52120e-01	1.625e-01	Gamma
7.72650e-01	1.607e-02	Gamma
8.17100e-01	1.159e-01	Gamma
8.53430e-01	1.545e-01	Gamma
8.61860e-01	7.497e-02	Gamma
1.04065e+00	1.457e-02	Gamma
1.13530e+00	1.183e-02	Gamma
1.17540e+00	3.267e-02	Gamma
1.34119e+00	2.296e-02	Gamma
1.64026e+00	3.179e-02	Gamma
1.82750e+00	1.095e-02	Gamma
6.38896e-01	3.912e-02	Positron
8.12250e-01	1.008e-02	Positron
1.68638e-05	5.617e-01	Auger electron
1.13381e-04	3.760e+00	Auger electron
1.23641e-04	3.093e-01	Auger electron
1.82378e-04	5.875e-01	Auger electron
5.72160e-04	1.184e-01	Auger electron
8.97974e-04	1.266e+00	Auger electron
1.07585e-03	8.599e-02	Auger electron
4.77284e-03	4.654e-01	Auger electron
5.92894e-03	1.632e-01	Auger electron
7.11973e-03	1.418e-02	Auger electron
3.47387e-02	3.205e-02	Auger electron
4.11460e-02	1.587e-02	Auger electron
1.14677e-01	9.376e-02	Conversion electron
1.36917e-01	1.191e-02	Conversion electron
1.56630e-01	1.133e-02	Conversion electron
3.96845e+00	1.669e-01	Alpha
1.09546e-01	1.669e-01	Alpha recoil

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