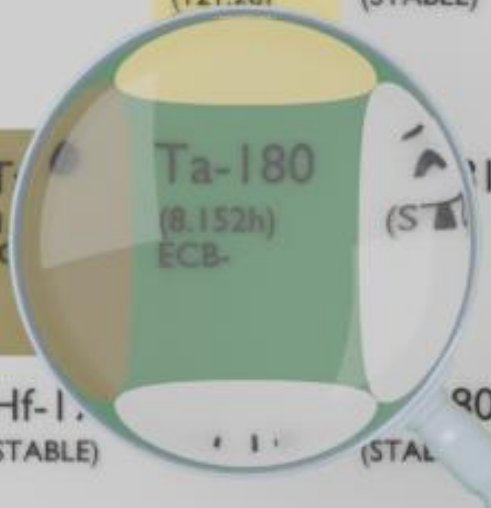




VV-177 (132m) CB+	VV-178 (21.6d) EC	VV-179 (37.05m) EC	VV-180 (121.2d)	VV-181 (STABLE)	VV-182 (STABLE)	VV-183 (STABLE)	VV-184 (75.1d) B-
Ta-176 (1.09h) CB+	Ta-177 (56.56h) EC	Ta-178 (9.31m) ECB+	Ta-180 (8.152h) ECB-	Ta-181 (STABLE)	Ta-182 (114.43d) B-	Ta-183 (5.1d) B-	Ta-184 (8.7h) B-
Hf-175 (70d) C	Hf-176 (STABLE)	Hf-177 (STABLE)	Hf-178 (STABLE)	Hf-179 (STABLE)	Hf-180 (STABLE)	Hf-181 (42.39d) B-	Hf-182 (9E+6y) B-

TANTALUM-180

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ta-180
Atomic number (Z): 73
Mass number (A): 180
Neutron number (N): 107

RADIOACTIVE DECAY

Decay modes: β^- , Electron capture
Half-life: 8.152 [h]
Decay constant: 2.3619×10^{-5} [1/s]
Daughters: Hf-180 (86.0%), W-180 (14.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.05651 [MeV]
Mean photon energy: 0.04824 [MeV]
Air kerma rate constant, Γ_{10} : 2.695×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.695×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 9.054×10^{-15} [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, $\Delta_{\beta,\beta^+,e^-}$: 9.054×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 7.729×10^{-15} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

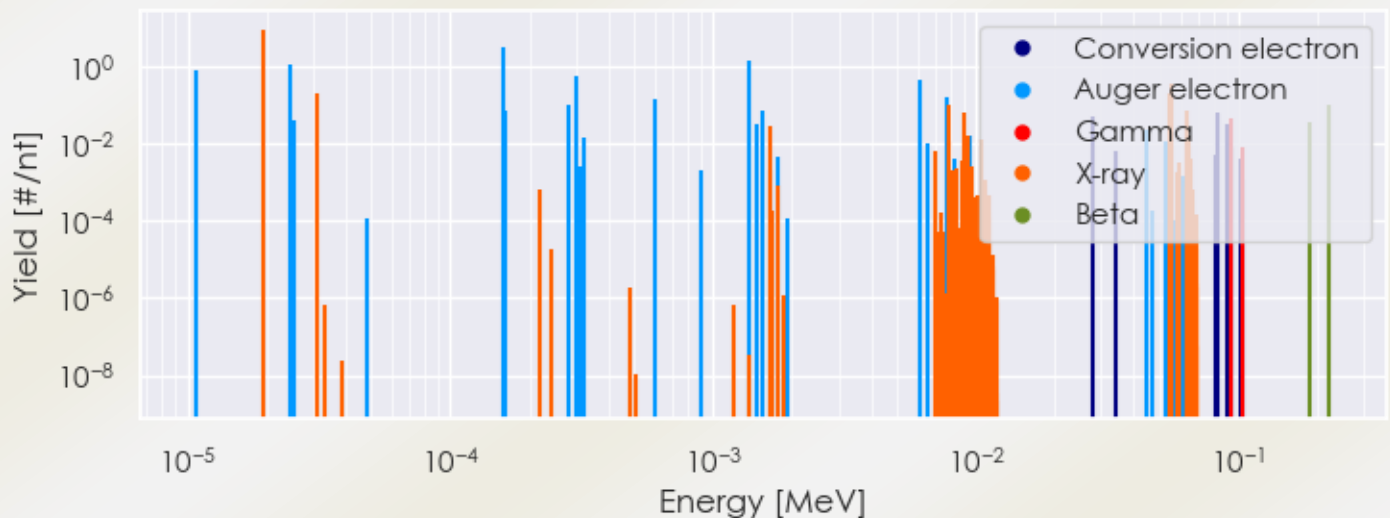
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ta-180 DPK.csv

SUMMARY SPECTRA (PLOT)

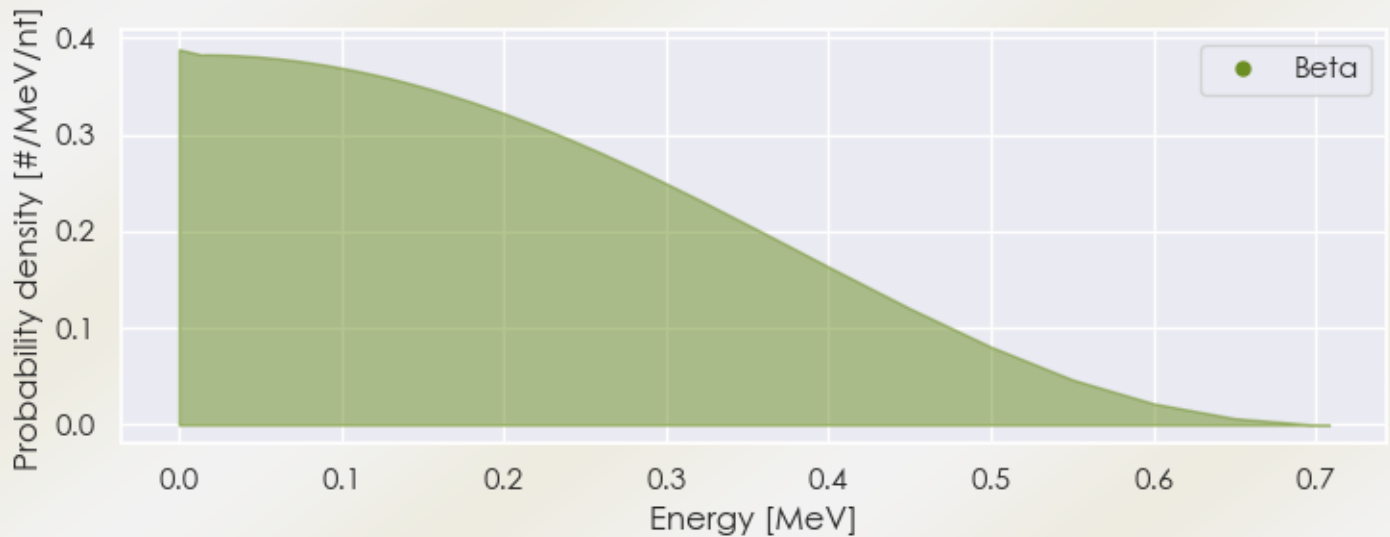
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Ta-180 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/Ta-180 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/Ta-180 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.94068e-05	9.302e+00	X-ray
3.13168e-05	2.132e-01	X-ray
1.63782e-03	2.815e-02	X-ray
7.83282e-03	1.118e-02	X-ray
7.88959e-03	9.862e-02	X-ray
9.03750e-03	6.695e-02	X-ray
9.34358e-03	1.714e-02	X-ray
1.05374e-02	1.218e-02	X-ray
5.47191e-02	2.051e-01	X-ray
5.59237e-02	3.589e-01	X-ray

6.31238e-02	3.820e-02	X-ray
6.33831e-02	7.384e-02	X-ray
6.51063e-02	1.663e-02	X-ray
9.34000e-02	4.506e-02	Gamma
1.85759e-01	3.600e-02	Beta
2.22946e-01	1.040e-01	Beta
1.08202e-05	8.097e-01	Auger electron
2.44612e-05	1.149e+00	Auger electron
2.53244e-05	4.217e-02	Auger electron
1.59774e-04	3.238e+00	Auger electron
1.61677e-04	7.272e-02	Auger electron
2.83133e-04	1.021e-01	Auger electron
3.02271e-04	5.453e-01	Auger electron
3.20120e-04	1.429e-02	Auger electron
5.98731e-04	1.473e-01	Auger electron
1.36387e-03	1.412e+00	Auger electron
1.47583e-03	3.352e-02	Auger electron
1.54180e-03	7.429e-02	Auger electron
6.16203e-03	4.556e-01	Auger electron
6.59171e-03	1.072e-02	Auger electron
7.78195e-03	1.690e-01	Auger electron
9.43215e-03	1.581e-02	Auger electron
2.79180e-02	4.927e-02	Conversion electron
4.45280e-02	2.275e-02	Auger electron
5.31026e-02	1.178e-02	Auger electron
8.26370e-02	6.132e-02	Conversion electron
8.38417e-02	5.767e-02	Conversion electron
9.13010e-02	3.105e-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