THALLIUM-202

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Tl-202
Atomic number (Z): 81
Mass number (A): 202
Neutron number (N): 121

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 12.23 [d]
Decay constant: 6.5597e-07 [1/s]
Daughters: Hg-202 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

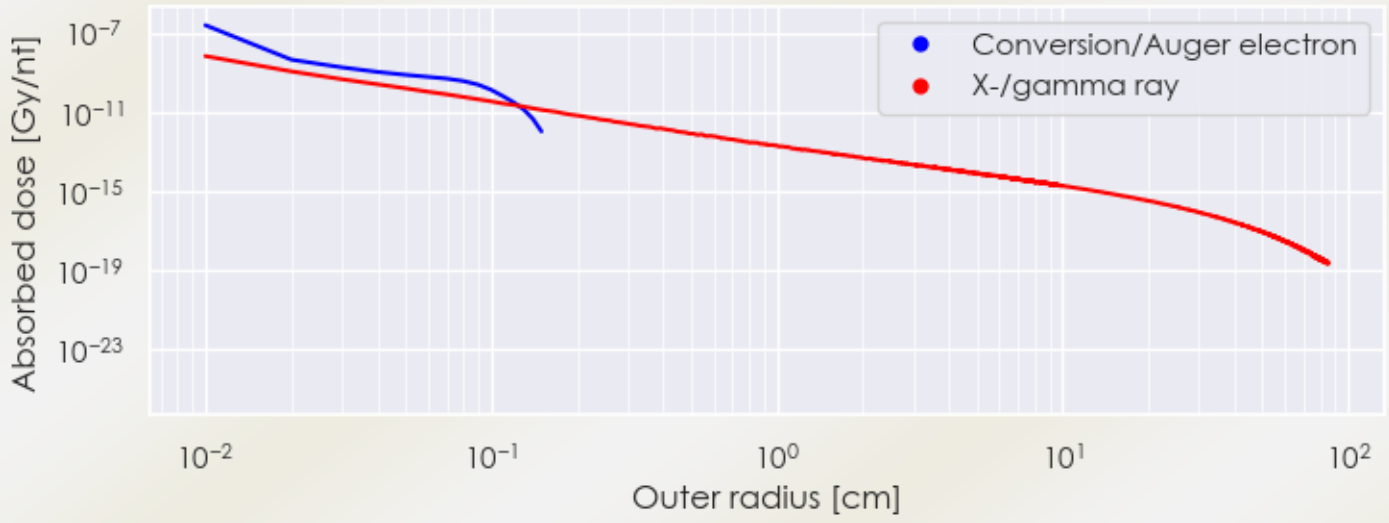
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.02328 [MeV]
Mean photon energy: 0.46577 [MeV]
Air kerma rate constant, Γ_{10}: 2.316e-17 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 2.316e-17 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 3.730e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 3.730e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 7.462e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

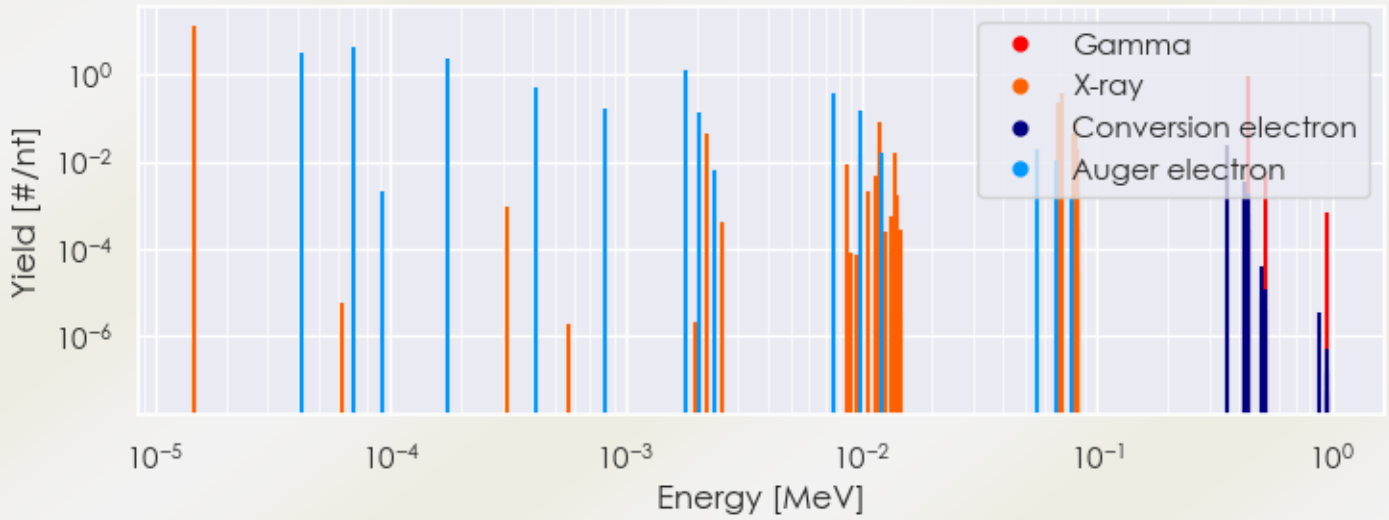
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Tl-202 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/Tl-202 Summary 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/Tl-202 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
1.47029e-05	1.349e+01	X-ray
2.22232e-03	4.416e-02	X-ray
9.89221e-03	1.465e-02	X-ray
9.98619e-03	1.290e-01	X-ray
1.18592e-02	8.051e-02	X-ray
1.19285e-02	2.435e-02	X-ray
1.38758e-02	1.608e-02	X-ray
6.90989e-02	2.286e-01	X-ray
7.10661e-02	3.874e-01	X-ray
8.00792e-02	4.279e-02	X-ray
8.05161e-02	8.281e-02	X-ray
8.26796e-02	1.009e-02	X-ray
8.27860e-02	1.975e-02	X-ray
4.39560e-01	9.140e-01	Gamma
4.20435e-05	3.056e+00	Auger electron
6.99088e-05	4.469e+00	Auger electron
1.74625e-04	2.349e+00	Auger electron
4.15400e-04	4.961e-01	Auger electron
8.13839e-04	1.647e-01	Auger electron
1.80732e-03	1.213e+00	Auger electron
2.03973e-03	1.340e-01	Auger electron
7.64604e-03	3.626e-01	Auger electron
9.85460e-03	1.550e-01	Auger electron
1.20910e-02	1.600e-02	Auger electron
5.57212e-02	2.029e-02	Auger electron
6.69357e-02	1.099e-02	Auger electron
3.56207e-01	2.386e-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