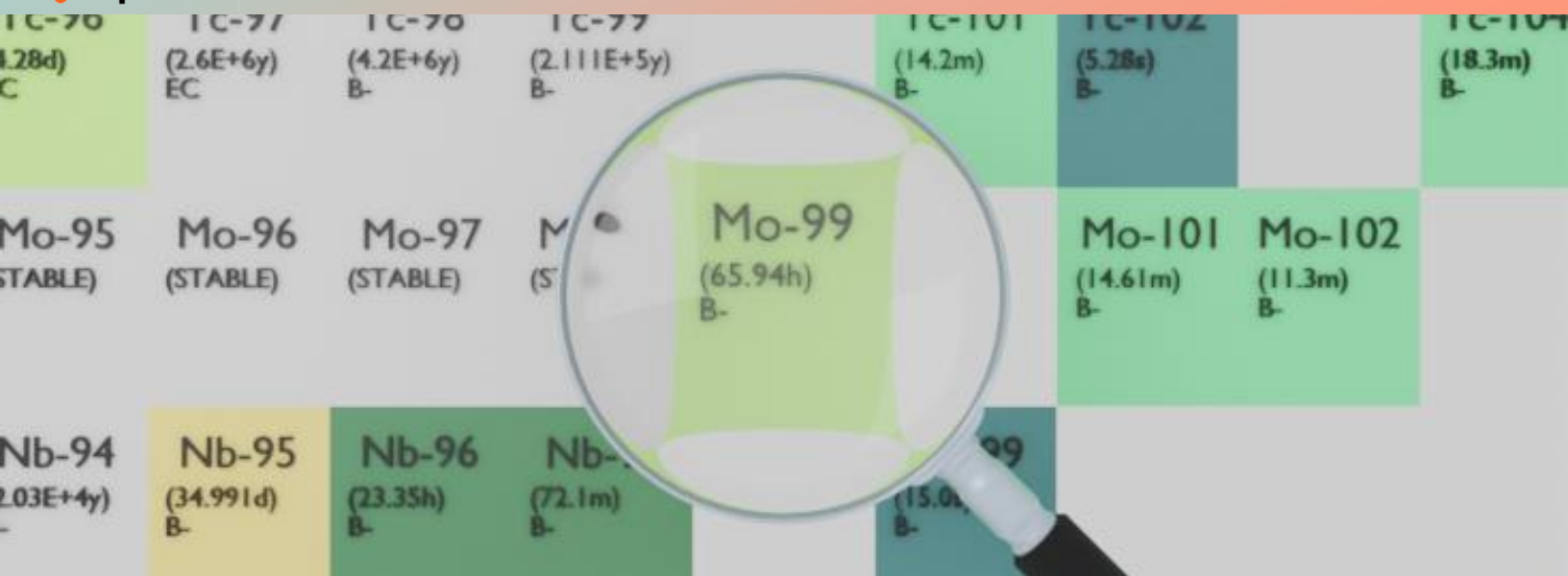




MOLYBDENUM-99

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Mo-99
Atomic number (Z): 42
Mass number (A): 99
Neutron number (N): 57

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 65.94 [h]
Decay constant: 2.9199×10^{-6} [1/s]
Daughters: Tc-99m (87.7%), Tc-99 (12.3%)
Radioactive daughters: Tc-99m, Tc-99

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.39288 [MeV]
Mean photon energy: 0.14841 [MeV]
Air kerma rate constant, Γ_{10} : 6.011×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 6.011×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 6.295×10^{-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, $\Delta_{\beta,\beta^+,e^-}$: 6.295×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.378×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

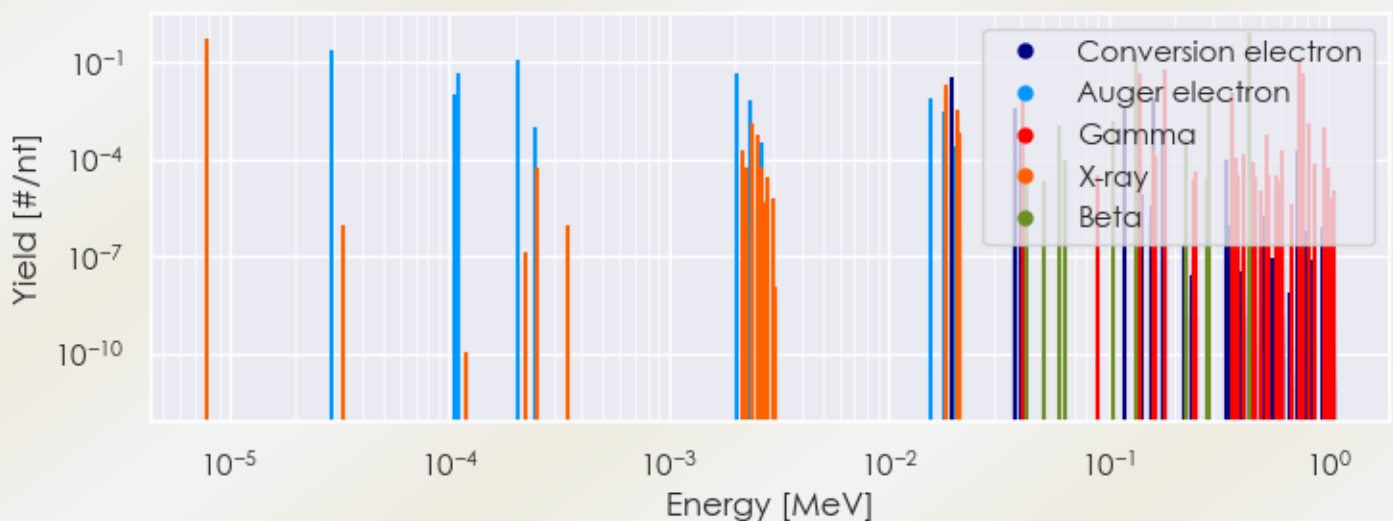
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Mo-99 DPK.csv

SUMMARY SPECTRA (PLOT)

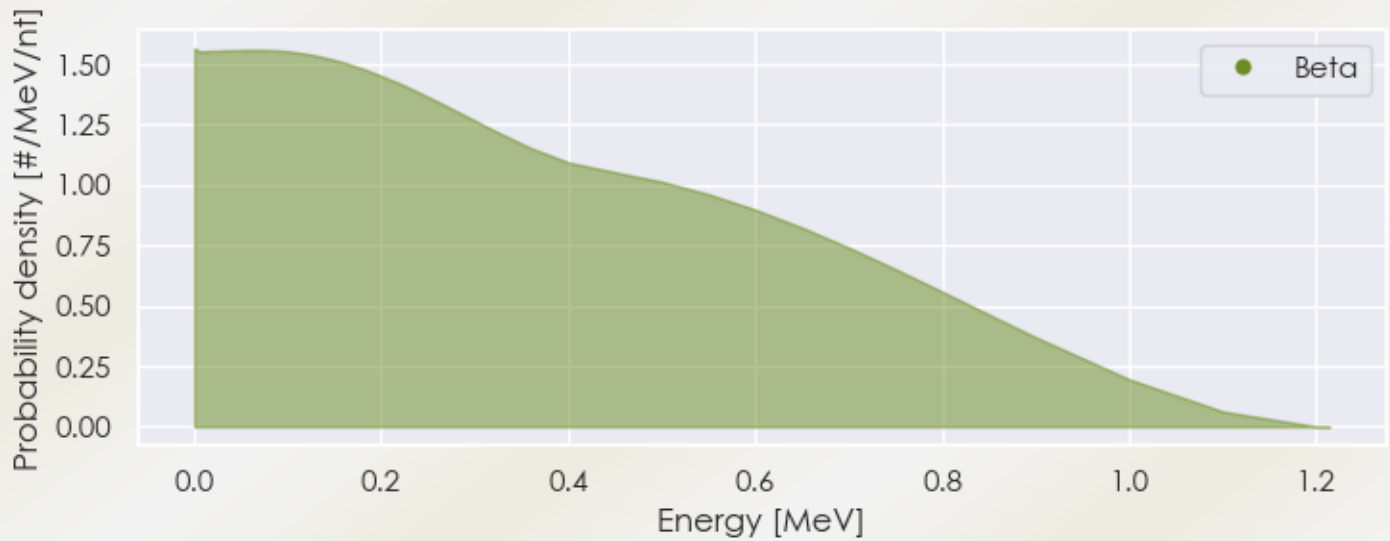
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Mo-99 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/Mo-99 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/Mo-99 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
7.87651e-06	5.109e-01	X-ray
1.82141e-02	1.064e-02	X-ray
1.83344e-02	2.023e-02	X-ray
4.05845e-02	1.053e-02	Gamma
1.40511e-01	4.524e-02	Gamma
1.81068e-01	5.992e-02	Gamma
3.66421e-01	1.191e-02	Gamma
7.39500e-01	1.213e-01	Gamma
7.77921e-01	4.258e-02	Gamma
1.33139e-01	1.636e-01	Beta

2.89703e-01	1.137e-02	Beta
4.42825e-01	8.220e-01	Beta
2.94022e-05	2.233e-01	Auger electron
1.06154e-04	1.015e-02	Auger electron
1.10411e-04	4.658e-02	Auger electron
2.03876e-04	1.131e-01	Auger electron
2.05404e-03	4.475e-02	Auger electron
1.95725e-02	3.476e-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/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6