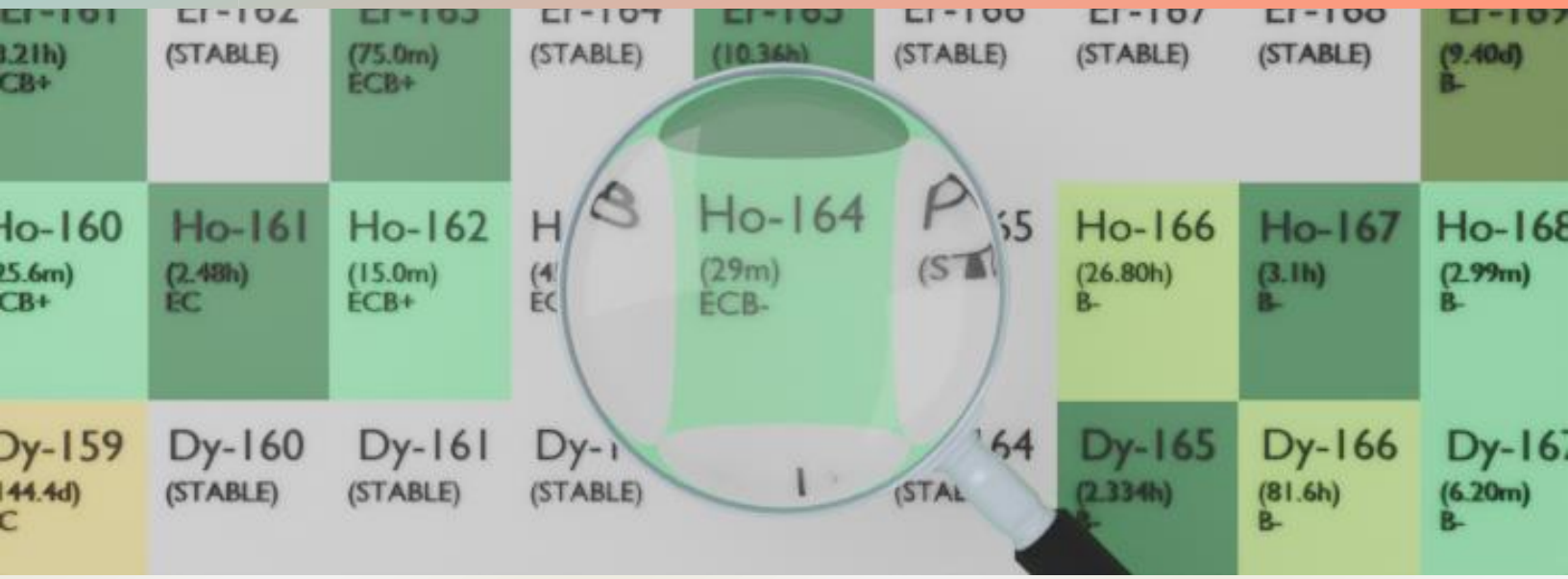


HOLMIUM-164

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ho-164
Atomic number (Z): 67
Mass number (A): 164
Neutron number (N): 97

RADIOACTIVE DECAY

Decay modes: β-, Electron capture
Half-life: 29.0 [m]
Decay constant: 3.9836e-04 [1/s]
Daughters: Dy-164 (60.0%), Er-164 (40.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

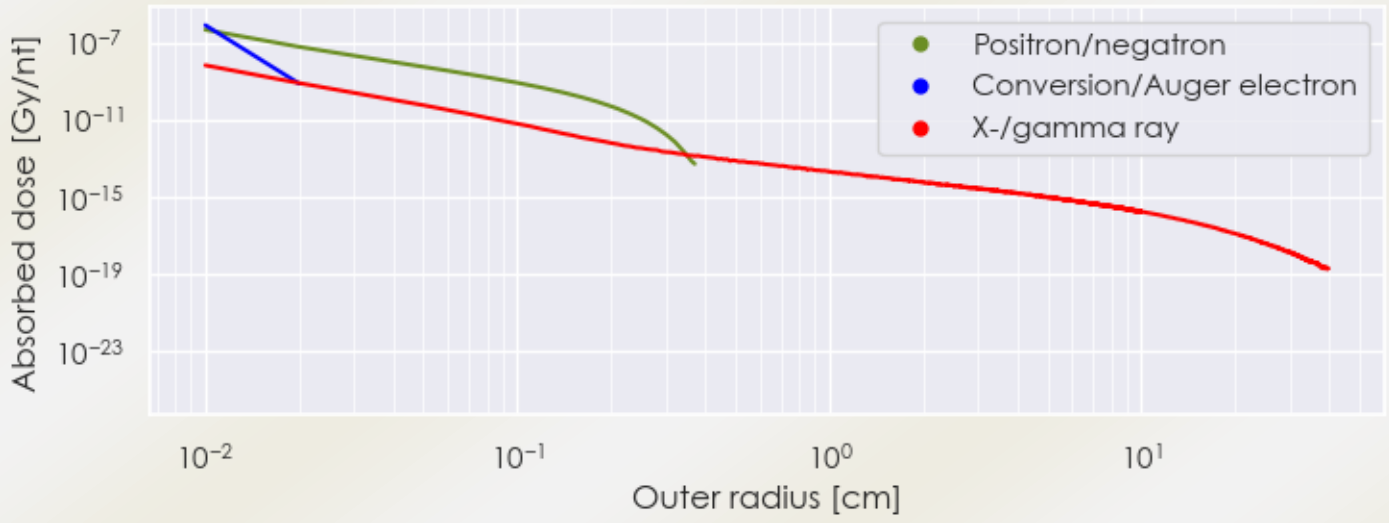
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.14702 [MeV]
Mean photon energy: 0.02973 [MeV]
Air kerma rate constant, Γ_{10}: 1.591e-18 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 1.591e-18 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 2.356e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 2.356e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 4.763e-15 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

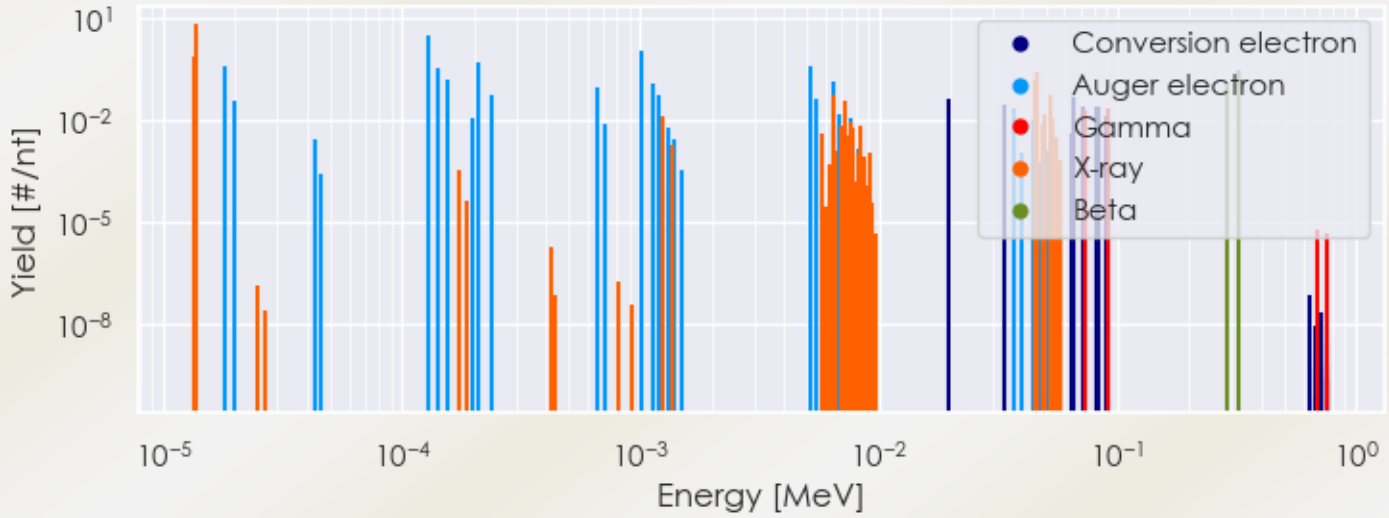
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ho-164 DPK.csv

SUMMARY SPECTRA (PLOT)

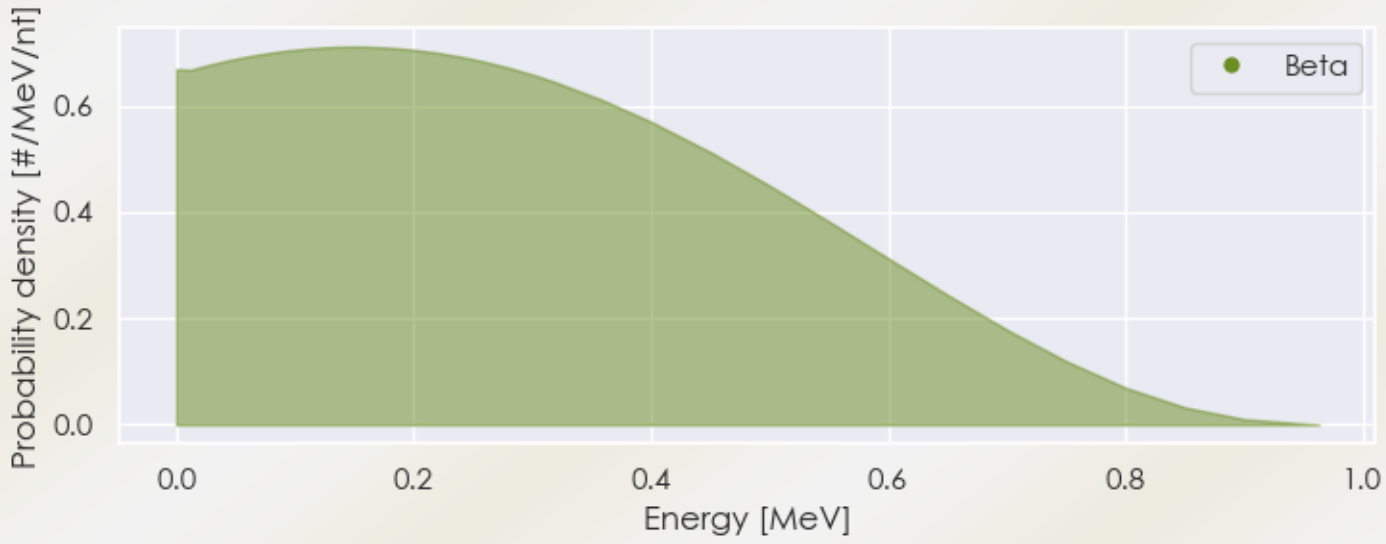
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Ho-164 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/Ho-164 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/Ho-164 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
1.35289e-05	7.265e-01	X-ray
1.37085e-05	6.485e+00	X-ray
1.22930e-03	1.243e-02	X-ray
6.48150e-03	5.199e-02	X-ray
7.25411e-03	3.693e-02	X-ray
4.52703e-02	1.447e-01	X-ray
4.60801e-02	2.585e-01	X-ray
4.92265e-02	1.437e-02	X-ray
5.20302e-02	2.661e-02	X-ray
5.21989e-02	5.144e-02	X-ray

5.35696e-02	1.135e-02	X-ray
7.33920e-02	1.884e-02	Gamma
9.13900e-02	2.280e-02	Gamma
2.86591e-01	1.200e-01	Beta
3.22128e-01	2.800e-01	Beta
1.81686e-05	3.583e-01	Auger electron
1.98170e-05	3.483e-02	Auger electron
1.28560e-04	2.960e+00	Auger electron
1.41564e-04	3.270e-01	Auger electron
1.54931e-04	1.456e-01	Auger electron
1.97914e-04	1.155e-02	Auger electron
2.10096e-04	4.767e-01	Auger electron
2.36832e-04	5.500e-02	Auger electron
6.54097e-04	9.042e-02	Auger electron
1.01705e-03	1.033e+00	Auger electron
1.13431e-03	1.234e-01	Auger electron
1.19272e-03	5.617e-02	Auger electron
5.12387e-03	3.680e-01	Auger electron
5.48230e-03	4.241e-02	Auger electron
6.38621e-03	1.295e-01	Auger electron
6.85572e-03	1.512e-02	Auger electron
7.68228e-03	1.147e-02	Auger electron
1.95310e-02	4.003e-02	Conversion electron
3.38160e-02	2.981e-02	Conversion electron
3.70640e-02	2.058e-02	Auger electron
4.39727e-02	1.030e-02	Auger electron
6.48013e-02	4.599e-02	Conversion electron
6.56110e-02	4.973e-02	Conversion electron
7.17299e-02	2.401e-02	Conversion electron
8.21152e-02	2.394e-02	Conversion electron
8.30426e-02	2.384e-02	Conversion electron
8.95938e-02	1.235e-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