YTTERBIUM-169

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Yb-169
Atomic number (Z): 70
Mass number (A): 169
Neutron number (N): 99

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 32.03 [d]
Decay constant: 2.5050e-07 [1/s]
Daughters: Tm-169 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

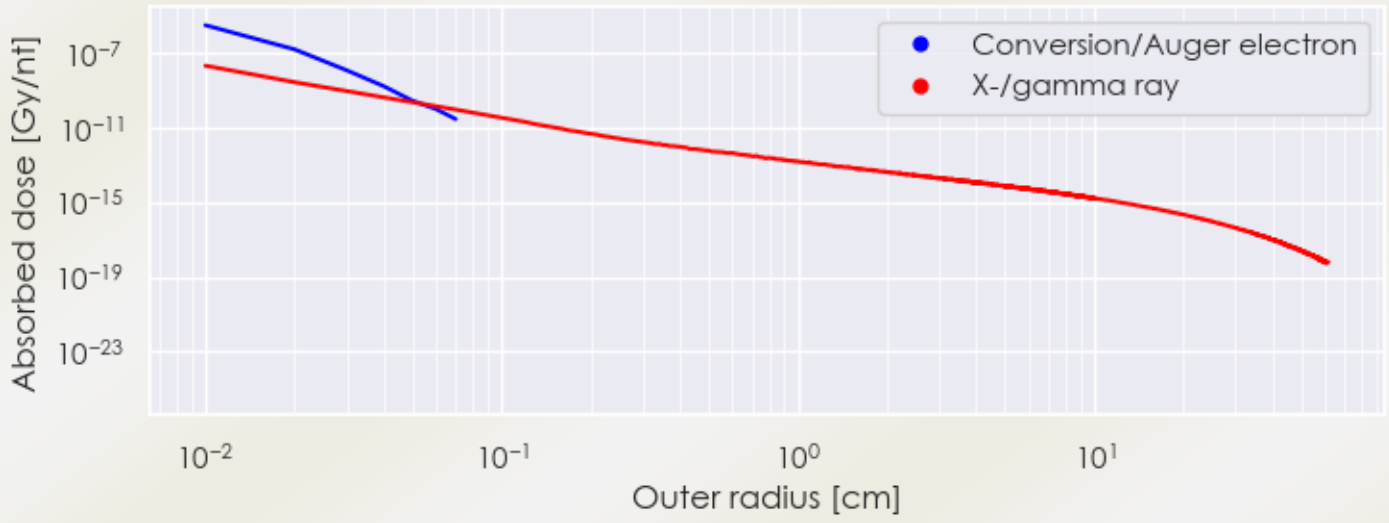
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.14713 [MeV]
Mean photon energy: 0.33015 [MeV]
Air kerma rate constant, Γ_{10}: 1.275e-17 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 1.275e-17 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 2.357e-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, $\Delta_{\beta-,\beta+,e-}$: 2.357e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 5.290e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

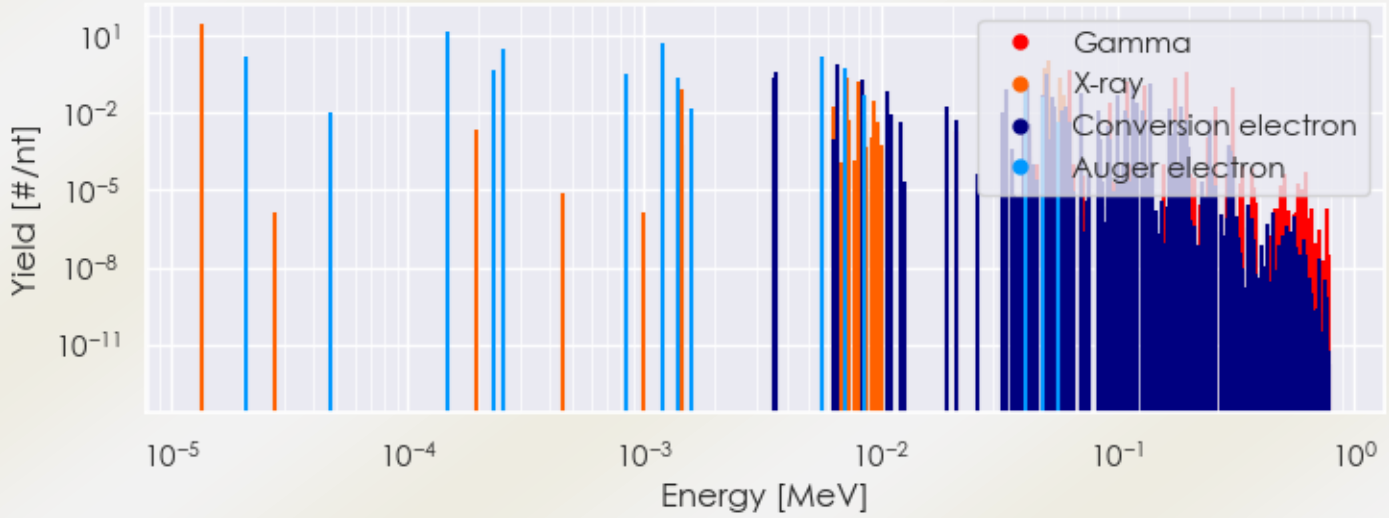
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Yb-169 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/Yb-169 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/Yb-169 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
1.34758e-05	3.038e+01	X-ray
1.44232e-03	7.757e-02	X-ray
6.36071e-03	1.808e-02	X-ray
7.12210e-03	2.827e-02	X-ray
7.16830e-03	2.497e-01	X-ray
8.00581e-03	1.256e-02	X-ray
8.11340e-03	1.749e-01	X-ray
8.21590e-03	1.686e-02	X-ray
8.45978e-03	4.253e-02	X-ray
9.44243e-03	3.107e-02	X-ray
4.98586e-02	5.954e-01	X-ray
5.08500e-02	1.052e+00	X-ray
5.74128e-02	1.103e-01	X-ray
5.76229e-02	2.132e-01	X-ray
5.91167e-02	2.448e-02	X-ray
5.91642e-02	4.735e-02	X-ray
5.94584e-02	1.136e-02	X-ray
6.30120e-02	2.148e-02	Gamma
6.31208e-02	4.421e-01	Gamma
9.36151e-02	2.606e-02	Gamma
1.09780e-01	1.747e-01	Gamma
1.18190e-01	1.869e-02	Gamma
1.30524e-01	1.131e-01	Gamma
1.77214e-01	2.216e-01	Gamma
1.97958e-01	3.580e-01	Gamma
2.61079e-01	1.715e-02	Gamma
3.07738e-01	1.005e-01	Gamma

2.06752e-05	1.450e+00	Auger electron
4.71999e-05	1.097e-02	Auger electron
1.47722e-04	1.359e+01	Auger electron
2.31193e-04	4.524e-01	Auger electron
2.54481e-04	2.810e+00	Auger electron
8.38226e-04	3.466e-01	Auger electron
1.20298e-03	4.946e+00	Auger electron
1.39157e-03	2.424e-01	Auger electron
1.58491e-03	1.497e-02	Auger electron
3.52401e-03	2.190e-01	Conversion electron
3.63278e-03	3.977e-01	Conversion electron
5.65299e-03	1.446e+00	Auger electron
6.54521e-03	7.424e-01	Conversion electron
7.08778e-03	5.188e-01	Auger electron
8.41031e-03	2.029e-01	Conversion electron
8.55433e-03	4.717e-02	Auger electron
1.06710e-02	7.116e-02	Conversion electron
1.88869e-02	1.890e-02	Conversion electron
3.26790e-02	1.108e-02	Conversion electron
3.41271e-02	8.316e-02	Conversion electron
4.07026e-02	7.504e-02	Auger electron
4.07740e-02	1.424e-02	Conversion electron
4.09806e-02	1.008e-01	Conversion electron
4.19719e-02	1.149e-01	Conversion electron
4.84128e-02	3.816e-02	Auger electron
4.87449e-02	5.324e-02	Conversion electron
5.02919e-02	3.528e-01	Conversion electron
5.06100e-02	1.395e-02	Conversion electron
5.29310e-02	3.035e-02	Conversion electron
5.30398e-02	3.933e-02	Conversion electron
5.34914e-02	1.453e-02	Conversion electron
5.44827e-02	1.824e-02	Conversion electron
5.87022e-02	1.302e-02	Conversion electron
6.12557e-02	1.617e-02	Conversion electron
7.10357e-02	6.081e-02	Conversion electron
8.35341e-02	1.143e-02	Conversion electron
9.96989e-02	4.864e-02	Conversion electron
1.07915e-01	1.298e-02	Conversion electron

1.17726e-01	1.071e-01	Conversion electron
1.20894e-01	2.507e-02	Conversion electron
1.21886e-01	2.208e-02	Conversion electron
1.28659e-01	1.296e-02	Conversion electron
1.38470e-01	1.315e-01	Conversion electron
1.67133e-01	1.448e-02	Conversion electron
1.87877e-01	1.787e-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