



Eu-143 (2.59m) ECB+	Eu-144 (10.2s) ECB+	Eu-145 (5.93d) ECB+	Eu-146 (4.0h) EC	Eu-147 (24.1d) ECB+A	Eu-148 (5.0h) EC	Eu-149 (93.1d) EC	Eu-150 (36.9y) ECB+
Sm-142 (72.49m) CB+	Sm-143 (8.75m) ECB+	Sm-144 (STABLE)	Sm-145 (340d) EC	Sm-146 (1.06E+15y) A	Sm-147 (7E+15y) A	Sm-148 (7E+15y) A	Sm-149 (STABLE)

EUROPIUM-147

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Eu-147
 Atomic number (Z): 63
 Mass number (A): 147
 Neutron number (N): 84

RADIOACTIVE DECAY

Decay modes: α , β^+ , Electron capture
 Half-life: 24.1 [d]
 Decay constant: 3.3289×10^{-7} [1/s]
 Daughters: Sm-147 (100.0%), Pm-143 (0.0022%)
 Radioactive daughters: Sm-147, Pm-143

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
 Mean electron energy: 0.04308 [MeV]
 Mean photon energy: 0.47206 [MeV]
 Air kerma rate constant, Γ_{10} : 1.855×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
 Air kerma coefficient, K_{air} : 1.869×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
 Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 6.902×10^{-15} [Gy $\cdot$ kg/Bq $\cdot$ s]
 Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

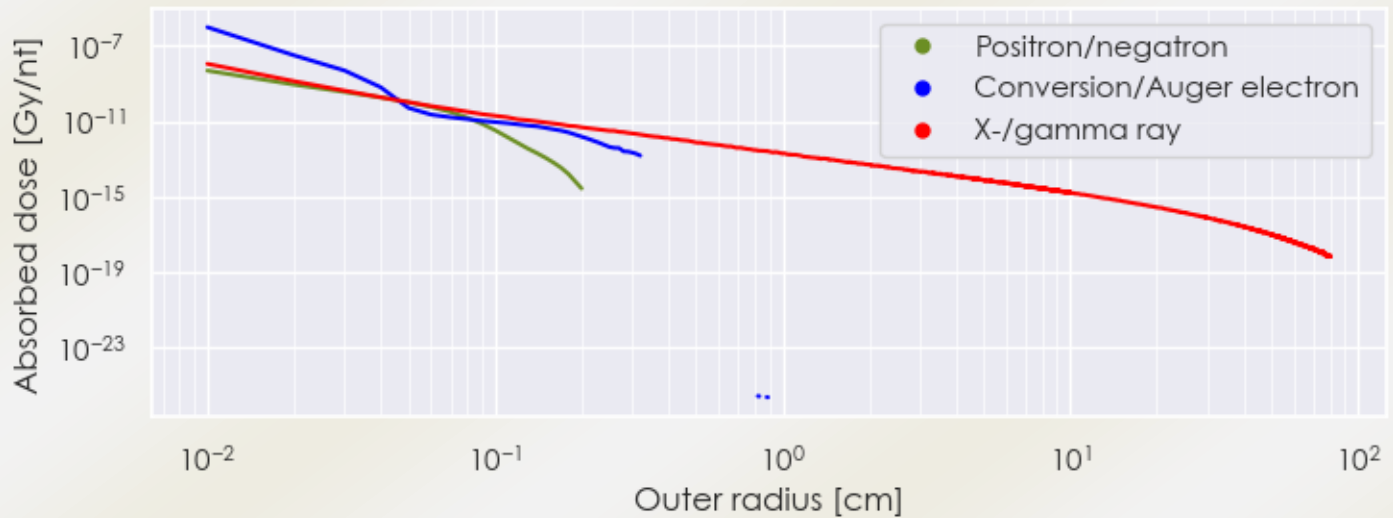
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 6.902×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 7.563×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

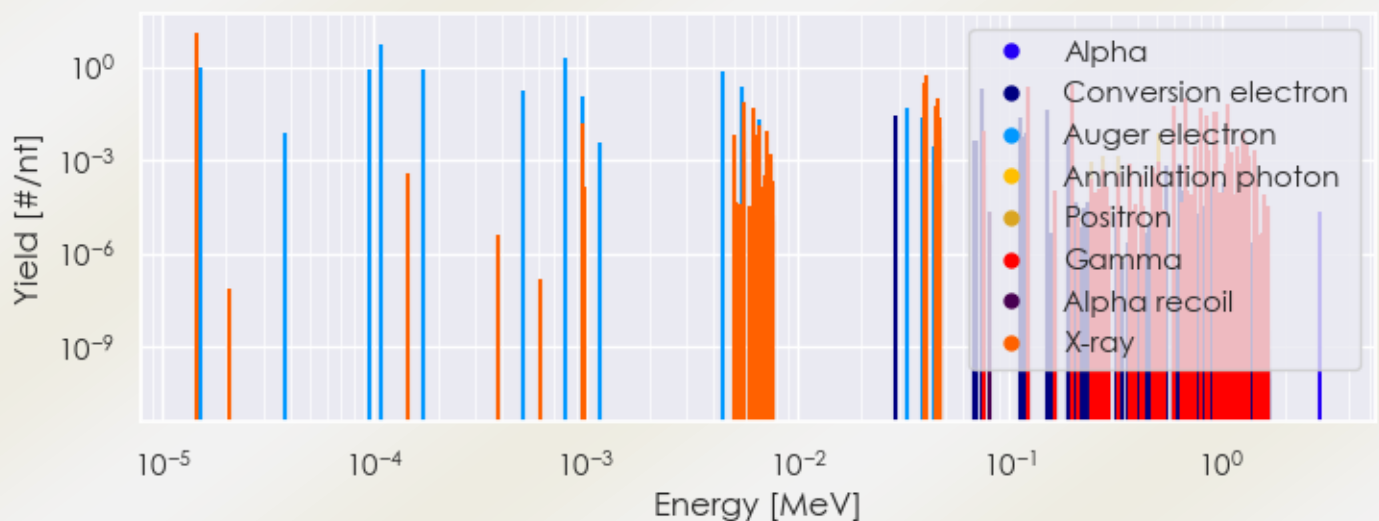
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Eu-147 DPK.csv

SUMMARY SPECTRA (PLOT)

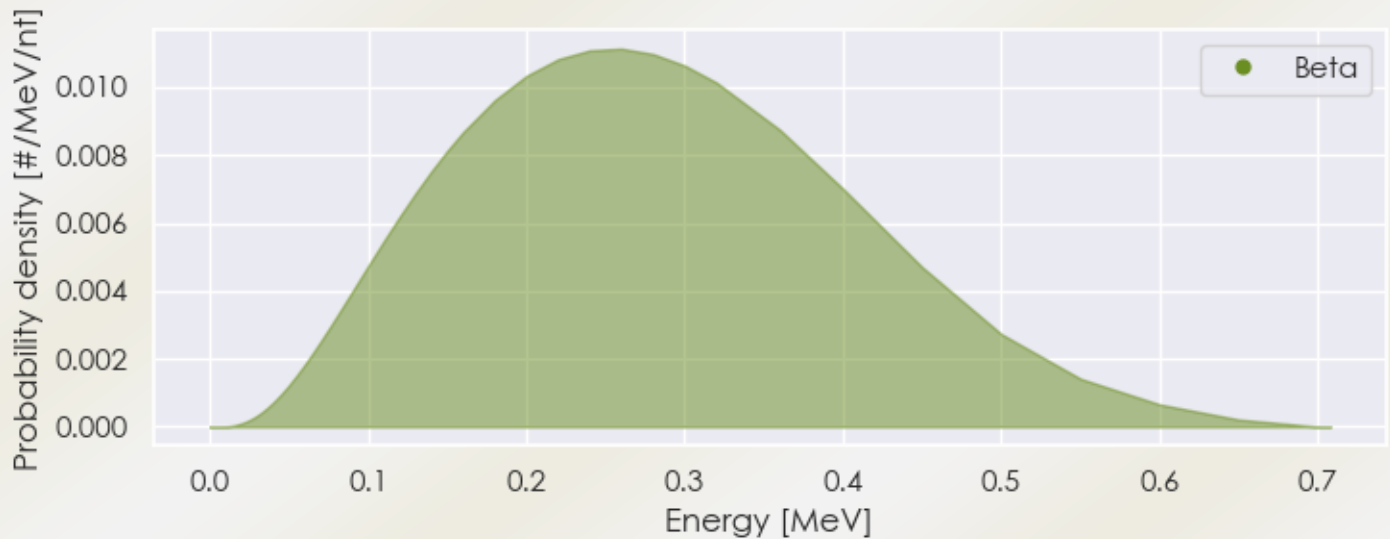
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Eu-147 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/Eu-147 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/Eu-147 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
1.45273e-05	1.299e+01	X-ray
9.69446e-04	1.521e-02	X-ray
5.62210e-03	7.618e-02	X-ray
6.20531e-03	4.878e-02	X-ray
6.57141e-03	1.270e-02	X-ray
3.95578e-02	2.913e-01	X-ray
4.01680e-02	5.273e-01	X-ray
4.53441e-02	5.285e-02	X-ray
4.54683e-02	1.022e-01	X-ray
4.65986e-02	1.146e-02	X-ray

4.66259e-02	2.225e-02	X-ray
1.21220e-01	2.292e-01	Gamma
1.97299e-01	2.650e-01	Gamma
6.01450e-01	5.883e-02	Gamma
6.77516e-01	9.778e-02	Gamma
7.98729e-01	4.849e-02	Gamma
8.56929e-01	2.703e-02	Gamma
9.33005e-01	3.445e-02	Gamma
9.55832e-01	3.842e-02	Gamma
1.07704e+00	6.148e-02	Gamma
1.51033e-05	1.016e+00	Auger electron
9.42576e-05	8.314e-01	Auger electron
1.06714e-04	5.429e+00	Auger electron
1.68997e-04	8.669e-01	Auger electron
5.08008e-04	1.707e-01	Auger electron
8.03788e-04	1.863e+00	Auger electron
9.73825e-04	1.192e-01	Auger electron
4.45860e-03	6.934e-01	Auger electron
5.50866e-03	2.371e-01	Auger electron
6.59240e-03	2.021e-02	Auger electron
2.91970e-02	2.708e-02	Conversion electron
3.25196e-02	5.029e-02	Auger electron
3.84443e-02	2.450e-02	Auger electron
7.43440e-02	1.912e-01	Conversion electron
1.13518e-01	2.436e-02	Conversion electron
1.50423e-01	4.150e-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