

Eu-147 (9.28d) CB+	Eu-148 (54.5d) CB+A	Eu-149 (93.1d) EC	Eu-150 (36.9y) ECB+	Eu-152n (96m) IT	Eu-153 (8.593y) B-EC	Eu-154 (8.593y) B-EC	Eu-155 (4.7611y) B-	Eu-156 (15.19d) B-
Gd-150 (1.79E+6y) A	Gd-151 (124d) ECA	Gd-152 (1.08E+14y) A	Gd-153 (240.4d)	Gd-154 (STABLE)	Gd-155 (STABLE)	Gd-156 (STABLE)	Gd-157 (STABLE)	Gd-158 (STABLE)
Sm-147 (1.060E11y)	Sm-148 (7E+15y) A	Sm-149 (STABLE)	Sm-150 (STABLE)	Sm-151 (STABLE)	Sm-152 (STABLE)	Sm-153 (46.50h) B-	Sm-154 (STABLE)	Sm-155 (22.3m) B-

EUROPIUM-152N

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Eu-152n
Atomic number (Z): 63
Mass number (A): 152
Neutron number (N): 89

RADIOACTIVE DECAY

Decay modes: Internal transition
Half-life: 96.0 [m]
Decay constant: 1.2034×10^{-4} [1/s]
Daughters: Eu-152 (100.0%)
Radioactive daughters: Eu-152

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.06664 [MeV]
Mean photon energy: 0.07526 [MeV]
Air kerma rate constant, Γ_{10} : 2.930×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 2.930×10^{-18} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.068×10^{-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, $\Delta_{\beta,\beta^+,e^-}$: 1.068×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.206×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

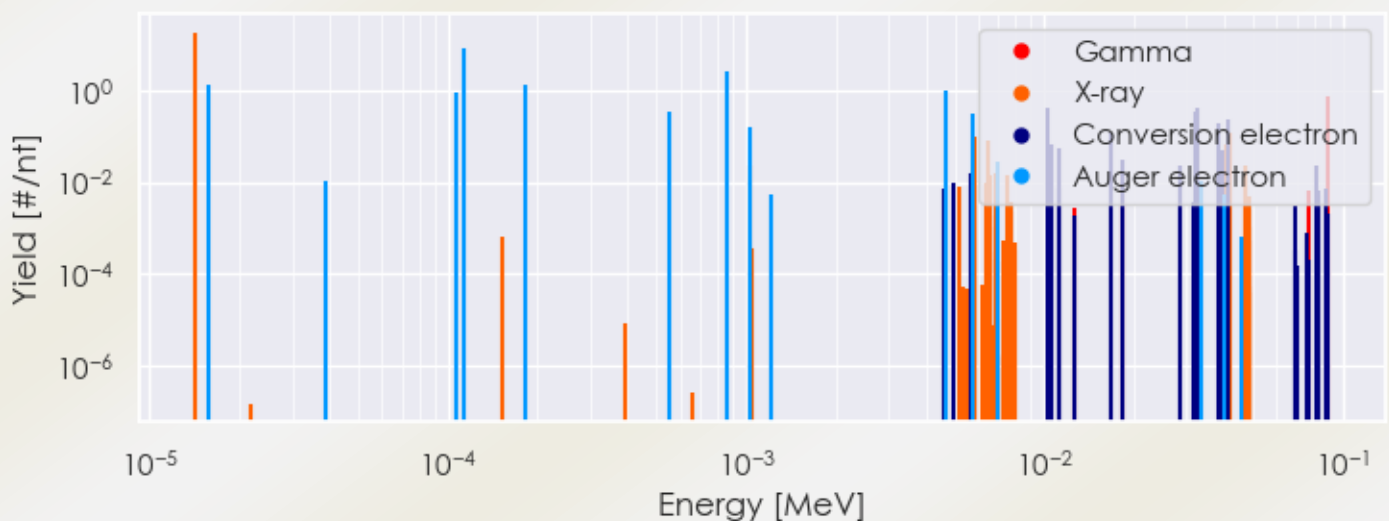
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Eu-152n 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-152n 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/Eu-152n Summary Spectrum.csv

Energy [MeV]	Yield [#]/nt] if > 0.01	Radiation type
1.42534e-05	1.811e+01	X-ray
1.03194e-03	2.351e-02	X-ray
5.80160e-03	1.081e-02	X-ray
5.83100e-03	9.559e-02	X-ray
6.45760e-03	7.930e-02	X-ray
6.54850e-03	1.442e-02	X-ray
6.82635e-03	1.602e-02	X-ray
7.47704e-03	1.370e-02	X-ray
1.82100e-02	1.258e-02	Gamma
4.09430e-02	6.567e-02	X-ray
4.15992e-02	1.184e-01	X-ray
4.69640e-02	1.195e-02	X-ray
4.70984e-02	2.313e-02	X-ray
8.98470e-02	6.990e-01	Gamma
1.58398e-05	1.294e+00	Auger electron
3.88900e-05	1.025e-02	Auger electron
1.06122e-04	8.899e-01	Auger electron
1.12949e-04	7.813e+00	Auger electron
1.81399e-04	1.296e+00	Auger electron
5.54912e-04	3.392e-01	Auger electron
8.56147e-04	2.589e+00	Auger electron
1.03123e-03	1.605e-01	Auger electron
4.67763e-03	9.336e-01	Auger electron
5.62920e-03	1.595e-02	Conversion electron
5.78423e-03	3.227e-01	Auger electron
6.92778e-03	2.797e-02	Auger electron
1.01919e-02	3.936e-01	Conversion electron

1.05852e-02	6.835e-02	Conversion electron
1.12412e-02	5.242e-02	Conversion electron
1.67404e-02	1.123e-01	Conversion electron
1.82100e-02	3.088e-02	Conversion electron
2.86620e-02	2.306e-02	Conversion electron
3.21252e-02	3.386e-01	Conversion electron
3.27812e-02	4.077e-01	Conversion electron
3.36229e-02	1.077e-02	Auger electron
3.82804e-02	1.977e-01	Conversion electron
3.97500e-02	5.166e-02	Conversion electron
4.12790e-02	2.226e-01	Conversion electron
8.18289e-02	2.258e-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