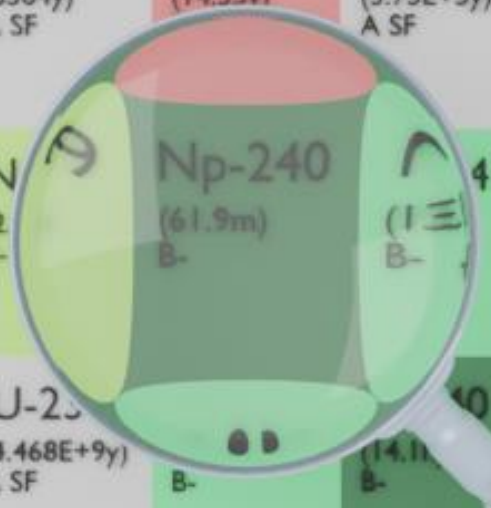




U-237 (45.2d) CA	U-238 (87.7y) A SF	U-239 (2.411E+4y) A	U-240 (6564y) A SF	U-241 (14.35v) A SF	U-242 (3.75E+5y) A SF	U-243 (4.956h) B-	U-244 (8.00E+7y) A SF	U-245 (10.5h) B-
Np-236 (1.54E+5y) CB-A	Np-237 (2.144E+6y) A	Np-238 (2.117d) B-	Np-240 (61.9m) B-	Np-241 (1.3E+5y) B-	Np-242 (2.2m) B-			
U-235 (7.04E+8y) A	U-236 (2.342E+7y) A	U-237 (6.75d) B-	U-238 (4.468E+9y) A SF	U-239 (2.35d) B-	U-240 (14.1h) B-	U-241 (4.54E+5y) A SF	U-242 (16.8m) B-	U-243 (16.8m) B-

NEPTUNIUM-240

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Np-240
Atomic number (Z): 93
Mass number (A): 240
Neutron number (N): 147

RADIOACTIVE DECAY

Decay modes: β^-
Half-life: 61.9 [m]
Decay constant: 1.8663e-04 [1/s]
Daughters: Pu-240 (100.0%)
Radioactive daughters: Pu-240

DOSIMETRIC CONSTANTS

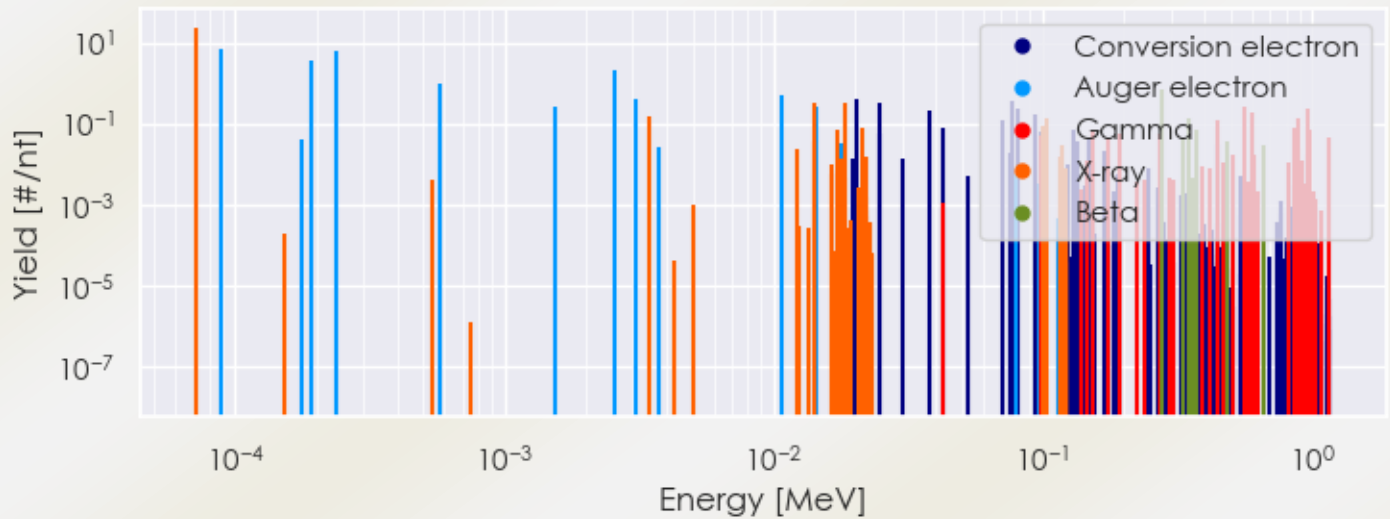
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.50945 [MeV]
Mean photon energy: 1.05379 [MeV]
Air kerma rate constant, Γ_{10} : 5.747e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 5.747e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 8.162e-14 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta+, e^-}$: 8.162×10^{-14} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.688×10^{-13} [Gy·kg/Bq·s]

SUMMARY SPECTRA (PLOT)

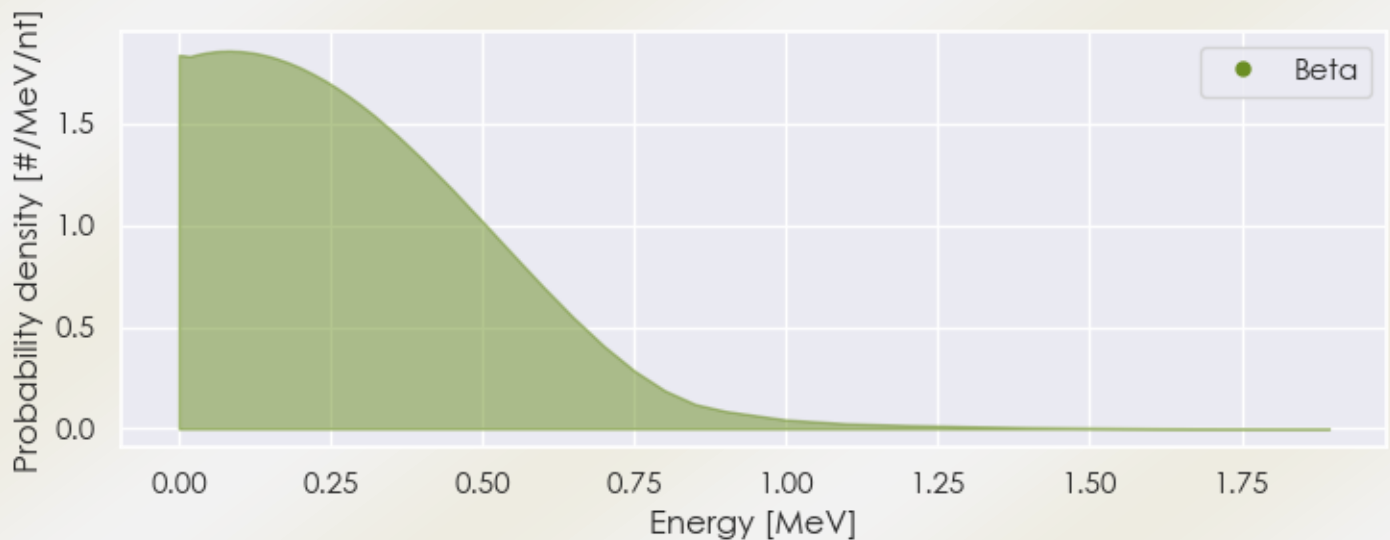
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Np-240 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Np-240%20Summary%20Spectrum.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/Np-240 Beta Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Np-240%20Beta%20Spectrum.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/Np-240 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Np-240%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [#/(nt)] if > 0.01	Radiation type
7.20413e-05	2.386e+01	X-ray
3.45636e-03	1.571e-01	X-ray
1.21689e-02	2.277e-02	X-ray
1.40932e-02	3.619e-02	X-ray
1.42941e-02	3.178e-01	X-ray
1.72768e-02	6.761e-02	X-ray
1.79612e-02	1.316e-02	X-ray
1.83932e-02	3.382e-01	X-ray
2.15284e-02	7.806e-02	X-ray
2.22515e-02	1.560e-02	X-ray
9.89000e-02	4.810e-02	Gamma
9.99790e-02	8.457e-02	X-ray
1.04279e-01	1.339e-01	X-ray
1.16802e-01	1.552e-02	X-ray
1.17801e-01	3.045e-02	X-ray
1.47200e-01	1.175e-02	Gamma
1.52700e-01	6.701e-02	Gamma
1.75400e-01	4.682e-02	Gamma
1.93300e-01	5.600e-02	Gamma
2.71300e-01	5.692e-02	Gamma
4.48010e-01	1.230e-01	Gamma
4.66700e-01	1.074e-02	Gamma
5.07300e-01	1.671e-02	Gamma
5.66340e-01	2.534e-01	Gamma
6.00570e-01	1.836e-01	Gamma
6.06100e-01	1.625e-02	Gamma
8.21200e-01	1.065e-02	Gamma
8.67200e-01	8.078e-02	Gamma

8.88800e-01	2.295e-02	Gamma
8.95800e-01	1.359e-01	Gamma
9.16000e-01	1.221e-02	Gamma
9.59100e-01	1.689e-02	Gamma
9.73900e-01	2.378e-01	Gamma
9.87700e-01	6.701e-02	Gamma
1.16710e+00	4.498e-02	Gamma
2.76221e-01	6.775e-01	Beta
3.29613e-01	4.517e-02	Beta
3.46583e-01	1.355e-01	Beta
3.75614e-01	7.227e-02	Beta
4.88001e-01	3.613e-02	Beta
6.63949e-01	2.891e-02	Beta
8.91110e-05	6.532e+00	Auger electron
1.76454e-04	4.113e-02	Auger electron
1.91741e-04	3.720e+00	Auger electron
2.37110e-04	6.260e+00	Auger electron
5.77322e-04	9.689e-01	Auger electron
1.53519e-03	2.586e-01	Auger electron
2.56474e-03	2.047e+00	Auger electron
3.09803e-03	4.201e-01	Auger electron
3.75847e-03	2.526e-02	Auger electron
1.07985e-02	5.049e-01	Auger electron
1.43479e-02	2.621e-01	Auger electron
1.79383e-02	3.200e-02	Auger electron
1.96780e-02	1.402e-02	Conversion electron
2.04290e-02	3.910e-01	Conversion electron
2.47290e-02	3.381e-01	Conversion electron
2.48500e-02	5.762e-02	Conversion electron
3.03500e-02	1.314e-02	Conversion electron
3.82501e-02	2.076e-01	Conversion electron
4.28000e-02	7.407e-02	Conversion electron
7.09500e-02	1.197e-01	Conversion electron
7.57780e-02	1.791e-02	Conversion electron
7.65290e-02	3.449e-01	Conversion electron
8.08290e-02	2.286e-01	Conversion electron
9.43501e-02	1.664e-01	Conversion electron
9.89000e-02	5.953e-02	Conversion electron

1.24078e-01	1.024e-02	Conversion electron
1.30329e-01	6.942e-02	Conversion electron
1.34629e-01	3.778e-02	Conversion electron
1.48150e-01	3.176e-02	Conversion electron
1.48950e-01	4.516e-02	Conversion electron
1.52700e-01	1.141e-02	Conversion electron
1.70178e-01	2.118e-02	Conversion electron
4.43990e-01	2.823e-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