



ZIRCONIUM-86

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Zr-86
Atomic number (Z): 40
Mass number (A): 86
Neutron number (N): 46

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture
Half-life: 16.5 [h]
Decay constant: 1.1669×10^{-5} [1/s]
Daughters: Y-86 (100.0%)
Radioactive daughters: Y-86

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.03103 [MeV]
Mean photon energy: 0.29523 [MeV]
Air kerma rate constant, Γ_{10} : 3.939×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 3.942×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 4.972×10^{-15} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

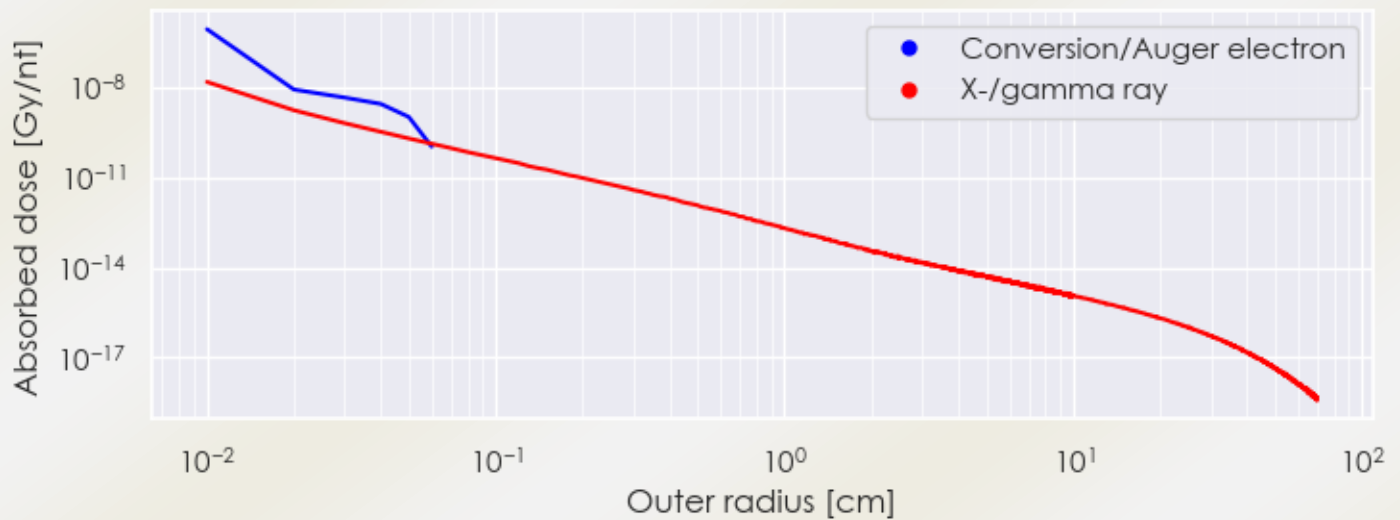
Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 4.972e-15 [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 4.730e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

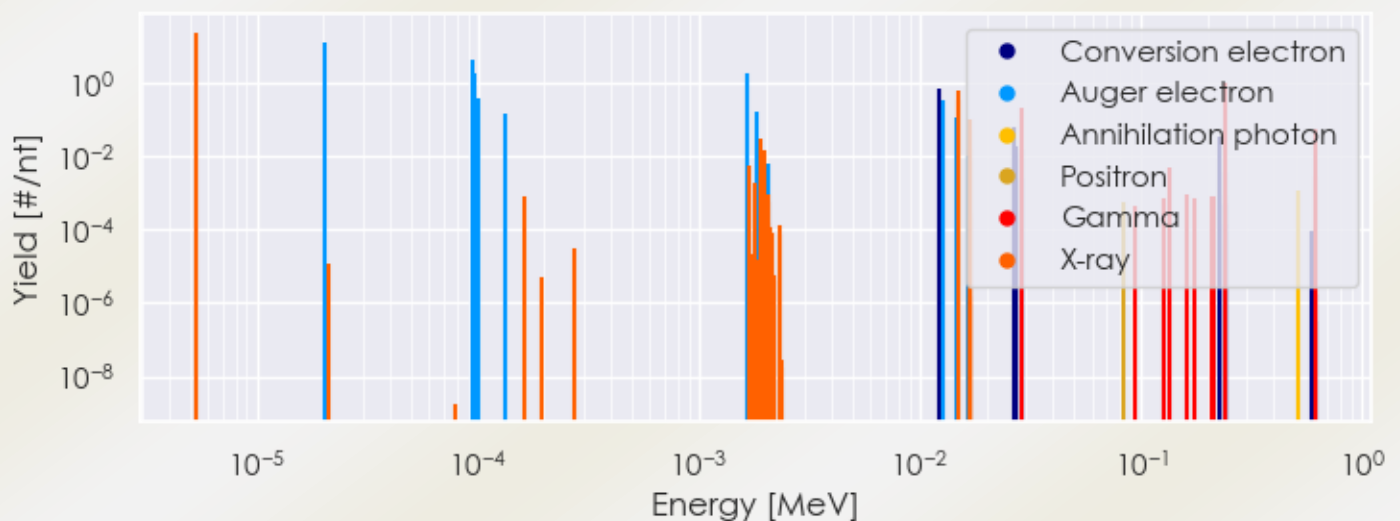
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Zr-86 DPK.csv

SUMMARY SPECTRA (PLOT)

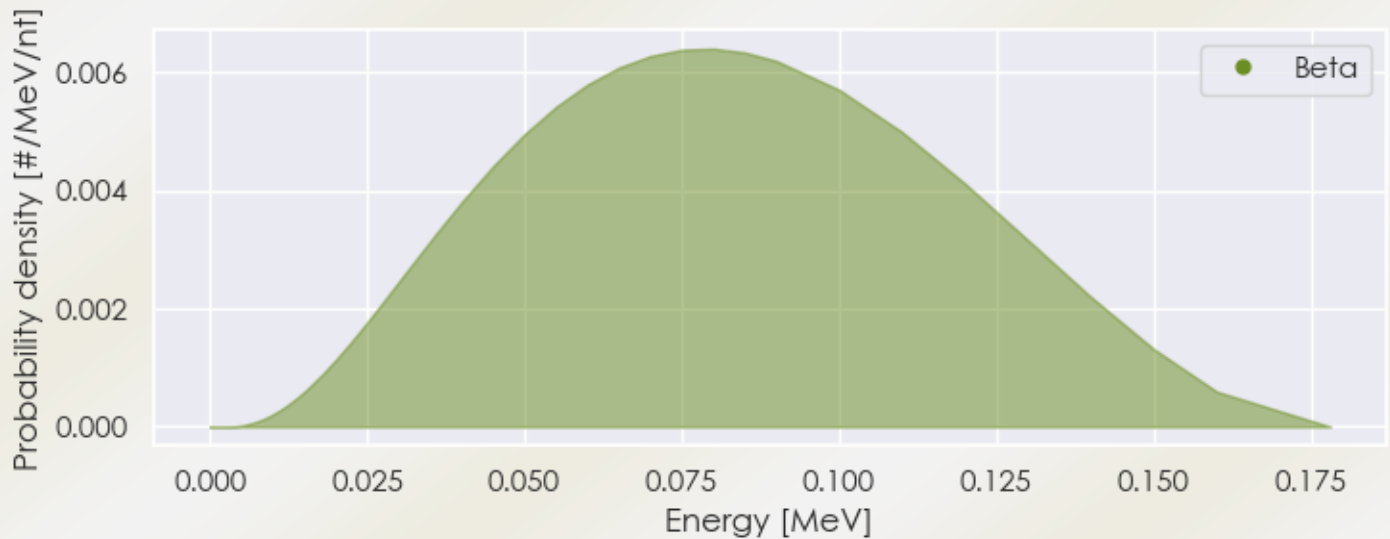
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Zr-86 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/Zr-86 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/Zr-86 Summary Spectrum.csv

Energy [MeV]	Yield [# / nt] if > 0.01	Radiation type
5.29808e-06	2.397e+01	X-ray
1.91499e-03	3.019e-02	X-ray
1.99096e-03	1.505e-02	X-ray
1.48403e-02	3.310e-01	X-ray
1.49185e-02	6.342e-01	X-ray
1.66877e-02	4.914e-02	X-ray
1.67001e-02	9.574e-02	X-ray
1.69678e-02	1.395e-02	X-ray
2.91000e-02	2.156e-01	Gamma
2.42800e-01	9.584e-01	Gamma

6.12000e-01	5.750e-02	Gamma
2.02950e-05	1.333e+01	Auger electron
9.45647e-05	4.088e+00	Auger electron
9.62459e-05	1.825e+00	Auger electron
1.00091e-04	3.622e-01	Auger electron
1.31687e-04	1.504e-01	Auger electron
1.66206e-03	1.725e+00	Auger electron
1.82664e-03	1.725e-01	Auger electron
1.21000e-02	6.943e-01	Conversion electron
1.26657e-02	3.405e-01	Auger electron
1.45497e-02	1.184e-01	Auger electron
2.67451e-02	5.900e-02	Conversion electron
2.69403e-02	1.081e-02	Conversion electron
2.70185e-02	1.834e-02	Conversion electron
2.88001e-02	1.504e-02	Conversion electron
2.25800e-01	3.568e-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