



III-106 (6.2m) CB+	III-107 (32.4m) ECB+	III-108 (58.0m) ECB+	III-109 (4.2h) ECB+	III-110 (4.9h) EC	III-111 (2.8047d) EC	III-112 (14.97m) ECB+B-	III-113 (STABLE)	III-114 (71.9s) B-ECB+
Cd-105 (55.5m) CB+	Cd-106 (STABLE)	Cd-107 (6.50h) ECB+	Cd-108 (STABLE)	Cd-109 (461.4d) EC	Cd-110 (STABLE)	Cd-111 (STABLE)	Cd-112 (STABLE)	Cd-113 (7.7E+15y) B-
Ag-104 (59.2m) CB+	Ag-105 (41.29d) EC	Ag-106 (23.96m) ECB+B-	Ag-107 (STABLE)	Ag-108 (STABLE)	Ag-109 (STABLE)	Ag-110 (24.6s) B-EC	Ag-111 (7.45d) B-	Ag-112 (3.130h) B-

CADMIUM-109

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Cd-109
Atomic number (Z): 48
Mass number (A): 109
Neutron number (N): 61

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 461.4 [d]
Decay constant: 1.7387×10^{-8} [1/s]
Daughters: Ag-109 (100.0%)
Radioactive daughters: None

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.0827 [MeV]
Mean photon energy: 0.02652 [MeV]
Air kerma rate constant, Γ_{10} : 1.093×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Air kerma coefficient, K_{air} : 1.093×10^{-17} [Gy $\cdot$ m²/Bq $\cdot$ s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 1.325×10^{-14} [Gy $\cdot$ kg/Bq $\cdot$ s]
Equilibrium dose constant for alphas, Δ_{α} : 0.000e+00 [Gy $\cdot$ kg/Bq $\cdot$ s]

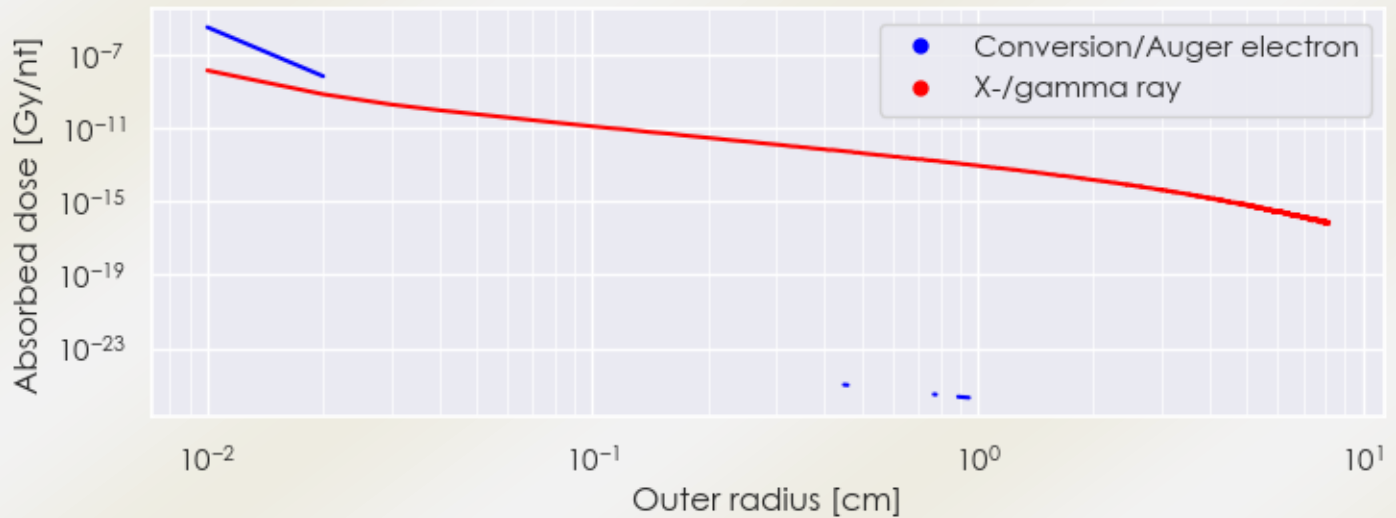
Equilibrium dose constant for betas/electrons, $\Delta_{\beta,\beta+,e-}$: 1.325e-14 [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 4.249e-15 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

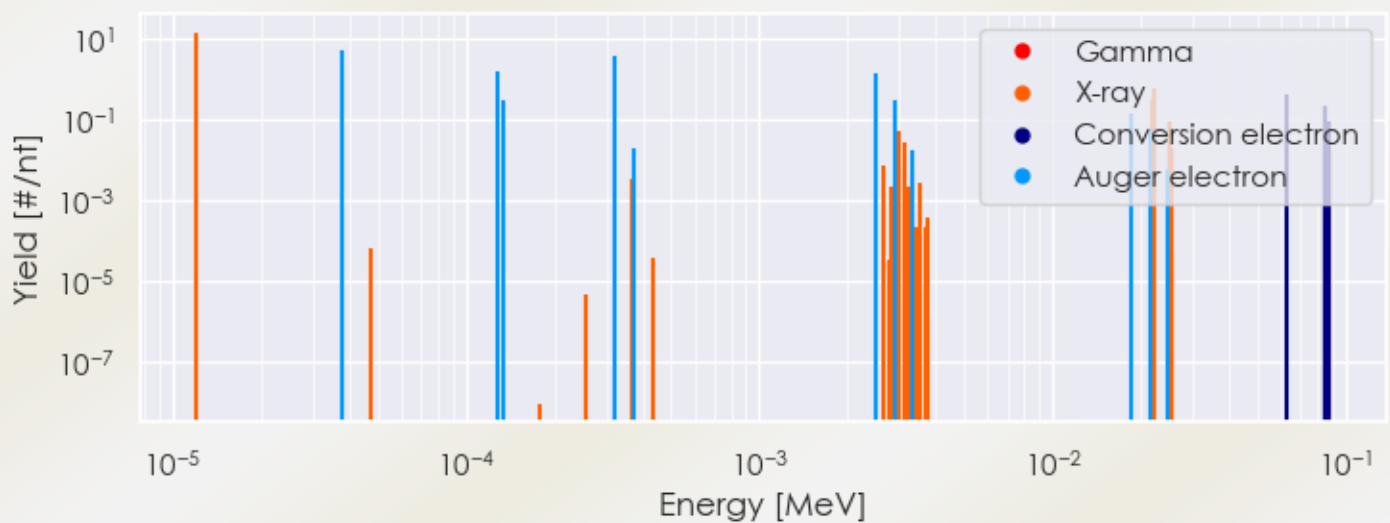
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Cd-109 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/Cd-109 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/Cd-109 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Cd-109%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [# / n _t] if > 0.01	Radiation type
1.20786e-05	1.446e+01	X-ray
2.97344e-03	5.056e-02	X-ray
3.14510e-03	2.805e-02	X-ray
2.19609e-02	2.921e-01	X-ray
2.21389e-02	5.504e-01	X-ray
2.48888e-02	4.799e-02	X-ray
2.49204e-02	9.325e-02	X-ray
2.54258e-02	1.886e-02	X-ray
8.80336e-02	3.595e-02	Gamma
3.78399e-05	5.268e+00	Auger electron
1.27447e-04	1.473e+00	Auger electron
1.34797e-04	3.002e-01	Auger electron
3.19044e-04	3.560e+00	Auger electron
3.71588e-04	1.851e-02	Auger electron
2.49627e-03	1.363e+00	Auger electron
2.90415e-03	2.954e-01	Auger electron
3.32996e-03	1.699e-02	Auger electron
1.84717e-02	1.412e-01	Auger electron
2.14605e-02	5.704e-02	Auger electron
6.25446e-02	4.088e-01	Conversion electron
8.42502e-02	3.245e-02	Conversion electron
8.45055e-02	1.918e-01	Conversion electron
8.46836e-02	2.230e-01	Conversion electron
8.74651e-02	9.213e-02	Conversion electron
8.80336e-02	1.594e-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