IRIDIUM-189

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Ir-189
Atomic number (Z): 77
Mass number (A): 189
Neutron number (N): 112

RADIOACTIVE DECAY

Decay modes: Electron capture
Half-life: 13.2 [d]
Decay constant: 6.0777e-07 [1/s]
Daughters: Os-189m (7.43%), Os-189 (92.6%)
Radioactive daughters: Os-189m

DOSIMETRIC CONSTANTS

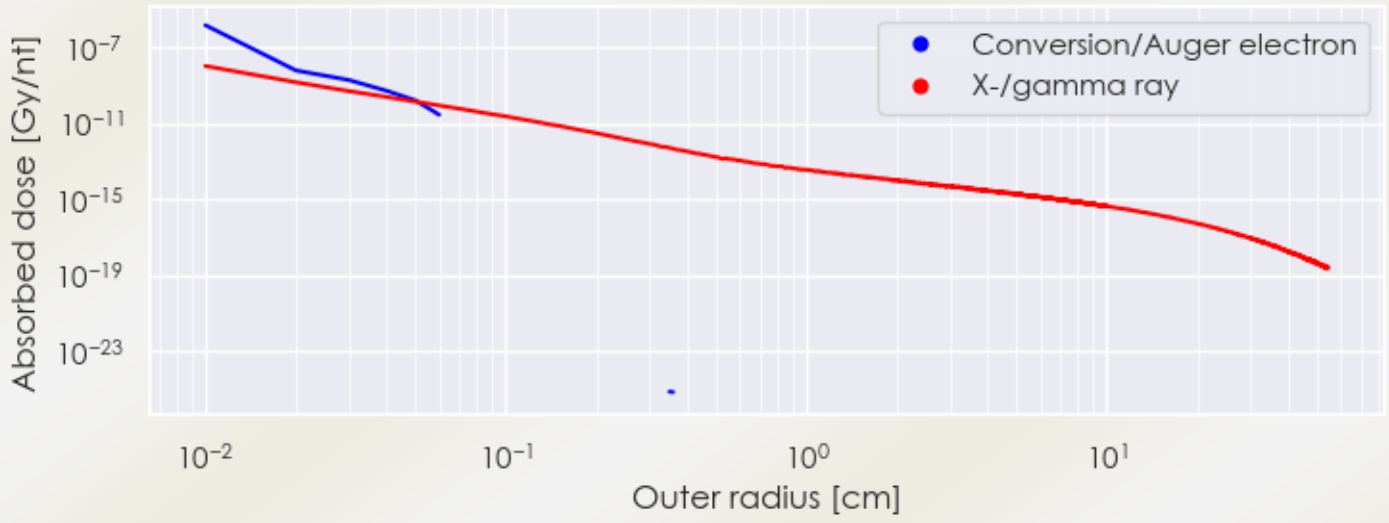
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.04577 [MeV]
Mean photon energy: 0.07933 [MeV]
Air kerma rate constant, Γ_{10}: 1.323e-17 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 1.323e-17 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 7.333e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 7.333e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 1.271e-14 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

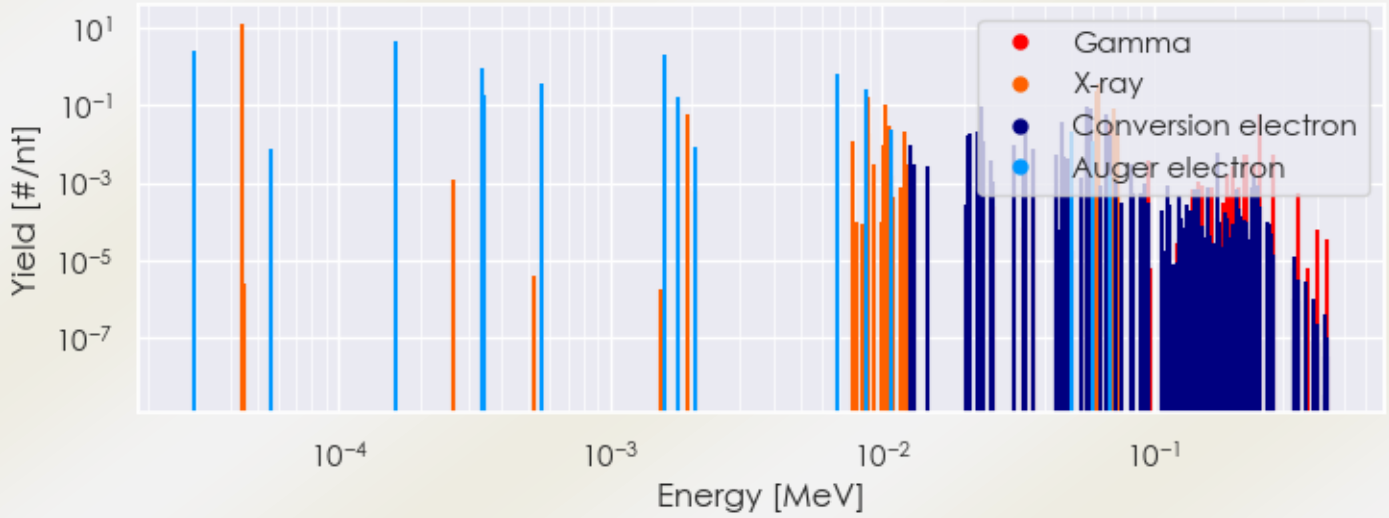
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Ir-189 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/Ir-189 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/Ir-189 Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
4.40012e-05	1.332e+01	X-ray
1.92081e-03	5.773e-02	X-ray
7.84700e-03	1.140e-02	X-ray
8.83249e-03	1.962e-02	X-ray
8.90609e-03	1.730e-01	X-ray
1.03795e-02	1.093e-01	X-ray
1.04983e-02	1.095e-02	X-ray
1.05947e-02	3.133e-02	X-ray
1.21269e-02	2.083e-02	X-ray
5.90500e-02	1.200e-02	Gamma
6.16420e-02	2.237e-01	X-ray
6.31890e-02	3.854e-01	X-ray
6.95280e-02	3.540e-02	Gamma
7.12758e-02	4.184e-02	X-ray
7.16144e-02	8.087e-02	X-ray
7.35997e-02	1.873e-02	X-ray
2.45080e-01	6.000e-02	Gamma
2.96133e-05	2.604e+00	Auger electron
1.63618e-04	4.419e+00	Auger electron
3.35880e-04	8.920e-01	Auger electron
3.45590e-04	1.794e-01	Auger electron
5.64077e-04	3.560e-01	Auger electron
1.58151e-03	2.109e+00	Auger electron
1.77829e-03	1.648e-01	Auger electron
6.89962e-03	6.248e-01	Auger electron
8.80126e-03	2.483e-01	Auger electron
1.07342e-02	2.436e-02	Auger electron

2.08860e-02	1.758e-02	Conversion electron
2.11740e-02	2.002e-02	Conversion electron
2.24330e-02	2.012e-02	Conversion electron
2.32200e-02	9.461e-02	Conversion electron
2.37460e-02	1.140e-02	Conversion electron
3.37183e-02	2.530e-02	Conversion electron
4.61000e-02	3.970e-02	Conversion electron
4.99348e-02	2.209e-02	Auger electron
5.65780e-02	5.178e-02	Conversion electron
5.65983e-02	1.060e-02	Conversion electron
5.71040e-02	9.224e-02	Conversion electron
5.86510e-02	8.558e-02	Conversion electron
5.97656e-02	1.171e-02	Auger electron
6.70763e-02	5.750e-02	Conversion electron
6.95280e-02	1.655e-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