YTTRIUM-83M

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Y-83m
Atomic number (Z): 39
Mass number (A): 83
Neutron number (N): 44

RADIOACTIVE DECAY

Decay modes: β+, Electron capture, Internal transition
Half-life: 2.85 [m]
Decay constant: 4.0535e-03 [1/s]
Daughters: Sr-83 (60.0%), Y-83 (40.0%)
Radioactive daughters: Sr-83, Y-83

DOSIMETRIC CONSTANTS

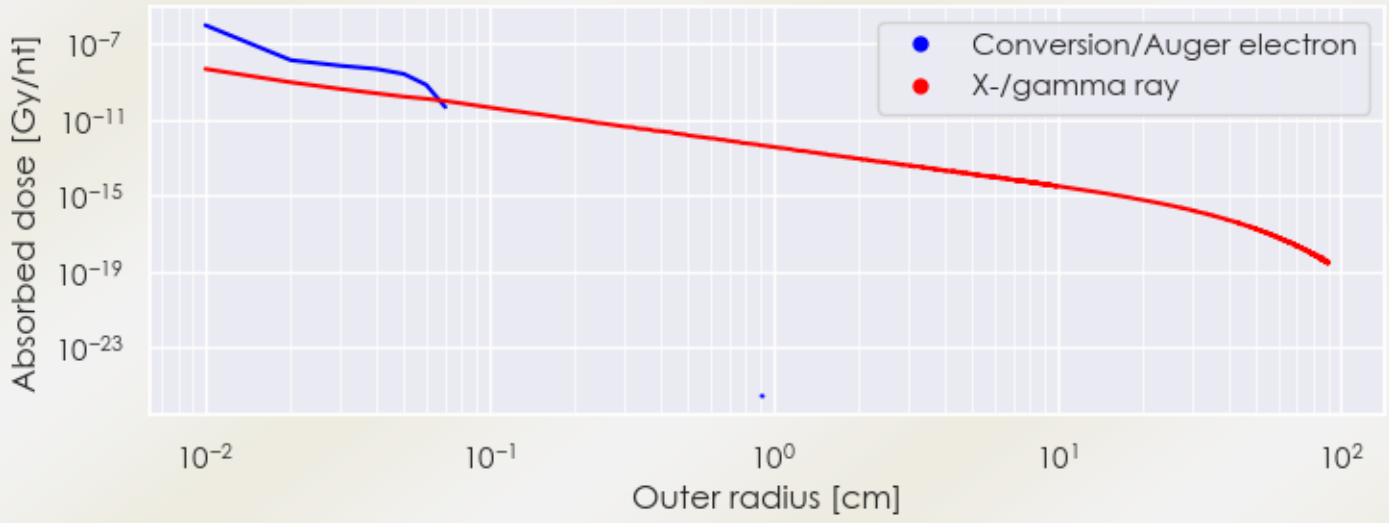
Mean alpha energy: 0.0 [MeV]
Mean electron energy: 0.81768 [MeV]
Mean photon energy: 0.83695 [MeV]
Air kerma rate constant, Γ_{10}: 1.490e-17 [Gy·m^2/Bq·s]
Air kerma coefficient, K_{air}: 3.669e-17 [Gy·m^2/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (a and/or electrons), Δ_{wp}: 1.310e-13 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{a}: 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-,\beta+,e-}$: 1.310e-13 [Gy·kg/Bq·s]
Equilibrium dose constant for photons, Δ_{p}: 1.341e-13 [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

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

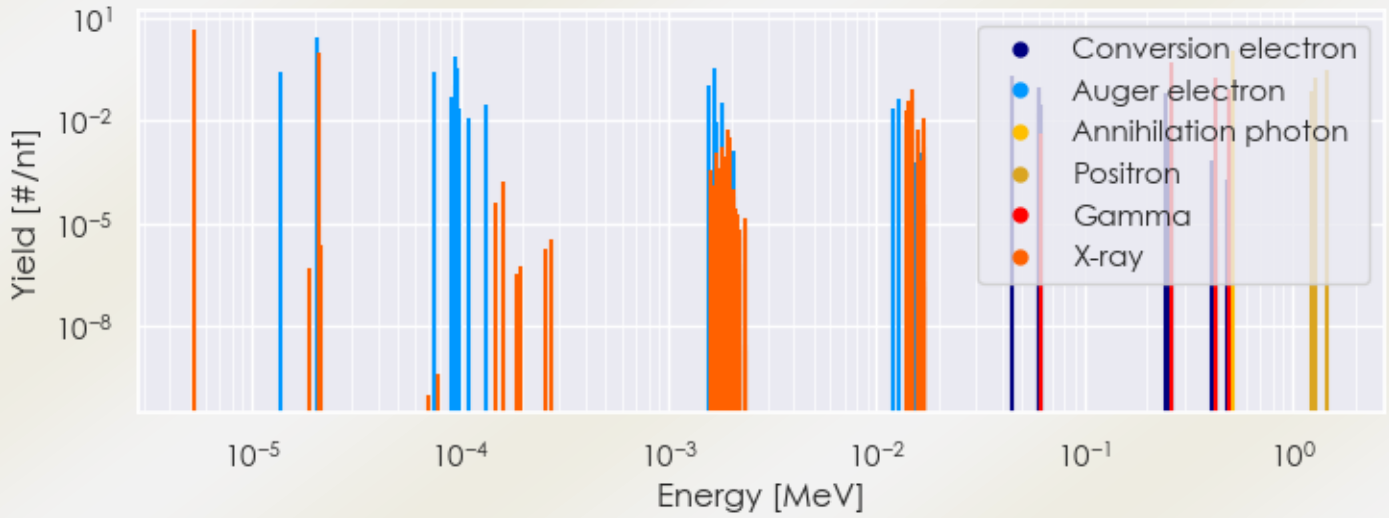
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Y-83m DPK.csv

SUMMARY SPECTRA (PLOT)

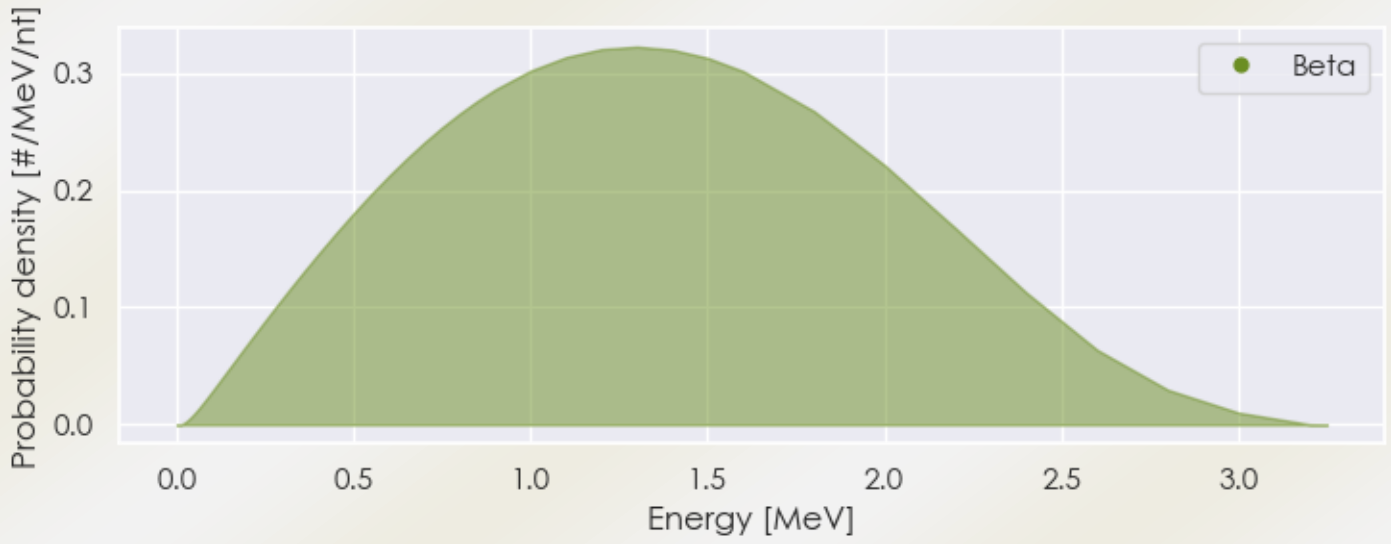
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Y-83m 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/Y-83m 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/Y-83m Summary Spectrum.csv

Energy [MeV]	Yield [#/nt] if > 0.01	Radiation type
5.29803e-06	4.687e+00	X-ray
2.09381e-05	9.317e-01	X-ray
1.40549e-02	1.934e-02	X-ray
1.41246e-02	3.713e-02	X-ray
1.48403e-02	4.128e-02	X-ray
1.49185e-02	7.909e-02	X-ray
1.67001e-02	1.194e-02	X-ray
2.59100e-01	5.252e-01	Gamma
4.21800e-01	1.946e-01	Gamma
4.94500e-01	8.109e-02	Gamma

5.11000e-01	1.126e+00	Annihilation photon
1.24008e+00	7.606e-02	Positron
1.27426e+00	1.826e-01	Positron
1.47350e+00	3.043e-01	Positron
1.36397e-05	2.595e-01	Auger electron
2.03059e-05	2.605e+00	Auger electron
7.49258e-05	2.591e-01	Auger electron
9.03992e-05	4.805e-02	Auger electron
9.40874e-05	1.100e-01	Auger electron
9.44686e-05	7.974e-01	Auger electron
9.70899e-05	3.627e-01	Auger electron
9.94089e-05	2.243e-02	Auger electron
1.09876e-04	1.255e-02	Auger electron
1.31390e-04	2.927e-02	Auger electron
1.57331e-03	1.088e-01	Auger electron
1.66207e-03	3.441e-01	Auger electron
1.82511e-03	3.428e-02	Auger electron
1.20238e-02	2.210e-02	Auger electron
1.26657e-02	4.246e-02	Auger electron
1.45497e-02	1.476e-02	Auger electron
4.51000e-02	1.996e-01	Conversion electron
5.97451e-02	1.548e-02	Conversion electron
5.99403e-02	6.584e-02	Conversion electron
6.00185e-02	9.002e-02	Conversion electron
6.18001e-02	3.105e-02	Conversion electron
2.43033e-01	6.274e-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