

The diagram illustrates the decay chain of Sr-90. Sr-90 (half-life 28.8 years) decays to Y-90 (half-life 2.68 hours), which then decays to Zr-90 (half-life 2.14 seconds). The diagram shows the following isotopes and their properties:

Isotope	Half-life	Decay Mode
Sr-79	2.25m	ECB+
Sr-80	106.3m	ECB+
Sr-81	22.3m	ECB+
Sr-82	25.5d	ECB+
Sr-83	32.4h	ECB+
Sr-84	(STABLE)	
Sr-85	64.84d	EC
Sr-86	(STABLE)	
Y-81	70.4s	ECB+
Y-82	2.68h	ECB+
Y-83	7.08m	ECB+
Y-84	1.65h	ECB+
Y-85	1.68h	ECB+
Y-86	83.4d	EC
Y-87	79.8h	ECB+
Zr-88	83.4d	EC
Zr-89	79.8h	ECB+
Zr-90	2.14s	ECB+

YTTRIUM-83

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Y-83

Atomic number (Z): 39

Mass number (A): 83

Neutron number (N): 44

RADIOACTIVE DECAY

Decay modes: β^+ , Electron capture

Half-life: 7.08 [m]

Decay constant: 1.6317e-03 [1/s]

Daughters: Sr-83 (100.0%)

Radioactive daughters: Sr-83

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0 [MeV]

Mean electron energy: 1.31382 [MeV]

Mean photon energy: 1.34575 [MeV]

Air kerma rate constant, Γ_{10} : 2.635e-17 [Gy·m²/Bq·s]

Air kerma coefficient, K_{air} : $6.193\text{e-}17$ [$\text{Gy} \cdot \text{m}^2/\text{Bq} \cdot \text{s}$]

Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 2.105e-13 [Gy·kg/Bq·s]

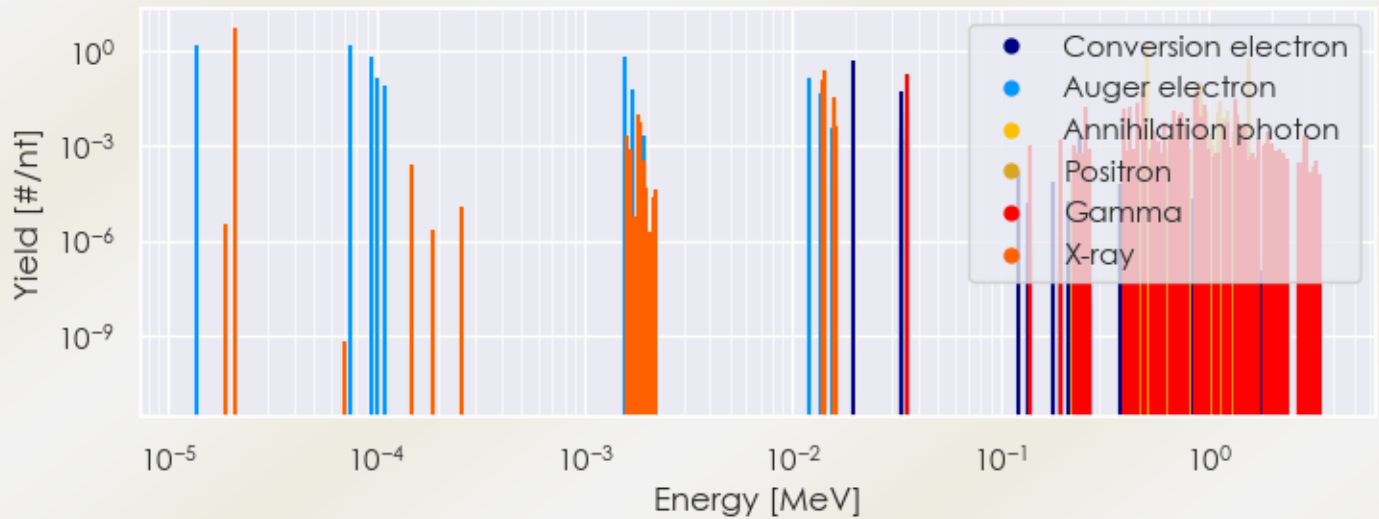
Equilibrium dose constant for alphas, Δ_a : 0.000e+00 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta, \beta^+, e^-}$: 2.105×10^{-13} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 2.156×10^{-13} [Gy·kg/Bq·s]

SUMMARY SPECTRA (PLOT)

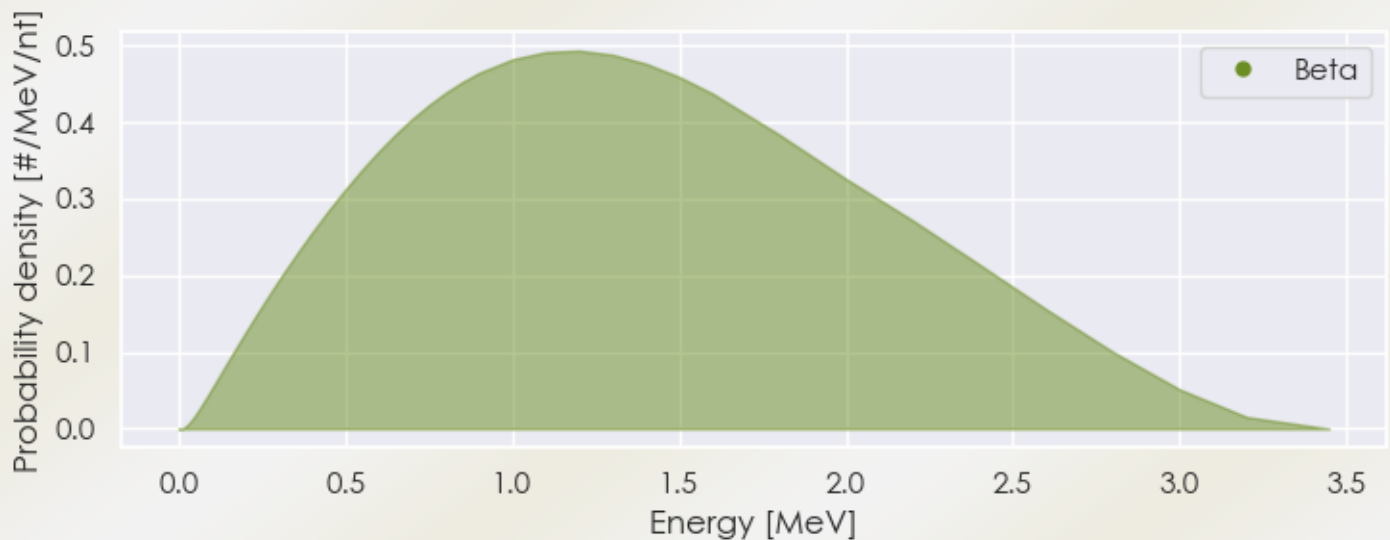
Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



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

Energy [MeV]	Yield [#/(nt)] if > 0.01	Radiation type
2.09371e-05	5.825e+00	X-ray
1.79939e-03	1.043e-02	X-ray
1.40549e-02	1.235e-01	X-ray
1.41246e-02	2.371e-01	X-ray
1.57867e-02	1.802e-02	X-ray
1.57975e-02	3.512e-02	X-ray
3.55000e-02	1.934e-01	Gamma
2.59100e-01	1.820e-02	Gamma
3.91600e-01	1.449e-02	Gamma
4.20300e-01	1.840e-02	Gamma
4.54400e-01	2.394e-02	Gamma
4.89900e-01	5.531e-02	Gamma
5.11000e-01	1.838e+00	Annihilation photon
6.82100e-01	1.241e-02	Gamma
7.21200e-01	1.058e-02	Gamma
7.43500e-01	1.229e-02	Gamma
8.58700e-01	3.213e-02	Gamma
8.82100e-01	6.300e-02	Gamma
9.51800e-01	1.953e-02	Gamma
1.33650e+00	3.087e-02	Gamma
1.37190e+00	1.008e-02	Gamma
9.23197e-01	1.162e-01	Positron
9.87266e-01	1.259e-02	Positron
1.11311e+00	1.200e-02	Positron
1.14517e+00	2.807e-02	Positron
1.22792e+00	1.297e-02	Positron
1.55026e+00	6.293e-01	Positron
1.56713e+00	5.808e-02	Positron

1.36397e-05	1.623e+00	Auger electron
7.49326e-05	1.620e+00	Auger electron
9.40231e-05	6.870e-01	Auger electron
1.00022e-04	1.442e-01	Auger electron
1.09890e-04	7.848e-02	Auger electron
1.57330e-03	6.793e-01	Auger electron
1.71355e-03	6.038e-02	Auger electron
1.20238e-02	1.411e-01	Auger electron
1.37890e-02	4.782e-02	Auger electron
1.94330e-02	5.398e-01	Conversion electron
3.32999e-02	5.791e-02	Conversion electron
3.52305e-02	1.083e-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