

U. S. Department of Commerce
Rogers C. B. Morton
Secretary
National Bureau of Standards
Edward W. Roberts, Director

National Bureau of Standards

Certificate

Standard Reference Material 4263

K-X-Ray-Emission-Rate Standard

Strontium-85

This Standard Reference Material consists of strontium-85, quantitatively deposited as the chloride, on polyester tape, approximately 0.006-cm thick, and covered by another layer of the same tape. The tape is supported on an aluminum annulus 0.8-cm wide and 5.5-cm outside diameter.

The number of rubidium-85 K x rays emitted per second at 1200 EST, July 1, 1975, was

* $\pm 2.5\%*$.

The K-x-ray-emission rate of this Standard Reference Material was measured in the National Bureau of Standards Low-Geometry, Sodium-Iodide, X-Ray-Detector System, the overall efficiency of which had been determined using calculated geometrical factors and known absorption coefficients. Confirmatory measurements of the calculated efficiencies were performed using iron-55 sources, which had previously been calibrated for K-x-ray-emission rate by means of 4 π -high-pressure proportional counting. A further confirmation of the above certified number of rubidium-85 K x rays emitted per second was obtained by x- γ coincidence counting, using the percentage of K x rays per disintegration given in the attached sheet.

The uncertainty in the K-x-ray-emission rate, 2.5 percent, is the linear sum of 1.1 percent, which is the limit of the random error of the sodium-iodide measurements at the 99-percent confidence level ($4.604 S_m$, where S_m is the standard error computed from five measurements), and 1.4 percent, which is the sum of the estimated upper limits of conceivable systematic errors.

The material from which this standard was prepared was examined for impurities with a Ge(Li) spectrometer, and no gamma-ray impurities were observed.

This Standard Reference Material was prepared and calibrated in the Center for Radiation Research, Radioactivity Section, W. B. Mann, Chief.

J. Paul Cali, Chief
Office of Standard Reference Materials

Washington, D.C. 20234
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SRM-4263-

Notes on Strontium-85

Precaution: The total number of K x rays leaving the source are less than the quoted K-x-ray-emission rate by the number absorbed by the source mount. For that part of the beam moving perpendicularly to the plane of the source, the fraction absorbed is 0.4%.

85SR EC DECAY $T_{1/2} = 64.85 \text{ D } 3$

Type	Radiations Energy (keV)	Intensity (%)
Auger-L	1.68	108.3 23
Auger-K	11.4	29.1 9
ce-K- 1	498.790 10	0.617 21
ce-L- 1	511.925 10	0.070 3
ce-MNO- 1	513.668 10	0.024 3
X-ray L	1.69	1.6 6
X-ray $K\alpha_2$	13.33580 20	17.1 5
X-ray $K\alpha_1$	13.39530 20	33.0 7
X-ray $K\beta$	15	8.7 3
γ 1	513.990 10	98.0 10
γ 2	868.5 5	0.0140 20

From: Murray J. Martin
Nuclear Data Project
Oak Ridge National Laboratory
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