

National Bureau of Standards Certificate

Standard Reference Material 4403L-B

Radioactivity Standard

Strontium-85

This Standard Reference Material consists of strontium-85 and carrier in grams of solution in a flame-sealed borosilicate-glass ampoule. The solution, which contains 0.03 milligrams of strontium per gram of approximately 1 molar hydrochloric acid, has a density of 1.016 ± 0.002 grams per milliliter at 22°C .

The radioactive concentration of the strontium-85 at 1200 EST April 20, 1977, was

$$*1.071 \times 10^6 \text{ s}^{-1}\text{g}^{-1} \pm 1.40%*$$

This Standard Reference Material was measured, relative to a radium-226 reference source, in the National Bureau of Standards " 4π " γ pressure ionization chamber which had previously been calibrated, in terms of a radium-226 reference source, with strontium-85 solutions from which quantitative sources had been prepared and x- γ coincidence counted.

The uncertainty in the value of the radioactive concentration, 1.40 percent, is the linear sum of 0.03 percent, which is the limit of the random error of the ionization-chamber measurements at the 99-percent confidence level ($2.831 S_m$, where S_m is the standard error computed from independent measurements of 22 samples) and 1.37 percent, which is the estimated upper limit of conceivable systematic errors.

The solution from which this Standard Reference Material was prepared was examined for photon-emitting impurities with a Ge(Li)-spectrometer system and rubidium-84 and rubidium-86 were observed to be present. On April 20, 1977 at 1200 EST, the ratios of the activity of each impurity to the activity of strontium-85 were

rubidium-84	$9.5 \times 10^{-4} \pm 20\%$
rubidium-86	$1.7 \times 10^{-3} \pm 20\%$

The detection limits for any other impurity gamma rays may be expressed as a percentage of the gamma-ray-emission rate of the 514-keV gamma ray of strontium-85. These limits are approximately 0.1 percent for gamma rays with energies less than 514 keV, and 0.01 percent for those of greater energy.

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

Washington, D.C. 20234
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Office of Standard Reference Materials

SRM 4403L-B-