U. S. Department of Commerce
Maurice H. Stans
Secretary

National Bureau of Standards
L. M. Branscomb, Director

Certificate

STANDARD REFERENCE MATERIAL 4201-B

Gamma-Ray Standard

Niobium-94

This standard consists of niobium-94 deposited, as the oxide, on polyester tape approximately 0.006-centimeter thick and covered by another layer of the same tape. The tape is mounted on an aluminum annulus, 0.8-centimeter wide and 5.5-centimeter outside diameter.

The activity of the niobium-94 in nuclear transformations per second in April 1970, was

This standard is a dried deposit of an accurately weighed aliquot of a solution whose activity was measured by gamma-gamma coincidence counting. Niobium-94 was assumed to decay with the emission of gamma rays of 0.702 MeV and 0.871 MeV in cascade, 100 percent of the time.

There is a niobium-93m impurity whose K-x-ray (16 keV) emission rate, on June 11, 1970, was 71 percent of the above-stated activity. The gamma-ray spectrum was examined with both NaI(Tl) and Ge(Li) detectors and no other impurities were observed.

The uncertainty in the activity, 1.5 percent, is the sum of 0.6 percent, which is the limit of the random error at the 99-percent confidence level (i.e. 2.77 s_m, where s_m is the standard error computed from 27 sets of measurements), and 0.9 percent, which is the maximum uncertainty due to the estimated systematic errors in the measurements.

This standard was prepared and calibrated in the Center for Radiation Research, Nuclear Radiation Division, by members of the Radioactivity Section, W. B. Mann, Chief.

Washington, D. C. 20234
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J. Paul Cali, Acting Chief
Office of Standard Reference Materials

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