U.S. Department of Commerce
Juanita M. Kreps
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards Certificate

Standard Reference Material 4907

Alpha-Particle Standard

Gadolinium-148

This Standard Reference Material consists of a practically weightless source of gadolinium-148 electroplated onto a 0.010-cm-thick platinum foil 1.6 cm in diameter, which is cemented to a monel disk 2.54 cm in diameter and 0.16-cm thick.

The activity of the gadolinium-148 at 1200 EST, August 13, 1979, was

* $s^{-1} \pm$ %*.

This Standard Reference Material was calibrated in the National Bureau of Standards $0.1\pi\alpha$ counter, which has an accurately known geometry.

The uncertainty in the activity, percent, is the linear sum of percent which is the limit of the random error at the 99-percent confidence level (S_m, where S_m is the standard error computed from measurements), and 0.5 percent, which is the sum of the estimated upper limits of conceivable systematic errors.

The material from which this standard was prepared has been examined for both alpha-particle- and gamma-ray-emitting impurities. No alpha-particles other than those from gadolinium-148 were detected with a silicon surface-barrier spectrometer system with a resolution of 25 keV. It is estimated that the alpha-particle-emission rate of any impurity is less than 10^{-4} that of the gadolinium-148. A search for photon-emitting impurities with a Ge(Li) spectrometer system in 1973 revealed only gadolinium-151 and gadolinium-153 to be present. The ratio of the activity of these impurities to that of gadolinium-148 is calculated to be less than 10^{-4} in August, 1979.

A half life of 93 years[†], based on a weighted average of published values, is suggested for the calculation of radioactive decay.

This Standard Reference Material was prepared and calibrated in the Center for Radiation Research, Nuclear Radiation Division, Radioactivity Group, W. B. Mann, Principal Scientist.

George A. Uriano, Chief
Office of Standard Reference Materials

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[†]Nuclear Data Sheets, vol. 20, No. 3, p. 373 (1977).