

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 997

Isotopic Standard for Thallium

This Standard Reference Material (SRM) is certified for use as an isotopic standard. SRM 997 consists of 0.5 gram of a commercial, high-purity thallium metal. Note: While this SRM is a high-purity material for isotopic purposes, it oxidizes rapidly and cannot be used for assay purposes. The certified isotopic compositions are given below together with the atomic weight of thallium.

Absolute Abundance Ratio	$^{205}\text{Tl}/^{203}\text{Tl}$	2.38714 ± 0.00101
Isotopic Composition		
^{203}Tl , Atom Percent		29.5235 ± 0.0088
^{205}Tl , Atom Percent		70.4765 ± 0.0088
Thallium Atomic Weight		204.38333 ± 0.00018

The above indicated uncertainties are the overall limits of error based on the sum of 95 percent confidence limits for the mean and allowances for the effects of known sources of possible systematic error.

This SRM was used in the determination of the absolute abundance ratio and atomic weight of thallium. [1] The absolute abundance ratio of $^{205}\text{Tl}/^{203}\text{Tl}$ was determined by single filament thermal ionization mass spectrometry. Mixtures of known $^{205}\text{Tl}/^{203}\text{Tl}$, prepared from nearly pure separated thallium isotopes, were used to calibrate the mass spectrometers.

The analytical measurements leading to the certification of this material were performed in the NBS Inorganic Analytical Research Division. Mass spectrometric measurements were made by L.J. Powell and J.W. Gramlich on calibration mixes prepared by L. J. Powell. The purity of the separated isotopes was determined by P.J. Paulsen using spark source mass spectrometry.

Statistical analysis of the data was performed by H.H. Ku, NBS Statistical Engineering Division.

The overall direction and coordination of the technical measurements leading to certification of this SRM were performed under the chairmanship of I.L. Barnes, NBS Inorganic Analytical Chemistry Division, and W.C. Purdy, McGill University, Montreal, Quebec, Canada.

Issuance of this Standard Reference Material was coordinated through the Office of Standard Reference Materials by R.W. Seward.

Gaithersburg, MD 20899
July 23, 1986

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

Reference:

1. Dunstan, L.P., Gramlich, J.W., Barnes, I.L. and Purdy, W.C., J. Res. Nat. Bur. Stand. (U.S.), **85**, No. 1, 1-10 (1980).