

National Bureau of Standards Certificate

Standard Reference Material 991

Lead 206 Spike Assay and Isotopic Solution Standard

This Standard Reference Material (SRM) is certified for use as an assay and isotopic standard. The primary intended use is as a spike for lead determinations by isotope dilution mass spectrometry. SRM 991, Lead-206 Spike, is a solution of lead nitrate sealed in quartz ampoules. Each ampoule contains a nominal 15 grams of solution, which is 0.5 N in HNO_3 .

Concentration of Lead

0.32261 ± 0.00032 micromoles/gram

Isotopic composition (atom fraction)

$^{204}\text{Pb} = 0.0$ (<3 ppm)

$^{206}\text{Pb} = 0.99979$

$^{207}\text{Pb} = 0.00008 \pm 0.00001$

$^{208}\text{Pb} = 0.00013 \pm 0.00001$

Atomic Weight = 205.975

The concentration of lead in SRM 991 was determined by an isotope dilution mass spectrometry technique. A correction for isotopic fractionation was checked by analyzing SRM 981. The indicated uncertainty for the concentration is the 95 percent tolerance limit* for coverage of at least 99 percent of measured values of this lot of ampoules of SRM 991. In brief, if we had made concentration measurements on all the ampoules, almost all (at least 99 percent) of these measured values should fall within the indicated tolerance limits with a confidence coefficient of 95 percent (or probability = .95).

*See page 14, The Role of Standard Reference Materials in Measurement System, NBS Monograph 148, 1975. The concept of tolerance limit is also discussed in Chapter 2, Experimental Statistics, NBS Handbook 91, 1966.

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J. Paul Cali, Chief
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The mass spectrometry measurements at NBS were made by L. J. Moore and J. W. Gramlich using solutions prepared by L. A. Machlan.

The overall direction and coordination of the technical measurements leading to certification were under the chairmanship of I. L. Barnes.

The technical and support aspects concerning the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by W. P. Reed.