



# National Institute of Standards & Technology

## Certificate of Analysis

### Standard Reference Material 983

#### Radiogenic Lead Isotopic Standard

This Standard Reference Material (SRM) is intended primarily for use as an isotopic standard. SRM 983 consists of 1 gram of a wire that was prepared from radiogenic lead. It is chemically pure to at least 99.9+ percent purity, and extruded into wire form. The atomic weight of the material is calculated to be 206.0646 using the nuclidic masses 203.973044, 205.974468, 206.975903, and 207.976650. The certified isotopic compositions are given below.

Atomic Abundance Ratio, Lead-204/Lead-206 . . .	0.000371 ± 0.000020
Atomic Abundance Ratio, Lead-207/Lead-206 . . .	0.071201 ± 0.000040
Atomic Abundance Ratio, Lead-208/Lead-206 . . .	0.013619 ± 0.000024
Lead-204, atom percent . . . . .	0.0342 ± 0.0020
Lead-206, atom percent . . . . .	92.1497 ± 0.0041
Lead-207, atom percent . . . . .	6.5611 ± 0.0025
Lead-208, atom percent . . . . .	1.2550 ± 0.0022

Overall limits of error are based on 95 percent confidence limits for the mean of the ratio measurements and on allowances for the known sources of possible systematic error.

Notice to User: SRM 983 is **radioactive**, containing Lead-210  $2.6 \times 10^4$  Bq·g<sup>-1</sup> of natural origin (see attached Report of Test). All users and purchasers must comply with all state and federal regulations regarding the use and disposal of this material.

Measurements for certification were by triple filament solid-sample mass spectrometry. Mixtures with known <sup>208</sup>Pb/<sup>206</sup>Pb ratio, prepared from high-purity separated isotope solutions, were used as comparison standards. Details of the preparation and measurements were published by E.J. Catanzaro, T.J. Murphy, W.R. Shields, and E.L. Garner, J. Research NBS 72A, No. 3,261 (1968).

The analytical measurements leading to the certification of this material were performed in the NIST Inorganic Analytical Research Division.

The overall coordination of efforts leading to the update and revision of this certificate was coordinated through the Standard Reference Materials Program by T. E. Gills.

Gaithersburg, MD 20899  
March 25, 1991  
(Revision of certificate dated 6-1-68)

William P. Reed, Chief  
Standard Reference Materials Program



U.S. DEPARTMENT OF COMMERCE  
National Institute of Standards & Technology  
Gaithersburg, MD 20899

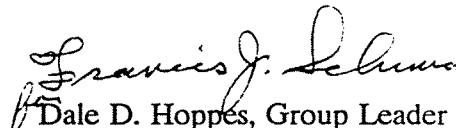
## REPORT OF TEST

for

National Institute of Standards and Technology  
Office of Standard Reference Materials  
Gaithersburg, MD 20899

Radionuclide	Lead-210
Source identification	SRM 983
Source description	Radiogenic lead isotopic standard
Source composition	Radiogenic lead in wire form <sup>(1)*</sup>
Reference time	November 1, 1990
Radioactivity concentration	$2.628 \times 10^4 \text{ Bq g}^{-1}$
Overall uncertainty	10.1 percent <sup>(2)</sup>
Photon-emitting impurities	None observed
Half life	$22.3 \pm 0.2 \text{ years}^{(3)}$
Measuring instrument	Liquid scintillation counter <sup>(4)</sup>

For the Director,

  
Dale D. Hoppes, Group Leader  
Radioactivity Group  
Center for Radiation Research

Gaithersburg, MD 20899  
December, 1990

\*Notes on back