



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 982

Equal-Atom Lead Isotopic Standard

This Standard Reference Material (SRM) is intended primarily for use as an isotopic standard. SRM 982 consists of 1 gram of a wire that was prepared by mixing commercial and radiogenic leads to obtain essentially equal-atom amounts of Lead-206 and Lead-208. It is chemically pure to at least 99.9+ percent purity. The atomic weight of the material is calculated to be 206.9429 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 . . . 0.027219 ± 0.000027

Atomic Abundance Ratio, Lead-207/Lead-206 . . . 0.46707 ± 0.00020

Atomic Abundance Ratio, Lead-208/Lead-206 . . . 1.00016 ± 0.00036

Lead-204, atom percent 1.0912 ± 0.0012

Lead-206, atom percent 40.0890 ± 0.0072

Lead-207, atom percent 18.7244 ± 0.0023

Lead-208, atom percent 40.0954 ± 0.0077

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 982 is **radioactive**, containing Lead-210 $4.2 \times 10^3 \text{ Bq} \cdot \text{g}^{-1}$ 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 $^{208}\text{Pb}/^{206}\text{Pb}$ 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

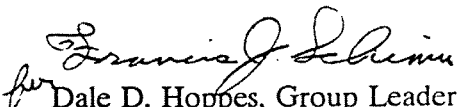
REPORT OF TEST

for

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

Radionuclide	Lead-210
Source identification	SRM 982
Source description	Equal-atom lead isotopic standard
Source composition	Lead-210 plus non-radioactive lead-204, lead-206, lead-207, and lead-208 as metal wire ^{(1)*}
Reference time	November 1, 1990
Radioactivity concentration	$4.188 \times 10^3 \text{ Bq g}^{-1}$
Overall uncertainty	10.1 percent ⁽²⁾
Photon-emitting impurities	None observed
Half life	$22.3 \pm 0.2 \text{ years}$ ⁽³⁾
Measuring instrument	Liquid scintillation counter ⁽⁴⁾

For the Director,


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

Gaithersburg, MD 20899
December, 1990

*Notes on back