U. S. Department of Commerce
Malcolm Baldrige
Secretary

National Bureau of Standards
Ernest Ambler, Director

# National Bureau of Standards

# Certificate

## Standard Reference Material 4324

### Radioactivity Standard

| | |
|---|---|
| Radionuclide | Uranium-232 (1)* |
| Source identification | 4324 |
| Source description | Liquid in 5-ml flame-sealed glass ampoule |
| Solution composition | Uranium-232 in 2-molar nitric acid |
| Solution mass | Approximately 5 grams |
| Reference time | 1400 EST, 14 February 1984 |
| Radioactivity concentration | 82.6 Bq $g^{-1}$ |
| Random uncertainty | 0.4 percent (2) |
| Systematic uncertainty | 1.1 percent (3) |
| Total uncertainty (Random plus systematic) | 1.5 percent |
| Alpha-particle-emitting impurities | None detected (4) |
| Half life | 69.8 ± 1.0 years (5) |
| Measuring instruments | NBS "0.8$\pi$"$\alpha$ and "0.1$\pi$"$\alpha$ defined-solid-angle counters with scintillation detectors |

This Standard Reference Material was prepared in the Center for Radiation Research, Nuclear Radiation Division, Radioactivity Group, Dale D. Hoppes, Group Leader.

Gaithersburg, MD 20899
May 1984

Stanley D. Rasberry, Chief
Office of Standard Reference Materials

*Notes on back

## NOTES

(1) The uranium-232 was chemically separated from impurities and progeny on 1400 EST February 14, 1984. The ingrowth of progeny can be deduced from data given on the attached Supplemental Information Sheet.

(2) Half the 99-percent confidence interval of the mean (3.169 times the standard deviation of the mean computed from 11 measurements).

(3) Linear sum of estimated uncertainty limits due to:

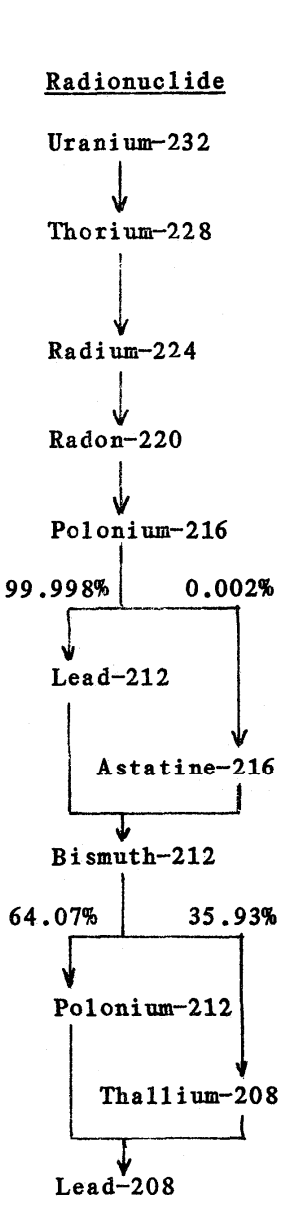
| | |
|---|---|
| a) gravimetric measurements | 0.1 percent |
| b) dead time | 0.1 percent |
| c) background | 0.01 percent |
| d) detection efficiency | 0.4 percent |
| e) count-rate-vs-energy extrapolation to zero energy | 0.5 percent |
| f) impurities | 0.01 percent |

(4) The limit of detection for alpha-particle-emitting impurities is $10^{-4}$ of the uranium-232 alpha-particle-emission rate.

(5) Proposed Recommended List of Heavy Element Radionuclide Decay Data, International Nuclear Data Committee, INDC (NDS)-149/NE, December, 1983.

For further information contact J.M.R. Hutchinson at (301) 921-2396 or FTS-921-2396.

**Uranium-232 Supplemental Information Sheet**
**Some Decay Properties of Uranium-232 and Its Progeny**




For more information see: INDC (NDS)-149/NE, December, 1983