

National Bureau of Standards

Certificate

Standard Reference Material U-050

Uranium Isotopic Standard (Nominally 5% Enriched)

	²³⁴ U	²³⁵ U	²³⁶ U	²³⁸ U
Atom Percent	0.0279	5.010	0.0480	94.915
	±.0001	±0.005	±.0002	± 0.005
Weight Percent	0.0275	4.949	0.0476	94.975

This Standard Reference Material (SRM) is certified for use as an isotopic standard. The primary intended use is for the evaluation of mass discrimination effects encountered in the operation of a mass spectrometer.

The material is a highly purified uranium oxide, U₃O₈. The atomic weight of the material is calculated to be 237.898, using the nuclidic masses 234.0409; 235.0439; 236.0457; and 238.0508.

The values for ²³⁴U and ²³⁶U were calculated from measurements at the National Bureau of Standards. The samples were spiked with high-purity ²³³U to approximate the ²³⁴U concentration, the ratios ²³³U to ²³⁴U and ²³³U to ²³⁶U were measured on a triple-filament equipped surface ionization mass spectrometer with ion-multiplier amplifier circuits.

The values for ²³⁵U and ²³⁸U were calculated from measurements of the ²³⁵U to ²³⁸U ratio made at the National Bureau of Standards on a triple-filament, surface ionization mass spectrometer equipped with d-c amplifier circuits. The observed ratios were corrected for mass discrimination effects by intercomparison with synthetic mixtures prepared at the 5 percent ²³⁵U level from high-purity ²³⁵U and ²³⁸U.

The indicated uncertainties for the isotopic concentrations are at the 95-percent confidence level for a single determination, and include allowances for inhomogeneities in the material as well as analytical error. The ²³⁵U to ²³⁸U ratio for this standard, 0.05278, is known to at least 0.1 percent.

Measurements leading to the certification of this SRM were made by E. L. Garner and L. A. Machlan.

The overall direction and coordination of the technical measurements leading to certification were performed under the chairmanship of W. R. Shields.

The technical and support aspects in the preparation, certification, and issuance of this Standard Reference Material were coordinated through the Office of Standard Reference Materials by J. L. Hague.

NOTE: In many industries traceability of their quality control process to the national measurement system is carried out through the mechanisms of SRM's. It may be therefore of interest to know the details of the measurements made at NBS in arriving at the certified values of this SRM. An NBS Special Publication, 260-27, is reserved for this purpose and is available from the NBS Office of Standard Reference Materials upon request.

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 Certificate dated 7-30-70)

George A. Uriano, Chief
 Office of Standard Reference Materials