U.S. Department of Commerce
Juanita M. Kreps
Secretary

National Bureau of Standards
Ernest Ambler, Director

National Bureau of Standards Certificate

Standard Reference Material 950b

Uranium Oxide (U_3O_8)

(In Cooperation with the Department of Energy, New Brunswick Laboratory, Argonne, Illinois)

This material consists of normal uranium in the form of oxide, U_3O_8. It is intended to provide a reference material of known uranium content.

CERTIFIED VALUE

Uranium Oxide (U_3O_8). . . . 99.968 ± 0.020 percent

The stated uncertainty of ±0.020 percent associated with the certified value is the linear sum of 0.0076 percent, which is the limit of the random error of the assay measurements at the 99 percent confidence level (2.807 S_m, where S_m is the standard error of the mean with n = 24), and 0.012 percent, the estimated upper limit of conceivable systematic errors including material variability. The above certified value is based on material heated at 800 °C for one hour in an open crucible in a muffle furnace and cooled in a desiccator. *It is important that the material be freshly ignited in this manner to obtain accurate results.*

The total impurities as determined by spectrochemical analysis are estimated to be less than 50 μg/g. The determined iron content is ~3 μg/g and the determined vanadium content is ~ 1 μg/g. The assay of this material is based on the use of NBS Potassium Dichromate (SRM 136c), as the oxidizing agent as described in the NBL titrimetric method for the precise assay of uranium metal.[1,2] The assay values obtained are compatible with those obtained from the assay of NBS Uranium Metal, (SRM 960) and NBS Uranium Oxide, (SRM 950a). The certified value for this lot of uranium oxide has also been confirmed using a coulometric procedure.

The atomic weights used in the calculations are: uranium, 238.029, and oxygen, 15.9994.

This material was prepared under contract with the National Lead Company of Ohio, Cincinnati, Ohio. Assay of the material was performed by N. M. Trahey of the New Brunswick Laboratory, Argonne, Illinois and J. R. Moody and W. Koch of the NBS Analytical Chemistry Division. Iron and vanadium were measured by B. I. Diamondstone and S. A. Wicks of the NBS Analytical Chemistry Division.

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

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

Washington, D.C. 20234
March 1, 1978

J. Paul Cali, Chief
Office of Standard Reference Materials

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Ignition of Material Before Use

To assay accurately, this material must be ignited in an open crucible in a muffle furnace at 800 °C for one hour and cooled in a desiccator just prior to use. The ignition temperature, 800 °C, was determined to be essential for this specific lot of material.

References

1. A. R. Eberle and M. W. Lerner, NBL Annual Progress Report, No. 258, July 1969 - June 1970, pp 5-9.
2. A. R. Eberle and M. W. Lerner, NBL Annual Progress Report, No. 262, July 1970 - June 1971, pp. 5-16.