

National Bureau of Standards Certificate

Standard Reference Material 990

Assay-Isotopic Standard for Silicon

This Standard Reference Material is supplied in the form of a wafer 3 cm in diameter and 0.2 cm thick. It is intended to be used as a standard for assay and isotopic measurements of pure silicon materials. The purity of this standard is established to be greater than 99.999 percent based on the determination of 22 impurities by isotope dilution spark source mass spectroscopy. The material was prepared from a single crystal of high purity silicon. This particular material has been used as the reference sample in the recent determination of Avogadro's number.(1)

Silicon -28, atom percent	92.2293 ± 0.0038
Silicon -29, atom percent	4.6698 ± 0.0022
Silicon -30, atom percent	3.1009 ± 0.0021
Atomic Weight	28.085526 ± 0.000056

The indicated uncertainties are overall limits of error for a single analysis, based on 95% confidence limits of the mean and known sources of systematic bias.

Mass spectrometric measurements were made by I. L. Barnes and L. J. Moore on samples prepared by L. A. Machlan and T. J. Murphy.

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

The technical and support aspects concerning 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
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J. Paul Cali, Chief
Office of Standard Reference Materials

(1) Deslattes, R. D., Et al, Determination of the Avogadro Constant, Physical Review Letters, Vol. 33 No. 8, 463 (1974).