



National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 976

Isotopic Standard for Copper

This Standard Reference Material (SRM) is intended for use as an isotopic standard. SRM 976 consists of a disc of a commercial copper metal weighing approximately 0.4 g. The certified isotopic compositions are given below together with the atomic weight of copper. The atomic weight of this copper SRM was calculated from the certified isotopic composition and nuclidic masses, 62.929598 for ^{63}Cu , and 64.927792 for ^{65}Cu reported by Wapstra and Audi.[1]

Absolute Isotopic Abundance Ratio, $^{63}\text{Cu}/^{65}\text{Cu}$:	2.2440 ± 0.0021
Isotopic Composition:	
^{63}Cu , Atom Percent	69.174 ± 0.020
^{65}Cu , Atom Percent	30.826 ± 0.020
Atomic Weight:	63.5456 ± 0.0004

The indicated uncertainties are overall limits of error based on the sum of 95% confidence limits for the means and upper bounds for the effects of known sources of possible systematic error.

The absolute abundance ratio of $^{63}\text{Cu}/^{65}\text{Cu}$ was determined by thermal ionization mass spectrometry. Mixtures of known $^{63}\text{Cu}/^{65}\text{Cu}$ prepared from high-purity separated copper isotopes were used to calibrate the mass spectrometers. Details of the preparation and measurements of this SRM are described by Shields, W.R., Murphy, T.J., and Garner, E.L., Absolute Isotopic Abundance Ratio and the Atomic Weight of a Reference Sample of Copper.[2]

The analytical measurements leading to certification of this material were performed in the NIST Inorganic Analytical Research Division. Mass spectrometric measurements were made by W.R. Shields and E.L. Garner based on calibration mixes prepared by T.J. Murphy.

Statistical analysis of the data was performed by H.H. Ku, NIST Statistical Engineering Division.

The technical and support aspects involved in the original preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by R.L. Seward. The revision of this certificate was coordinated through the Standard Reference Materials Program by J.S. Kane.

REFERENCES

- [1] Wapstra, A.H. and Audi, G., Nuclear Physics A432(1), 1-55 (1985).
- [2] Shields, W.R., Murphy, T.J., and Garner, E.L., J. Res. Nat Bur. Stand., (U.S.), 68A, (Phys. and Chem.), No. 6, 589-592 (1964).

Gaithersburg, MD 20899
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