

National Bureau of Standards

Certificate of Analysis

Standard Reference Material 2129

Spectrometric Standard Solutions

Titanium, Tungsten, Vanadium, and Zirconium

This Standard Reference Material (SRM) is intended for use in atomic absorption spectrometry, optical emission (plasma) spectrometry, spectrophotometry, or any other analytical technique that requires aqueous standard solutions for calibrating instruments. SRM 2129 consists of four single element solutions of Ti, W, V, and Zr. Each solution contains 50 mL and was prepared gravimetrically at 22 °C to contain, except for vanadium, 10.00 ± 0.01 mg/mL of the metal ion. Because the stability of NH₄VO₃ is low, this solution was prepared to contain 5.000 ± 0.005 mg/mL of vanadium. The approximate acid concentration (V/V) of each solution is also shown in Table 1. The certified values (Table 1) are based on gravimetric procedures, i.e., weight per volume composition of high-purity metals or salt dissolved in NBS high-purity reagents.

Table 1

<u>Solution</u>	<u>Metal</u>	<u>Concentration (mg/mL)</u>	<u>Source (Purity, %)</u>		<u>Acid Conc. (V/V) Approximate</u>
2129-1	Ti	10.00 ± 0.01	Ti metal	(99.95)*	HCl, 20%
2129-2	W	10.00 ± 0.01	W metal	(99.99)**	HNO ₃ , 7% and HF, 4%
2129-3	V	5.000 ± 0.005	NH ₄ VO ₃	(99.99)**	HNO ₃ , 10%
2129-4	Zr	10.00 ± 0.01	SRM 1234	(99.9)	HNO ₃ , 10% and HF, 2%

*This high-purity material was analyzed by optical emission spectrometry and atomic absorption spectrometry and found to contain less than 500 µg/g total impurities.

**This high-purity material was analyzed by optical emission spectrometry and atomic spectrometry and found to contain less than 50 µg/g total impurities.

SRM 2129 was prepared by T. C. Rains of the Inorganic Analytical Research Division. Atomic absorption and emission spectrometric analyses were made by T.A. Butler, T.A. Rush, T. C. Rains, and J.A. Norris.

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 R.W. Seward.

July 23, 1986
 Gaithersburg, MD 20899

Stanley D. Rasberry, Chief
 Office of Standard Reference Materials

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Procedures for Use

Stability:

This certificate is valid for one year from the shipping date provided the solutions are kept tightly capped and stored under proper laboratory conditions. NBS will monitor the stability of these solutions; if any changes occur that invalidate this certification, NBS will notify purchasers.

Preparation of Working Standard Solutions:

All solutions should be at 22 ± 1 °C and all glass or plastic surfaces coming into contact with the standard must have been previously cleaned. The working standard solution is prepared from the SRM solutions by serial dilution. The dilutions should be made with certified volumetric class A flasks and 5 or 10 mL class A pipets. All volumetric transfers of solutions should be performed by a proven analytical technique. Each dilution should be acidified with an appropriate high-purity solution acid and diluted to calibrated volume using high-purity water. The stability of the working standard solution will depend upon the final acid concentration. To achieve the highest accuracy, the analysts should prepare daily working solutions from 100 $\mu\text{g/mL}$ dilutions of the original SRM stock solutions.