National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material 3113

Spectrometric Standard Solution

Cobalt

Batch Code 391211

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 3113 is a single element solution prepared gravimetrically to contain a nominal 10 mg/mL of cobalt with a nitric acid concentration (V/V) of 10 percent. The certified value is based on gravimetric procedures, i.e., weight per volume composition of the high-purity metal dissolved in NIST high-purity reagents. The uncertainty listed is based on gravimetric and volumetric uncertainties of the preparation and the effect of solvent transpiration through the container wall for one year. The density of the solution at 22 °C is 1.069 g/mL.

Metal	Concentration mg/mL	Source Purity, %	Acid Conc. (V/V) Approximate
Co	10.00 ± 0.03	Co metal (99.98)*	HNO_3, 10%

*This high-purity material was analyzed for gases by inert gas fusion and for metals by inductively coupled plasma mass spectrometry. It was found to contain 0.009 weight percent oxygen and less than 200 μg/g total metallic impurities.

Procedures for Use

Stability: This certification is valid for one year from the shipping date provided the bottle is kept tightly capped and stored under normal laboratory conditions. NIST will monitor the stability of representative solutions from the SRM lot; and if any changes occur that invalidate this certification, NIST will notify purchasers.

Preparation of Working Standard Solutions: All materials used in the preparation of working standard solutions should be brought to 22 ± 1 °C before use and all glass or plastic surfaces coming into contact with the materials must have been previously cleaned. A working standard solution can be prepared from the SRM solution by serial dilution. 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 using a proven analytical technique. Each dilution should be acidified with an appropriate high-purity acid and diluted to calibrated volume using high-purity water. The stability of the working standard solution will depend on the final acid concentration; therefore, care should be exercised to ensure that the final acid concentration of the dilution closely approximates that of the SRM. To achieve the highest accuracy, the analyst should prepare daily working solutions from 100 μg/mL dilutions of the original SRM solution.

Gaithersburg, MD 20899
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Thomas E. Gills, Acting Chief
Standard Reference Materials Program

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SRM 3113 was prepared by T.A. Butler of the NIST Inorganic Analytical Research Division. Atomic absorption and emission spectrometric analyses were made by T.A. Butler.

The technical and support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by J.S. Kane.