

# National Bureau of Standards Certificate of Analysis

## Standard Reference Material 2124 Spectrometric Standard Solutions Cobalt, Copper, Iron, and Nickel

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 2124 consists of four single element solutions of Co, Cu, Fe and Ni. Each solution contains 50 mL and was prepared gravimetrically at 22 °C to contain  $10.00 \pm 0.01$  mg/mL of the metal ion in the percent (V/V) acid medium as shown in Table 1. The certified values (Table 1) are based on gravimetric procedures, i.e., weight per volume composition of high-purity metals dissolved in NBS high-purity reagents.

Table 1

Solution	Metal	Concentration (mg/mL)	Source (Purity, %)	Acid Conc. (V/V) (Approximate)
2124-1	Co	$10.00 \pm 0.01$	Co metal 99.98*	HNO <sub>3</sub> , 10%
2124-2	Cu	$10.00 \pm 0.01$	SRM 393 99.998	HNO <sub>3</sub> , 10%
2124-3	Fe	$10.00 \pm 0.01$	SRM 365 99.97	HCl, 10% <sup>a</sup>
2124-4	Ni	$10.00 \pm 0.01$	Ni metal 99.98*	HNO <sub>3</sub> , 10%

\*This high-purity material was analyzed by optical emission spectrometry and atomic absorption spectrometry and found to contain less than 200 µg/g total impurities.

(a) A weighed quantity of SRM 365 was dissolved in a minimum volume of HCl and HNO<sub>3</sub> and diluted to calibrated volume with 10% HCl.

SRM 2124 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.

### 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, purchasers will be notified by NBS.

#### Preparation of Working Standard Solutions:

All solutions should be at  $22 \pm 1$  °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 dilution should be made into certified volumetric class A flasks with 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 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, it is recommended that the analyst prepare daily working solutions from 100 µg/mL dilutions of the original SRM stock solutions.