



Approved by General Administration of Quality Supervision,

Inspection and Quarantine of the People's Republic of China

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GBW08667

Certificate of Certified Reference Material

Arsenate Solution

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Sample Number:

Date of Certification:

National Institute of Metrology (NIM)

No.18, Bei San Huan Dong Lu, Chaoyang Dist., Beijing, 100013, P.R.China

Tel: +86(10) 64271639, 64278838, 64204432

Fax: +86(10) 64271639, 64213149

Website: www.nim.ac.cn; www.ncrm.org.cn

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1. Description of Material & Intended Use

This certified reference material (CRM) is mainly intended for calibration of analytical instruments, validation and evaluation of analytical methods, quality control on analytical process and certificate assessment on analytical results in the process of speciation analysis for arsenic element in water, soil, sediment, biologic body fluid and aquatic product.

2. Preparation

The candidate of this reference material, sodium arsenate with high purity, is diluted with organic-component-free water in clean room at $20^{\circ}\text{C} \pm 2^{\circ}\text{C}$. The water is purified for three times by using reverse osmosis method, ion exchange method and quartz distiller.

3. Traceability and certification

The speciation and purity of arsenic in this certified reference material were determined using nuclear magnetic resonance (NMR) and high performance liquid chromatography - inductively coupled plasma-mass spectrometry (HPLC - ICPMS) methods.

Several accurate methods with different principles, such as high performance liquid chromatography - isotope dilution mass spectrometry (HPLC-IDMS), inductively coupled plasma-mass spectrometry (ICPMS), inductively coupled plasma- optical emission spectroscopy (ICP-OES) and atomic fluorescence spectrometry (AFS), were used to determine the concentration of arsenic compounds in this certified reference material.

The traceability of the certified value is ensured by using measurement methods and measuring instruments that meet the requirements of metrology.

4. Certified value and uncertainty

The certified value and the expanded uncertainty of the CRM are as follows:

Code	Certified value	Expanded uncertainty, $k=2$
GBW08667	Molar concentration: $0.233\mu\text{mol/g}$; Mass fraction: $17.5\mu\text{g/g}$ (as As), $32.4\mu\text{g/g}$ (as arsenate: AsO_4^{3-})	Molar concentration: $0.005\mu\text{mol/g}$; Mass fraction: $0.4\mu\text{g/g}$ (as As), $0.7\mu\text{g/g}$ (as arsenate: AsO_4^{3-})

Weighted mean value of the results independently obtained by using different methods was considered as the certified value of this CRM.

Contributions from characterization, homogeneity and stability were considered in uncertainty evaluation of the reference material.

5. Homogeneity and Stability Testing

According to the requirement of national criterion for primary certified reference materials, the homogeneity testing was carried out through random sampling by using HPLC-ICPMS method. The *F*-test method was used and no statistically significant difference among bottles was observed. The reference material is in good homogeneity. And the minimal sample intake of this CRM is 0.1g.

The stability testing for speciation and concentration of this reference material were carried out by using HPLC-ICPMS and ICP-MS methods for two years, respectively. The results showed that the reference material is well stable.

The valid period of this RM is two years from the date of certification. The stability of this RM is regularly monitored by NIM. Any change of the certified value during this period will be informed to the customers in time.

6. Instructions for use

- This certified reference material is sealed up in glass ampoules and each ampoule contains about 2ml of arsenate solution.
- This certified reference material should be kept cold in refrigeratory (4-10 ℃)
- Transformation from arsenate to other arsenic compounds is easily occurred through oxidation-reduction reaction, so please **AVOID** using it by mixing with other reducing agents and being open for a long time. This CRM should be used immediately and can be used only one time after being opened.

STATEMENT

1. The CRM is limited to the use of scientific research and analytical measurement. NIM is not responsible for any loss caused by improper use and storage of the CRM by the customer. Any compensate can only cover CRM itself.
2. Please check the status of reference materials as soon as the sample arriving. The certificate is only valid with the whole file and special stamp for NIM RM distribution. Please keep the integrality of the certificate.
3. If more information related to the use of the CRM is needed, please contact the technical enquiries section.