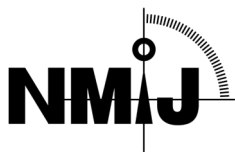


National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan



Reference Material Certificate

NMIJ CRM 7912-a
No. +++

Arsenate [As(V)] Solution

This certified reference material (CRM) is produced in accordance with the NMIJ's management system and is in compliance with ISO 17034 and ISO/IEC 17025. This CRM is intended for use in the calibration of instruments, and validation of analytical methods and instruments used for the quantification of arsenate.

Certified Value

The certified value for As(V) in this CRM is given in the table below. The uncertainty of the certified value is the half-width of the expanded uncertainty interval calculated using a coverage factor (k) of 2, which gives a level of confidence of approximately 95 %.

	CAS No.	Certified value Mass fraction (mg/kg)	Expanded uncertainty Mass fraction (mg/kg)
As(V)	7778-39-4	99.53	1.67

Analysis

The certified value of this CRM was weighted mean of the results of the following analytical methods:

- (1) Inductively coupled plasma mass spectrometry (ICP-MS)
- (2) Inductively coupled plasma atomic emission spectrometry (ICP-AES)
- (3) Graphite furnace atomic absorption spectrometry (GFAAS)
- (4) High performance liquid chromatography – ICP-MS (HPLC-ICP-MS)

Metrological Traceability

The certified value was determined by the methods with JCSS (Japan Calibration Service System) standard solution of arsenic. Therefore, the certified value is traceable to the International System of Units (SI).

Mutual Recognition Arrangement under Meter Convention

This certificate is consistent with the calibration and measurement capabilities (CMCs) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures (CIPM). Under the MRA, all participating institutes recognize the validity of each other's calibration and measurement certificates for the quantities, ranges and measurement uncertainties specified in Appendix C (as for Appendix C of MRA, see <http://kcdb.bipm.org/AppendixC/default.asp>).

Expiration of Certification

This certificate is valid for one year from the date of shipment, provided that the material remains unopened and is stored in accordance with the instructions given in this certificate.

Sample Form

This CRM is in the form of a colorless and transparent liquid at ordinary temperature, and 50 mL is kept in a polyethylene bottle.

Homogeneity

The homogeneity of this CRM was determined by analyzing 10 bottles hierarchical-randomly selected from the 400 bottles. As(V) was determined by HPLC-ICP-MS. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage

This CRM should be stored in a clean place at a temperature between 5 °C and 35 °C, and shielded from light.

Instructions for Use

- 1) Be careful to a disassembly of a cap with the opening.
- 2) The bottle should be opened after gently shaking at room temperature.
- 3) After opening, take care to avoid contamination. Also, it is desirable to use up this CRM as quickly as possible.
- 4) The minimum sample amount is 0.15 mL for the determination of As(V).
- 5) The bottle must be sealed as tightly as possible for storage after opening.
- 6) There is a possibility that some of the inorganic arsenic may change valence as a result of the dilution procedure and storage conditions, such as the diluted concentration of inorganic arsenic, temperature, standing time, and container material. Therefore, precautions regarding the use of this CRM are necessary. In the development of this CRM, the possibility that less than 2 % of As(V) (as a mole function) was changed to As(III) as a result of dilution with water and long-term storage at room temperature was suggested. It is thought that the ratio of the change to As(III) depends on the container material, volume, standing time, storage temperature, acid concentration, and arsenic concentration. Therefore, the choice of the dilution procedure and/or the storage conditions that ensures that the change of valence does not occur is necessary. An understanding of the change of valence is also necessary.

Precautions for Handling

Wear a mask, gloves, and other protective equipment during handling. Handling, storage, and disposal of this CRM obey the Poisonous and Deleterious Substances Control Law. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

A high purity As₂O₃ reagent (mass function: 99.9 % <) was used as the raw material, and it was oxidized to As(V) with HNO₃. The As(V) was dissolved in 0.8 mol/L HNO₃ solution that was then dispensed into polyethylene bottles (50 mL each).

Technical Information

The density of this CRM measured using the peculiar vibration cycle method was 1.01917 g/cm³ (25 °C). This CRM contains 0.8 mol/L HNO₃.

NMIJ Analysts

The technical manager is CHIBA K., the production manager is NARUKAWA T., and the analysts are NARUKAWA T., KUROIWA T., NARUSHIMA I., JIMBO Y. and SUZUKI T.

Information

If substantive technical changes occur that affect the certification before the expiration of this certificate, NMIJ will notify the registered customer. Customer registration on the NMIJ Website (given below) will facilitate notification. Technical reports regarding this CRM can be obtained from the contact details given below.

Reproduction of Certificate

In reproducing this certificate, it should be clearly indicated that the document is a copy.

April 1, 2020

ISHIMURA Kazuhiko
President

National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact:
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Revision history

August 10, 2012: Expiration date was extended from “March 31, 2014” to “March 31, 2019.”

April 1, 2015: “Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”

November 20, 2017: The description in “Expiration of Certification” was changed to “one year from the date of shipment.”

Sample