National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4215-a
No. +++

Sulfur in Toluene

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. It is primarily intended for use in controlling the precision of analysis or in confirming the validity of instruments during the determination of total sulfur (about 1 mg/kg) in liquid samples.

Certified Value

The certified value for total sulfur 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 %.

	Certified value, Mass fraction (mg/kg)	Expanded uncertainty Mass fraction (mg/kg)
Total Sulfur	0.98	0.02

Analysis

The certified value of this CRM was determined by the gravimetric blending method with high purity thiophene and high-purity toluene. Sulfur in toluene was determined and also included in the certified value.

Metrological Traceability

The certified value of this CRM was determined based on the mass ratio of the components weighed by using the balance traceable to the International System of Units (SI). The purity of thiophene determined by the Differential Scanning Calorimetry (DSC) and the impurity analysis in NMIJ, and the certified value is traceable to SI.

Expiration of Certification

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

Sample Form

This CRM is in the form of a colorless liquid at room temperature, and it of ca. 5 mL in net volume is kept in an amber glass ampule.

Homogeneity

The homogeneity of this CRM was confirmed by the measurement of sulfur in ten ampoules using an ultraviolet – fluorescence method. The homogeneity is reflected in the uncertainty of the certified value.

Instructions for Storage

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

Instructions for Use

This CRM is for laboratory use only. This CRM should be used promptly once the ampule is opened.

Precautions for Handling

A mask, gloves and other personal protective equipment must be worn during handling. The handling, storage and disposal of this CRM must be performed in accordance with all applicable laws. Refer to the safety data sheet (SDS) on this CRM before use.

Preparation

The high purity thiophene and the high purity toluene were mixed gravimetrically and the each 5 mL of the mixture was sealed in an amber ampoule with argon atmosphere by Kanto Chemical Co., Inc.

Technical note

The density of this CRM was given in the table below.

Temperature (°C)	Density (g/cm^3)
20	0.867
25	0.862

NMIJ Analysts

Technical manager for this CRM is KATO K. A responsibility for production is KITAMAKI Y. Analysts for production are KITAMAKI Y., SHIMIZU Y., OHTE Y. and BAO X.

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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National Metrology Institute of Japan,
Center for Quality Management of Metrology, Reference Materials Office,
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Revision history
December 13, 2010: The expiration date of this certificate was extended to March 31, 2016, from March 31, 2012, on the basis of the stability evaluation results.
October 1, 2014: The description in “Expiration of Certification” was changed to “one year from the date of shipment.”
April 1, 2015: “Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”