Date of shipment: Xxxxxx 00, 2017 4217a00101222-170831

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4217-a
No. +++

Sulfur in Toluene

National Institute of Advanced Industrial Science and Technology
AIST

This certified reference material (CRM) was produced in accordance with the NMIJ's management system, and in compliance with ISO GUIDE 34:2000 and ISO/IEC 17025:2005. This CRM is intended for use in controlling the precision of analysis or confirming the validity of instruments during the determination of 5 mg/kg to 10 mg/kg total sulfur 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	7.81	0.14

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 also evaluated and 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 impurity analysis in NMIJ, and the certified value is traceable to SI.

Expiration of Certification

This certificate is valid for one year after the date of shipment, provided that 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 approximately 10 mL of CRM is sealed in an amber glass ampoule.

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 kept at 5°C to 35 °C and shielded from light.

Instructions for Use

This CRM is for laboratory use only. This CRM should be used promptly once an ampoule is opened.

Precautions for Handling

A mask, gloves and other 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 Method

The high purity thiophene and the high purity toluene were mixed gravimetrically and the each 10 mL of the mixture was sealed in an amber ampoule with argon atmosphere by NMIJ.

Information

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

Temperature (℃)	Density (g/cm^3)
15	0.872
20	0.867
25	0.862

NMIJ Analysts

Technical manager for this CRM is K. Kato. A responsibility for production is Y. Kitamaki. Analysts for production are Y. Kitamaki, Y. Shimizu, Y. Ohte and X. Bao

Technical Information

Customer registration on the NMIJ Website (given below) will facilitate notification of any revision of the information given above. 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, 2015

Ryoji Chubachi
President
National Institute of Advanced Industrial Science and Technology

If you have any questions about this CRM, please contact
National Institute of Advanced Industrial Science and Technology,
National Metrology Institute of Japan,
Center for Quality Management of Metrology, Reference Materials Office,
1-1-1, Umezono, Tsukuba, Ibaraki 305-8563, Japan
Phone: +81-29-861-4059; Fax: +81-29-861-4009, https://www.nmij.jp/english/service/C/

Revision history
November 12, 2014: The description in “Expiration of Certification” was changed to “one year after the date of shipment.”
April 1, 2015: “Metrology Management Center” was renamed to “Center for Quality Management of Metrology.”