Date of Shipment: Xxxxx xx, 20xx

4407a01-190220-210121

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4407-a01

Hexane in methane

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.

Certified Value

The certified value of this CRM is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Certified value Amount-of-substance fraction (μmol/mol)	Expanded uncertainty Amount-of-substance fraction (μmol/mol)	Cylinder number
Hexane (*n*-Hexane)	110-54-3	509.1	2.3	CPC00286

Analysis

The certified value of this CRM is the synthesis concentration determined by a gravimetric method in accordance with ISO 6142-1:2015. The uncertainty of the certified value was estimated by combining the uncertainty of the gravimetric method, the uncertainty of synthesis evaluated by the gas chromatograph with flame ionization detector, and the uncertainty derived from the long-term stability.

Metrological Traceability

This CRM was prepared by the gravimetric method at NMIJ using a mass comparator and weights that were traceable to the International System of Units (SI). The source gas and the raw material whose purities were traceable to the SI were used. The certified value, therefore, is traceable to the SI.

Expiration of Certification

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

Description of the material

This CRM is in the form of colorless gas at room temperature and standard pressure. This CRM is delivered in an aluminum alloy cylinder with an inner volume of approximately 9.5 L. The specification of the cylinder outlet is W22-14-threads right. The pressure in the cylinder of this CRM is above 4 MPa (35 °C).

Instructions for Storage

This CRM should be stored in compliance with high-pressure gas regulations and other relevant laws. This CRM should not be exposed to sunlight. This CRM is flammable gas and, therefore, should be stored at temperatures of 0 °C to 40 °C in a well-ventilated area. The cylinder containing this CRM should be held with chains at its upper and lower parts to prevent it from falling.

Refer to the safety data sheet (SDS) on this CRM for details.

Instructions for Use

This certificate is valid when residual pressure of the cylinder of this CRM is kept at 1.5 MPa or more in terms of gauge pressure. It is recommended to sufficiently displace residual gas in a regulator, valves, piping systems, measuring instruments, and other relevant apparatuses of this CRM before use. To avoid contamination of the environment, it is recommended to check leakage from the joints of piping systems.

Precautions for Handling

This CRM should be handled in accordance with high-pressure gas regulations. This CRM is flammable gas and, therefore, should not be handled in the presence of open flames. This CRM is a simple asphyxiant that should only be handled at temperatures of 0 °C to 40 °C in a well-ventilated area. Care should be taken to the presence of flames and the leakage of this CRM. This CRM should be returned to Center for Quality Management of Metrology of AIST after use or after the expiry date. Refer to the SDS on this CRM before use.

Preparation

This CRM was prepared from commercially available high-purity hexane and methane by NMIJ by using the gravimetric method in accordance with ISO 6142-1:2015.

NMIJ Analysts

The technical manager for this CRM is SHIMOSAKA T., the production manager is WATANABE T., and the analysts are WATANABE T. and TAKADA K.

Information

If substantive technical changes occur that affect the certification before the expiration of this certificate, NMIJ will notify the registered customers. 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:
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://unit.aist.go.jp/nmij/english/refmate/

Date of Shipment: Xxxxx xx, 20xx

4407a02-190220-210121

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4407-a02

Hexane in methane

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.

Certified Value

The certified value of this CRM is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Certified value Amount-of-substance fraction (μmol/mol)	Expanded uncertainty Amount-of-substance fraction (μmol/mol)	Cylinder number
Hexane (*n*-Hexane)	110-54-3	503.4	2.4	CPC00287

Analysis

The certified value of this CRM is the synthesis concentration determined by a gravimetric method in accordance with ISO 6142-1:2015. The uncertainty of the certified value was estimated by combining the uncertainty of the gravimetric method, the uncertainty of synthesis evaluated by the gas chromatograph with flame ionization detector, and the uncertainty derived from the long-term stability.

Metrological Traceability

This CRM was prepared by the gravimetric method at NMIJ using a mass comparator and weights that were traceable to the International System of Units (SI). The source gas and the raw material whose purities were traceable to the SI were used. The certified value, therefore, is traceable to the SI.

Expiration of Certification

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

Description of the material

This CRM is in the form of colorless gas at room temperature and standard pressure. This CRM is delivered in an aluminum alloy cylinder with an inner volume of approximately 9.5 L. The specification of the cylinder outlet is W22-14-threads right. The pressure in the cylinder of this CRM is above 4 MPa (35 °C).

Instructions for Storage

This CRM should be stored in compliance with high-pressure gas regulations and other relevant laws. This CRM should not be exposed to sunlight. This CRM is flammable gas and, therefore, should be stored at temperatures of 0 °C to 40 °C in a well-ventilated area. The cylinder containing this CRM should be held with chains at its upper and lower parts to prevent it from falling.

Refer to the safety data sheet (SDS) on this CRM for details.

Instructions for Use

This certificate is valid when residual pressure of the cylinder of this CRM is kept at 1.5 MPa or more in terms of gauge pressure. It is recommended to sufficiently displace residual gas in a regulator, valves, piping systems, measuring instruments, and other relevant apparatuses of this CRM before use. To avoid contamination of the environment, it is recommended to check leakage from the joints of piping systems.

Precautions for Handling

This CRM should be handled in accordance with high-pressure gas regulations. This CRM is flammable gas and, therefore, should not be handled in the presence of open flames. This CRM is a simple asphyxiant that should only be handled at temperatures of 0 °C to 40 °C in a well-ventilated area. Care should be taken to the presence of flames and the leakage of this CRM. This CRM should be returned to Center for Quality Management of Metrology of AIST after use or after the expiry date. Refer to the SDS on this CRM before use.

Preparation

This CRM was prepared from commercially available high-purity hexane and methane by NMIJ by using the gravimetric method in accordance with ISO 6142-1:2015.

NMIJ Analysts

The technical manager for this CRM is SHIMOSAKA T., the production manager is WATANABE T., and the analysts are WATANABE T. and TAKADA K.

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Date of Shipment: Xxxxx xx, 20xx

4407a03-190220-210121

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4407-a03

Hexane in methane

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.

Certified Value

The certified value of this CRM is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Certified value Amount-of-substance fraction (μmol/mol)	Expanded uncertainty Amount-of-substance fraction (μmol/mol)	Cylinder number
Hexane (*n*-Hexane)	110-54-3	514.7	2.8	CPC00288

Analysis

The certified value of this CRM is the synthesis concentration determined by a gravimetric method in accordance with ISO 6142-1:2015. The uncertainty of the certified value was estimated by combining the uncertainty of the gravimetric method, the uncertainty of synthesis evaluated by the gas chromatograph with flame ionization detector, and the uncertainty derived from the long-term stability.

Metrological Traceability

This CRM was prepared by the gravimetric method at NMIJ using a mass comparator and weights that were traceable to the International System of Units (SI). The source gas and the raw material whose purities were traceable to the SI were used. The certified value, therefore, is traceable to the SI.

Expiration of Certification

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

Description of the material

This CRM is in the form of colorless gas at room temperature and standard pressure. This CRM is delivered in an aluminum alloy cylinder with an inner volume of approximately 9.5 L. The specification of the cylinder outlet is W22-14-threads right. The pressure in the cylinder of this CRM is above 4 MPa (35 °C).

Instructions for Storage

This CRM should be stored in compliance with high-pressure gas regulations and other relevant laws. This CRM should not be exposed to sunlight. This CRM is flammable gas and, therefore, should be stored at temperatures of 0 °C to 40 °C in a well-ventilated area. The cylinder containing this CRM should be held with chains at its upper and lower parts to prevent it from falling.

Refer to the safety data sheet (SDS) on this CRM for details.

Instructions for Use

This certificate is valid when residual pressure of the cylinder of this CRM is kept at 1.5 MPa or more in terms of gauge pressure. It is recommended to sufficiently displace residual gas in a regulator, valves, piping systems, measuring instruments, and other relevant apparatuses of this CRM before use. To avoid contamination of the environment, it is recommended to check leakage from the joints of piping systems.

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Preparation

This CRM was prepared from commercially available high-purity hexane and methane by NMIJ by using the gravimetric method in accordance with ISO 6142-1:2015.

NMIJ Analysts

The technical manager for this CRM is SHIMOSAKA T., the production manager is WATANABE T., and the analysts are WATANABE T. and TAKADA K.

Information

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Phone: +81-29-861-4059; Fax: +81-29-861-4009, https://unit.aist.go.jp/nmij/english/refmate/

Date of Shipment: Xxxxx xx, 20xx

4407a04-190220-210121

National Institute of Advanced Industrial Science and Technology

National Metrology Institute of Japan

Reference Material Certificate

NMIJ CRM 4407-a04

Hexane in methane

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.

Certified Value

The certified value of this CRM is given in the table below. The uncertainty of the certified value is the expanded uncertainty obtained by multiplying the combined standard uncertainty by a coverage factor (k) of 2, and it is the half-width of an interval estimated to have a level of confidence of approximately 95 %.

Substance	CAS No.	Certified value Amount-of-substance fraction (μmol/mol)	Expanded uncertainty Amount-of-substance fraction (μmol/mol)	Cylinder number
Hexane (*n*-Hexane)	110-54-3	486.0	2.3	CPC00290

Analysis

The certified value of this CRM is the synthesis concentration determined by a gravimetric method in accordance with ISO 6142-1:2015. The uncertainty of the certified value was estimated by combining the uncertainty of the gravimetric method, the uncertainty of synthesis evaluated by the gas chromatograph with flame ionization detector, and the uncertainty derived from the long-term stability.

Metrological Traceability

This CRM was prepared by the gravimetric method at NMIJ using a mass comparator and weights that were traceable to the International System of Units (SI). The source gas and the raw material whose purities were traceable to the SI were used. The certified value, therefore, is traceable to the SI.

Expiration of Certification

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

Description of the material

This CRM is in the form of colorless gas at room temperature and standard pressure. This CRM is delivered in an aluminum alloy cylinder with an inner volume of approximately 9.5 L. The specification of the cylinder outlet is W22-14-threads right. The pressure in the cylinder of this CRM is above 4 MPa (35 °C).

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NMIJ Analysts

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