

National Certified Reference Material (NCRM)

Code: GBW 06162



Reference Material Certificate

CRM of n-dodecane for purity, carbon and hydrogen content

Batch Number:

Certification Date:



Period of Validity:



Reference Material Producer: National Institute of Metrology of China

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Version: 2.0



Certified reference material (CRM) can be used to validate the analytical method of carbon and hydrogen content of petroleum using the organic elemental analyzer, and prepare the mixed solution CRM of normal alkanes for the calibration of the gas chromatography for the analysis of petroleum products content in environment.

1. Description of Material & Preparation

The commercial n-dodecane (CAS: 112-40-3) of analytical grade was packaged into ampoules and then the CRM was prepared.

The commercial n-dodecane of analytical grade were screened, and then the n-dodecane with highest purity was used as the raw material of CRM. The raw material was analyzed using gas chromatography – mass spectrometry, nuclear magnetic resonance, infrared spectroscopy, and differential scanning calorimeter. The results indicated that the raw material is n-dodecane. Then, the raw material was packaged into ampoules and the CRM was prepared.

2. Traceability and certification

The purity of CRM was determined by the mass balance method in which the organic impurities, water, and inorganic impurities were determined by gas chromatography, Karl Fischer coulometric titration, and residue on ignition method, respectively. Then, the content of main component, namely purity, was calculated by subtraction of all impurities content from 100% according to the mass balance theory. Furthermore, the purity of CRM was also determined using differential scanning calorimetry. The means of two purity results was used as the

certified value. The certified value of purity is traceable to SI units of mass and so on.

The carbon and hydrogen content was calculated based on the content of components and the elemental content of corresponding molecules which is well acknowledged as the certification method of CRM of organic pure substances for elemental contents. The certified elemental content is traceable to SI units of mass and the atomic weight.

3. Certified values and uncertainties

No.	Mass fraction($\times 10^{-2}$)	Uncertainty ($k=2, \times 10^{-2}$)	
	Purity	99.5	0.3
GBW 06162	Carbon	84.611	0.003
	Hydrogen	15.385	0.003

The uncertainty of certified value contains the uncertainty from certification, that from homogeneity and stability.

4. Homogeneity and Stability Testing

According to the requirement of JJF 1343-2012, equivalent to ISO Guide 35, the CRM candidates were random selected. And then the organic impurities, water, and inorganic impurities were determined by Gas Chromatography, Karl Fischer Coulometric Titration, and Residue on Ignition. Then, the purity was calculated according to the mass balance theory, and the elemental contents were calculated by the components contents and the elemental content of corresponding molecules. The results of homogeneity test showed that the homogeneity are qualified. The stability of CRM was also tested. The result showed that the stability are qualified. The period of validity of this CRM is 24 months since the date of

certification. The stability of this CRM is regularly monitored by the CRM producer.

5. Instructions for package, storage and use

1. Package: This CRM is packaged in the ampoules, and each bottle contains 1.0mL.


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2. Storage and transportation: This CRM should be stored at the temperature of

23°C±5°C. During the transportation, the temperature should be more than -18°C, and the CRM should be prevented to fall or collide.

3. Use: The CRM should be used up at one time after open the package. The minimum usage is 0.1 mL.


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STATEMENT

1. The CRM is only limited in use of scientific research and analytical measurement. Any loss caused by improper use and storage by customer will not be respond by maker.
2. Please check the kind, number and package as soon as the sample arriving. The compensate do not relate to any loss except for the CRM.
3. The maker only answer for the intact certificate with CRM cachet of nim. Please keep the certificate appropriately.
4. Please contact with technical consultant section, if more information related to the use of the CRM is needed.

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