



Approved by General Administration of Quality Supervision,

Inspection and Quarantine of the People's Republic of China

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GBW08656

Certificate of Certified Reference Material

Standard Solution of Lu

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Sample Number:

Date of Certification:

National Institute of Metrology (NIM)

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1. Description of Material & Intended Use

This certified reference material (CRM) can be served as a value traceable standard for lower-class CRMs or as a stock standard solution for single element. The working standard solutions, obtained from the CRM by using stepwise dilution method, are mainly intended for calibration of analytical instruments, validation and evaluation of analytical methods, quality control on measurement process and technology arbitration and certificate assessment on analytical results.

2. Preparation

The starting materials of this reference material, lutetium oxide (Lu_2O_3) with high and accurately known purity and high purity hydrochloric acid, are diluted with organic-component-free water in clean room at $20^\circ\text{C} \pm 2^\circ\text{C}$ by using gravimetric method. The water is purified for three times by using reverse osmosis method, ion exchange method and quartz distiller.

3. Traceability and certification

The purity of Lu_2O_3 was determined using volumetric method, inductively coupled plasma-mass spectrometry (ICP-MS) and inductively coupled plasma-atomic emission spectroscopy (ICP-AES) impurity deduction method. The preparing value (formulated value) checked with ICP-MS method, is considered as the certified value of the concentration of this CRM.

The traceability of the certified value is ensured by using measurement methods and measuring instruments that meet the requirements of metrology.

4. Certified value and uncertainty

The certified value and the expanded uncertainty of the CRM are as follows:

Code	Certified value	Relative expanded uncertainty, $k=2$	Matrix (V/V)
GBW08656	Mass fraction: $982.3\mu\text{g/g}$; Mass concentration: $1000\mu\text{g/ml}$	0.4%	10% HCl

Contributions from purity of materials, sample weighing for high purity materials and solution and change of temperature were considered in uncertainty evaluation of the reference material.

5. Homogeneity and Stability Testing

According to the requirement of national criterion for primary certified reference materials, the homogeneity and long-term stability testing were carried out through random sampling by using ICP-MS method. The F -test method was used and no statistically significant difference among bottles was observed. The reference material is in good homogeneity and stability.

The valid period of this RM is five years from the date of certification. The stability of this RM is regularly monitored by NIM. Any change of the certified value during this period will be informed to the customers in time.


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6. Instructions for use

- This certified reference material is sealed up in glass ampoules and each ampoule contains about 20ml of the standard solution.
- This certified reference material should be kept in cold and dark place. Prior to use, the CRM should be equilibrated to room temperature ($20\pm 2^{\circ}\text{C}$) and thoroughly mixed by inverting the ampoule.
- This certified reference material should be used one time after being opened and **CANNOT** be used repeatedly. And it should be prevented from contamination while using.


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STATEMENT

1. The CRM is limited to the use of scientific research and analytical measurement. NIM is not responsible for any loss caused by improper use and storage of the CRM by the customer. Any compensate can only cover CRM itself.
2. Please check the status of reference materials as soon as the sample arriving. The certificate is only valid with the whole file and special stamp for NIM RM distribution. Please keep the integrality of the certificate.
3. If more information related to the use of the CRM is needed, please contact the technical enquiries section.


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