

JOINT RESEARCH CENTRE
Institute for Reference Materials and Measurements

CERTIFICATE OF ANALYSIS

ERM[®] - AE637

| Mg in 0.2 M subboiled nitric acid | | | |
|--|--|--------------------------------|----------------------------|
| | | Certified value ⁽¹⁾ | Uncertainty ⁽²⁾ |
| amount content | mol (²⁴ Mg) · g ⁻¹ (solution) | 7.913 7 · 10 ⁻⁷ | 0.003 0 · 10 ⁻⁷ |
| amount ratios of Mg | $n(^{26}\text{Mg})/n(^{24}\text{Mg})$ | 0.139 68 | 0.000 32 |
| | $n(^{25}\text{Mg})/n(^{24}\text{Mg})$ | 0.126 86 | 0.000 18 |
| <p>1) The values reported in this certificate result from measurements performed at IRMM, and are traceable to the SI via the values of the isotopic reference material NIST SRM 980.</p> <p>2) Estimated expanded uncertainty U with a coverage factor k=2, corresponding to a level of confidence of about 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO, 1995.</p> | | | |

This certificate is valid for three years after purchase.

Sales date:

The material can be regarded as a homogenous solution.

Accepted as CRM, Geel, March 2001

Signed: _____

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Signed: _____

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NOTE

European Reference Material ERM[®]-AE637 was originally certified as IRMM-637. It was produced and certified under the responsibility of the IRMM according to the principles laid down in the technical guidelines of the European Reference Materials[®] co-operation agreement between BAM-IRMM-LGC. Information on these guidelines is available on the Internet (<http://www.erm-crm.org>). A detailed technical report on the certification procedure can be found in IRMM Internal Report GE/R/SIM/25/97, available from IRMM on explicit request.

DESCRIPTION OF THE SAMPLE

The Spike Isotopic Reference Material ERM[®]-AE637 is supplied with a certified isotope amount content of ²⁴Mg. The samples are supplied in flame-sealed glass ampoules containing approximately 4 mL solution of magnesium in nitric acid. The solution matrix is 0.2 M subboiled nitric acid.

From the certified values, the following amount and mass contents, the isotopic composition of Mg and the molar mass of Mg are derived:

| | | Certified value | Uncertainty ⁽¹⁾ |
|---|--|-------------------------------|-----------------------------|
| amount content | mol (Mg) · g ⁻¹ (solution) | 1.002 30 · 10 ⁻⁶ | 0.000 22 · 10 ⁻⁶ |
| mass content | g (²⁴ Mg) · g ⁻¹ (solution) | 1.898 11 · 10 ⁻⁵ | 0.000 70 · 10 ⁻⁵ |
| | g (Mg) · g ⁻¹ (solution) | 2.436 15 · 10 ⁻⁵ | 0.000 54 · 10 ⁻⁵ |
| isotope amount fractions of Mg (·100) | $n(^{24}\text{Mg})/n(\text{Mg})$ | 78.955 | 0.024 |
| | $n(^{25}\text{Mg})/n(\text{Mg})$ | 10.016 | 0.013 |
| | $n(^{26}\text{Mg})/n(\text{Mg})$ | 11.028 | 0.024 |
| isotope mass fractions of Mg (·100) | $m(^{24}\text{Mg})/m(\text{Mg})$ | 0.285 4 | 0.024 |
| | $m(^{25}\text{Mg})/m(\text{Mg})$ | 0.103 8 | 0.013 |
| | $m(^{26}\text{Mg})/m(\text{Mg})$ | 99.610 8 | 0.024 |
| molar mass Mg in this sample | | 24.305 58 g·mol ⁻¹ | 0.000 44 |
| ¹ Estimated expanded uncertainty U with a coverage factor k=2, corresponding to a level of confidence of about 95 %, as defined in the Guide to the Expression of Uncertainty in Measurement (GUM), ISO, 1995. | | | |

Atomic masses used for calculation of the derived values:*

* G. Audi and A.H. Wapstra, The 1993 atomic mass evaluation, *Nucl Phys A*565 (1993) 1-65.

| Isotope | g · mol ⁻¹ | U (k=2) |
|------------------|-----------------------|--------------|
| ²⁴ Mg | 23.985 041 87 | 0.000 000 52 |
| ²⁵ Mg | 24.985 837 00 | 0.000 000 52 |
| ²⁶ Mg | 25.982 593 00 | 0.000 000 52 |

ANALYTICAL METHOD USED FOR CERTIFICATION

The magnesium mass fraction has been determined by gravimetric preparation.

PARTICIPANTS

Not applicable

SAFETY INFORMATION

Not applicable

INSTRUCTIONS FOR USE

This is a ^{24}Mg isotopically enriched spike material for isotope dilution mass spectrometry.

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