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# Certificate of Analysis

## CERTIFIED REFERENCE MATERIAL FOR ICP-MS

**Solution of Erbium(Er) concentration 10 mg/l Matrix: 2% HNO3**

Lot N: XXXXXX
Barcode: XXXXXXXX

Ref N: M417.2NP.L1.L1

Certification Date:XXXXXX

| Component | Certified Value and uncertainty [mg/l] | Metrological traceability |
|---|---|---|
| Er | 9.973 ± 0.060 (a) | NIST SRM No 3116a Lot 000831 |

Notes:
(a) WQP 5.15.1.1 *The certified value was obtained using ICP/OES or ICP/MS calibration*

Density* 1.022 g/cm$^3$ at 20°C

| Starting Material, Purity* | Batch |
|---|---|
| $Er_2O_3$ 99.999% | 82008932 |

* *These values are not certified*

Storage Conditions: Store under normal laboratory conditions, at temperatures between 15° to 25°C

Shelf-life: XXXXXXXXXX Date of opening: ……..

*(Recommended period of use should not exceed 12 months from date of opening)*

**Concept of Certification and traceability statement:**
*This certified reference material is produced using a high purity starting material, acid from sub-boiling and 18 MOhm deionized water.*
*The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k = 2, which for a normal distribution corresponds to a coverage probability of approximately 95%. The standard uncertainty of measurement has been determined in accordance with EA 4/02*
*Property of the result of a measurement whereby it can be related to stated references, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties (ISO VIM)*
*The metrological traceability is assured through calibration on ICP/MS . The calibration curve is drawn using a series of standard solutions prepared from a certified reference material traceable to SI of NIST (SRM) or BAM (CRM). All contributions in relation to the certification of standard solutions are considered when evaluating the uncertainty.*
*The measurement results are traceable to SI. All analytical balances used for the preparation of the solution are calibrated yearly under an in-house procedure with analytical weights, traceable to DKD, and are checked daily.*
*Class A laboratory glassware is used.*
*The results from temperature measurement are traceable to SI. The thermometers used for solution's calibration are calibrated from an ISO 17025 accredited laboratory. The ambient conditions are controlled with a hygrometer calibrated from an ISO 17025 accredited laboratory.*

**Intended use: *For Laboratory Use Only***
Calibration of ICP/MS, ICP/OES
Preparation of "working reference samples"
Validation of analytical methods
Detection limit and linearity studies
This statement is not intended to restrict the use for other purposes.

**Instructions for the correct use of this reference material:**
This certified reference material can be used directly or can be diluted in an appropriate high purity matrix. Only a clean class A glassware should be used. Do not pipet from container. Obtained concentration (in mg/l) after dilution is a result from the multiplication of certified value of CRM concentration and the CRM's volume used for dilution and divided into the flask's volume used for dilution.

**Stability and storage:**
This CRM is with a guaranteed stability until ±0.5% of the certified concentration within its shelf life. Stability is guaranteed, provided that the solution is kept in its original packaging, tightly closed stored, as written in the section: Storage Conditions.The laboratory performs stability tests according to MQP 5.14.1 therefore solutions with one and the same bar-code number might have different expiration dates.

**Hazardous situation:**

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CERTIFIED ISO 9001

ANAB ANSI National Accreditation Board ACCREDITED ISO 17034 REFERENCE MATERIAL PRODUCER

**C.P.A. chem Ltd is accredited to ISO 17034 and ISO/IEC 17025**

CPAchem Ltd
www.cpachem.com
e-mail: info@cpachem.com; tel.:+359 42 60 77 16
for France, Belgium and Switzerland:
e-mail: acsd2@wanadoo.fr; tel.:01 30 57 57 32 / fax: 01 30 57 57 33

The normal laboratory safety precautions should be observed when working with this CRM. Further details for the handling of this CRM are available as safety data sheet.

**Level of homogeneity:**
This solution was mixed according to an in-house procedure and is guaranteed to be homogeneous.
To ensure sufficient homogeneity of the sample prior to use thoroughly mix by inversion.

**Names of certifying officers:**

Laboratory:  Tihomir Stoyanov

Manager:  Krassimira Taralova

*This document QF 5.17.1/1 version 1 is designed and the certified value(s) and uncertainty(ies) are determined in accordance with ISO Guide 31, ISO Guide 35,and Eurachem / CITAC Guides*

*This certificate relates solely to the lot number given above.*
*All processes (including generating of this certificate) are completely controlled by the specialized Computer-Aided-Manufacturing (CAM) software.*

*This Certified Reference Material was produced under a quality management system that is:*
*- Registered to ISO 9001 Quality Management System (Lloyd's Register Quality Assurance Ltd Cert No 0039638)*
*- Accredited according to ISO/IEC 17025 – Testing (ANAB Cert No AT-1836)*
*- Accredited according to ISO 17034 - Reference Material Producer (ANAB Cert No AR-1835)*

## Trace impurities in the actual solution reported in ppm:

(all values below are nominal and not certified)

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ag | <0.0038 | Cu | <0.0009 | La | <0.0024 | Pt | <0.0097 | Tb | <0.022 |
| Al | <0.0018 | Dy | <0.0054 | Li | <0.0001 | Rb | <0.063 | Te | <0.031 |
| As | <0.016 | Er | * | Lu | <0.0062 | Re | <0.0081 | Th | <0.014 |
| Au | <0.016 | Eu | <0.0039 | Mg | <0.0006 | Rh | <0.0038 | Ti | <0.0012 |
| B | <0.0078 | Fe | <0.0025 | Mn | <0.001 | Ru | <0.0089 | Tl | <0.028 |
| Ba | <0.0005 | Ga | <0.020 | Mo | <0.0024 | S | <0.071 | Tm | <0.0023 |
| Be | <0.0001 | Gd | <0.0028 | Na | <0.007 | Sb | <0.020 | U | <0.45 |
| Bi | <0.016 | Ge | <0.020 | Nb | <0.0066 | Sc | <0.0016 | V | <0.0018 |
| Ca | <0.004 | Hf | <0.0032 | Nd | <0.0058 | Se | <0.023 | W | <0.017 |
| Cd | <0.0012 | Hg | <0.024 | Ni | <0.0061 | Si | <0.037 | Y | <0.0007 |
| Ce | <0.0085 | Ho | <0.0053 | P | <0.048 | Sm | <0.0058 | Yb | <0.0003 |
| Co | <0.0028 | In | <0.098 | Pb | <0.021 | Sn | <0.050 | Zn | <0.0032 |
| Cr | <0.0014 | Ir | <0.0061 | Pd | <0.033 | Sr | <0.00006 | Zr | <0.0007 |
| Cs | <0.05 | K | <0.0095 | Pr | <0.0046 | Ta | <0.004 | | |

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