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Certificate of Analysis

CERTIFIED REFERENCE MATERIAL FOR ICP-MS

ICP-MS Calibration standard - 31 components: 10mg/l each of Ag ; Al ; As ; Ba ; B ; Cd ; Ce ; Co ; Cr ; Cu ; Dy ; Er ; Gd ; Ho ; La ; Li ; Lu ; Mn ; Nd ; Ni ; P ; Pb ; Rb ; Se ; Sm ; Sr ; Tl ; Tm ; U ; V ; Zn in HNO3 2%

Lot N: XXXXXX
Barcode: XXXXXXXX

Ref N: MSMSE194.10.2N.L1.L1

Certification Date:XXXXXX

Component	Certified Value and uncertainty [mg/l]	Metrological traceability
Ag	9.954 ± 0.032 (y)	NIST SRM No 3151 Lot 992212
Al	10.059 ± 0.037 (y)	NIST SRM No 3101a Lot 140903
As	9.998 ± 0.039 (y)	NIST SRM No 3103a Lot 100818
Ba	9.988 ± 0.035 (y)	NIST SRM No 3104a Lot 140909
B	9.991 ± 0.023 (y)	NIST SRM No 3107 Lot 110830
Cd	9.967 ± 0.038 (y)	NIST SRM No 3108 Lot 130116
Ce	10.027 ± 0.023 (y)	NIST SRM No 3110 Lot 090504
Co	9.989 ± 0.044 (y)	NIST SRM No 3113 Lot 000630
Cr	10.024 ± 0.044 (y)	NIST SRM No 3112a Lot 030730
Cu	9.960 ± 0.037 (y)	NIST SRM No 3114 Lot 121207
Dy	9.984 ± 0.027 (y)	NIST SRM No 3115a Lot 990504
Er	10.071 ± 0.027 (y)	NIST SRM No 3116a Lot 000831
Gd	10.019 ± 0.027 (y)	NIST SRM No 3118a Lot 992004
Ho	10.006 ± 0.032 (y)	NIST SRM No 3123a Lot 090408
La	10.014 ± 0.026 (y)	NIST SRM No 3127a Lot 890402
Li	10.052 ± 0.030 (y)	NIST SRM No 3129a Lot 100714
Lu	10.038 ± 0.027 (y)	NIST SRM No 3130a Lot 100503
Mn	10.004 ± 0.021 (y)	NIST SRM No 3132 Lot 050429
Nd	9.861 ± 0.037 (y)	NIST SRM No 3135a Lot 992803
Ni	9.939 ± 0.036 (y)	NIST SRM No 3136 Lot 120619
P	9.991 ± 0.029 (y)	NIST SRM No 3139a Lot 060717
Pb	9.971 ± 0.043 (y)	NIST SRM No 3128 Lot 101026
Rb	10.004 ± 0.063 (y)	NIST SRM No 3145a Lot 150622
Se	9.989 ± 0.063 (y)	NIST SRM No 3149 Lot 100901
Sm	9.945 ± 0.027 (y)	NIST SRM No 3147a Lot 892911
Sr	10.022 ± 0.027 (y)	NIST SRM No 3153a Lot 990906
Tl	9.993 ± 0.049 (y)	NIST SRM No 3158 Lot 993012
Tm	9.999 ± 0.037 (y)	NIST SRM No 3160a Lot 790912
U	9.971 ± 0.028 (y)	NIST SRM No 3164 Lot 080521
V	10.073 ± 0.037 (y)	NIST SRM No 3165 Lot 160906
Zn	9.973 ± 0.030 (y)	NIST SRM No 3168a Lot 120629

Notes:
(y) WQP 5.15.1.24 *The certified value was obtained by a weighted mean of the results of two independent calibration methods among: Classical Volumetric,Primary Gravimetric, Instrumental (ICP/OES, ICP/MS or IC)*

Density* 1.009 g/cm^3 at 20°C

Starting Material, Purity*	Batch
Ag 99.996%	82094089

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

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Al 99.995%	82088125
As 99.997%	82094003
$BaCO_3$ 99.995%	82088873
H_3BO_3 99.999%	82089733
Cd 99.99%	82093303
$Ce(NO_3)_3$ 99.99%	82089542
$Co(NO_3)_2$ 99.999%	82099909
$Cr(NO_3)_3$ 99.9987%	82089757
Cu 99.999%	82070236
Dy_2O_3 99.997%	82044527
Er_2O_3 99.99%	82024048
Gd_2O_3 99.999%	82071301
Ho_2O_3 99.99%	82062026
La_2O_3 99.99%	82082321
Li_2CO_3 99.999%	82089870
Lu_2O_3 99.995%	82072537
$Mn(NO_3)_2$ 99.993%	82099220
Nd_2O_3 99.99%	82070328
$Ni(NO_3)_2$ 99.999%	82085964
$NH_4H_2PO_4$ 99.999%	82089016
$Pb(NO_3)_2$ 99.998%	82100087
$RbNO_3$ 99.98%	82050474
Se 99.999%	82082444
Sm_2O_3 99.995%	82068363
$Sr(NO_3)_2$ 99.994%	82099473
$TlNO_3$ 99.999%	82082215
Tm_2O_3 99.995%	82075071
$UO_2(OOCCH_3)_2$ 99.9%	82089009
NH_4VO_3 99.996%	82085919
Zn 99.9993%	82094621

** 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 6 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:

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.

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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)

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