



Scharlab S.L.

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CERTIFICATE OF ANALYSIS

Product: Standard Solution of: Hafnium (Hf)
concentration 1.000 g/l in 2% Nitric Acid
(HNO₃), 1%Hydrofluoric acid (HF)

Batch 17238501

HA0011

Quality Release Date 14.06.2016

Expiry Date: 05.2019

Analysis	Batch Value (mg/l)	Specifications (mg/l)
concentration (Hf)	999.7 ± 2.7 ^(a)	1000

Density: 1.016 g/cm³ at 20 °C

Preparation

This certified reference material is produced in a clean room, using a highest purity starting material, acid from sub-boiling and 0.055 µS/cm deionized water. The low-density polyethylene bottle was decontaminated by leaching with 0.055 µS/cm deionized water and triple rinse.

The instructions of ISO Guide 34 were considered for the preparation of this solution.

Contains: HfO₂ 99.99%

Traceability

This standard is traceable to NIST SRM No 3122 Lot 080430 The certified value was obtained using ICP/OES calibration according to calibration procedure (a) WQP 5.15.1.1

The calibration curve is drawn using a series of standard solutions prepared from a certified reference material traceable to NIST (SRM) and accredited by laboratories/producers in compliance with ISO/IEC 17025 and/or ISO Guide 34.

Uncertainty

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

Measurement

Batch value certified at the time of measurement.

The certified value is calculated by means of both gravimetric preparation and ICP-OES, AAS analysis.

Hazardous

The normal laboratory safety precautions should be observed when working with this standard.

Please refer to Safety Data Sheet (SDS) to further details.

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, mix thoroughly by shaking.

Storage and use

For ICP spectrometer calibration.

If stored unopened in the original packaging, this solution is stable for 3 years from the release date. Shelf life is also limited by the effect of transpiration of solvent through the unopened bottle walls at an average of <0.1% per year. Once the bottle is opened, keep tightly closed at room temperature in the original packaging. Do not pipette directly from the bottle. Do not pour the used solution back in the bottle.

This standard can be used directly or can be diluted in an appropriate high-purity matrix.

Obtained concentration (in mg/l) after dilution is a result from the multiplication of certified value of standard

concentration and the volume used for dilution and divided into the final volume used for dilution.

We recommend that the material used be leached with acids.

We suggest rejecting the solution six months after opening.

This document 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.

The product is produced by laboratory accredited to ISO Guide 34 and ISO/IEC 17025

Signature:  (M. Canet)

This certificate does not release the user from their control upon receipt of the goods. You can get a copy of any of our COA from our website: www.scharlab.com

Trace impurities in the actual solution reported in ppm:

(all values below are nominal and not certified)

Ag	ND	<0.007
Al	ND	<0.047
As	ND	<0.080
Au	ND	<0.017
B	ND	<0.005
Ba	ND	<0.004
Be	ND	<0.0007
Bi	ND	<0.034
Ca	D	0.035
Cd	ND	<0.0025
Ce	ND	<0.060
Co	ND	<0.006
Cr	ND	<0.007
Cs	ND	<0.0005

Cu	ND	<0.0054
Dy	ND	<0.010
Er	ND	<0.010
Eu	ND	<0.0027
Fe	ND	<0.0062
Ga	ND	<0.046
Gd	ND	<0.014
Ge	ND	<0.048
Hf		*
Hg	ND	<0.061
Ho	ND	<0.0057
In	ND	<0.120
Ir	ND	<0.027
K	ND	<0.0005

La	ND	<0.010
Li	ND	<0.001
Lu	ND	<0.001
Mg	ND	<0.0002
Mn	ND	<0.0016
Mo	ND	<0.014
Na	D	0.012
Nb	ND	<0.036
Nd	ND	<0.187
Ni	ND	<0.015
Os	ND	<0.080
P	ND	<0.076
Pb	ND	<0.042
Pd	ND	<0.044

Pr	ND	<0.037
Pt	ND	<0.030
Rb	ND	<0.0001
Re	ND	<0.006
Rh	ND	<0.060
Ru	ND	<0.030
S	ND	<0.005
Sb	ND	<0.0001
Sc	ND	<0.0015
Se	ND	<0.075
Si	ND	<0.012
Sm	ND	<0.043
Sn	ND	<0.025
Sr	ND	<0.0008

Ta	ND	<0.028
Tb	ND	<0.055
Te	ND	<0.041
Th	ND	<0.065
Ti	ND	<0.0038
Tl	ND	<0.0001
Tm	ND	<0.0052
U	ND	<0.300
V	ND	<0.005
W	ND	<0.0055
Y	ND	<0.0035
Yb	ND	<0.0018
Zn	ND	<0.0018
Zr	ND	<0.0077