



Certificate of Analysis

ULTRAGrade™ Solution
Cerium ICP / ICP-MS Standard
10000 µg/mL

Catalog Number: ICP-158
Lot Number: T00067
Job Number: J00017612
Lot Issue Date: 01/16/2014
Expiration Date: 02/28/2021

Starting Material: cerium (III) nitrate
Starting Material Purity: 99.99%
Starting Material Lot #: BH02229
Matrix: 2% nitric acid in low TOC water (< 50 ppb)
Atomic Weight Ce: 140.13

Certified Value: 10013 ± 20 µg/mL

This Certified Reference Material (CRM) was manufactured and verified in accordance with ULTRA's ISO 9001 registered quality system. The analyte concentration(s) were prepared and verified by an ISO Guide 34 / ISO 17025 accredited laboratory, and compared to calibration standards independently prepared using NIST SRM(s). The certified value and uncertainty value at the 95% confidence level for each analyte is determined gravimetrically.

Classical Wet Assay Method: Theoretical, based on gravimetric measurements

Confirmation by Inductively Coupled Plasma Spectroscopy (ICP / ICP/MS) vs. NIST SRM 3110

ULTRA uses purified acids, 18 megohm double deionized water, calibrated Class A glassware & meticulously cleaned bottles in the manufacturing of ULTRAGrade standards. Balances used in the manufacturing of this standard are calibrated with weights traceable to NIST in compliance with ANSI/NCCL Z-540-1 and ISO 9001.

Trace Metallic Impurities in Solution Standard in µg/mL:

* Al <0.090 D	* Ga <0.005 ND	n Nb	n S
* Sb <0.005 ND	* Ge <0.005 D	n Os	n Ta
* As <0.005 ND	n Au	* Pd <0.005 ND	n Te
* Ba <0.009 D	n Hf	* P <0.005 ND	n Tb
* Be <0.005 ND	n Ho	* Pt <0.005 ND	* Tl <0.005 ND
* Bi <0.005 ND	* In <0.005 ND	* K <0.005 ND	n Th
* B <0.010 D	n Ir	* Pr <0.090 D	n Tm
* Cd <0.005 ND	* Fe <0.010 D	n Re	* Sn <0.005 ND
* Ca <0.060 D	* La <0.030 D	n Rh	* Ti <0.005 ND
s Ce	* Pb <0.005 D	n Rb	n W
n Cs	* Li <0.005 ND	n Ru	n U
* Cr <0.005 D	n Lu	* Sm <0.006 D	* V <0.005 ND
* Co <0.005 ND	* Mg <0.006 D	n Sc	n Yb
* Cu <0.005 ND	* Mn <0.005 ND	* Se <0.005 ND	n Y
n Dy	* Hg <0.005 ND	* Si <0.005 ND	* Zn <0.030 D
* Er <0.005 ND	* Mo <0.005 ND	* Ag <0.005 ND	* Zr <0.020 D
* Eu <0.005 ND	* Nd <0.020 D	* Na <0.030 D	
* Gd <0.005 ND	* Ni <0.005 D	* Sr <0.060 D	

* - element checked for
ND – not detected

l – spectral interference
D – detected

n – not checked for
s – solution standard element

Density of Solution (measured at 20.00°C ± 0.05°C): 1.0283 g/mL



William J. Leary
Quality Assurance Manager

ISO 9001 Registered Quality System – TUV USA