

Trace Analysis Arium[®] Pro

Elements	Detection threshold	Calculated concentration Arium [®] ultrapure water	Unit	Procedure
Aluminium Al	<0.5	1.4	ng/L (ppt)	ICP-SMS
Antimony Sb	<0.005	0.07	ng/L (ppt)	ICP-SMS
Arsenic As	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Barium Ba	<0.02	Under detection threshold	ng/L (ppt)	ICP-SMS
Beryllium Be	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Boron B	<2	Under detection threshold	ng/L (ppt)	ICP-SMS
Lead Pb	<0.01	0.04	ng/L (ppt)	ICP-SMS
Cadmium Cd	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Calcium Ca	<5	Under detection threshold	ng/L (ppt)	ICP-SMS
Cesium Cs	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Cerium Ce	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Chromium Cr	<0.02	0.09	ng/L (ppt)	ICP-SMS
Cobalt Co	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Dysprosium Dy	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Iron Fe	<0.5	Under detection threshold	ng/L (ppt)	ICP-SMS
Erbium Er	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Europium Eu	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Gadolinium Gd	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Gallium Ga	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Germanium Ge	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Gold Au	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Hafnium Hf	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Holmium Ho	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Iridium Ir	<0.001	Under detection threshold	ng/L (ppt)	ICP-SMS
Copper Cu	<0.5	Under detection threshold	ng/L (ppt)	ICP-SMS
Lanthanum La	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Lithium Li	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Lutetium Lu	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Magnesium Mg	<1	Under detection threshold	ng/L (ppt)	ICP-SMS
Manganese Mn	<0.05	Under detection threshold	ng/L (ppt)	ICP-SMS
Molybdenum Mo	<0.02	Under detection threshold	ng/L (ppt)	ICP-SMS
Neodymium Nd	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS

Execution and Analysis Procedure

The water analysis was executed by ALS Scandinavia AB, an internationally recognized testing laboratory for special analytics, based on the ICP-SMS (HR-ICP-MS) after 50-fold preconcentration by sub-boiling distillation. The trace elements are determined using 18 scans over the mass range, resulting in total measurement time of 300 s. All concentrations are within $\pm 30\%$ of the reported value. This may not apply to Br and I. The tests were performed with an Arium[®] Pro VF, without final filter, fed with DI water.

Elements	Detection threshold	Calculated concentration Arium® ultrapure water	Unit	Procedure
Nickel Ni	<0.4	0.46	ng/L (ppt)	ICP-SMS
Niobium Nb	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Osmium Os	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Palladium Pd	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Platinum Pt	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Potassium K	<5	25	ng/L (ppt)	ICP-SMS
Praseodymium Pr	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Mercury Hg	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Rhenium Re	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Rhodium Rh	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Rubidium Rb	<0.01	0.02	ng/L (ppt)	ICP-SMS
Ruthenium Ru	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Samarium Sm	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Scandium Sc	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Selenium Se	<0.05	Under detection threshold	ng/L (ppt)	ICP-SMS
Silver Ag	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Sodium Na	<10	20	ng/L (ppt)	ICP-SMS
Strontium Sr	<0.01	0.03	ng/L (ppt)	ICP-SMS
Tantalum Ta	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Tellurium Te	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Terbium Tb	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Thallium Tl	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Thorium Th	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Thulium Tm	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Titanium Ti	<0.1	Under detection threshold	ng/L (ppt)	ICP-SMS
Uranium U	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Vanadium V	<0.01	Under detection threshold	ng/L (ppt)	ICP-SMS
Bismuth Bi	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Tungsten W	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Ytterbium Yb	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Yttrium Y	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Zinc Zn	<2	Under detection threshold	ng/L (ppt)	ICP-SMS
Tin Sn	<0.02	0.03	ng/L (ppt)	ICP-SMS
Zirconium Zr	<0.005	Under detection threshold	ng/L (ppt)	ICP-SMS
Silicon, Si	<30	Under detection threshold	ng/L (ppt)	ICP-SMS
Bromine, Br	<5	Under detection threshold	ng/L (ppt)	ICP-SMS
Phosphorus, P	<2	Under detection threshold	ng/L (ppt)	ICP-SMS
Iodine, I	<0.2	Under detection threshold	ng/L (ppt)	ICP-SMS
Sulphur, S	<20	Under detection threshold	ng/L (ppt)	ICP-SMS

Execution and Analysis Procedure


The water analysis was executed by ALS Scandinavia AB, an internationally recognized testing laboratory for special analytics, based on the ICP-SMS (HR-ICP-MS) after 50-fold preconcentration by sub-boiling distillation. The trace elements are determined using 18 scans over the mass range, resulting in total measurement time of 300 s. All concentrations are within $\pm 30\%$ of the reported value. This may not apply to Br and I. The tests were performed with an Arium® Pro VF, without final filter, fed with DI water.

Germany

Sartorius Lab Instruments GmbH & Co. KG
Otto-Brenner-Straße 20
37079 Göttingen
Phone +49 551 308 0

USA

Sartorius Corporation
565 Johnson Avenue
Bohemia, NY 11716
Phone +1 631 254 4249
Toll-free +1 800 635 2906

 For further information, visit
www.sartorius.com