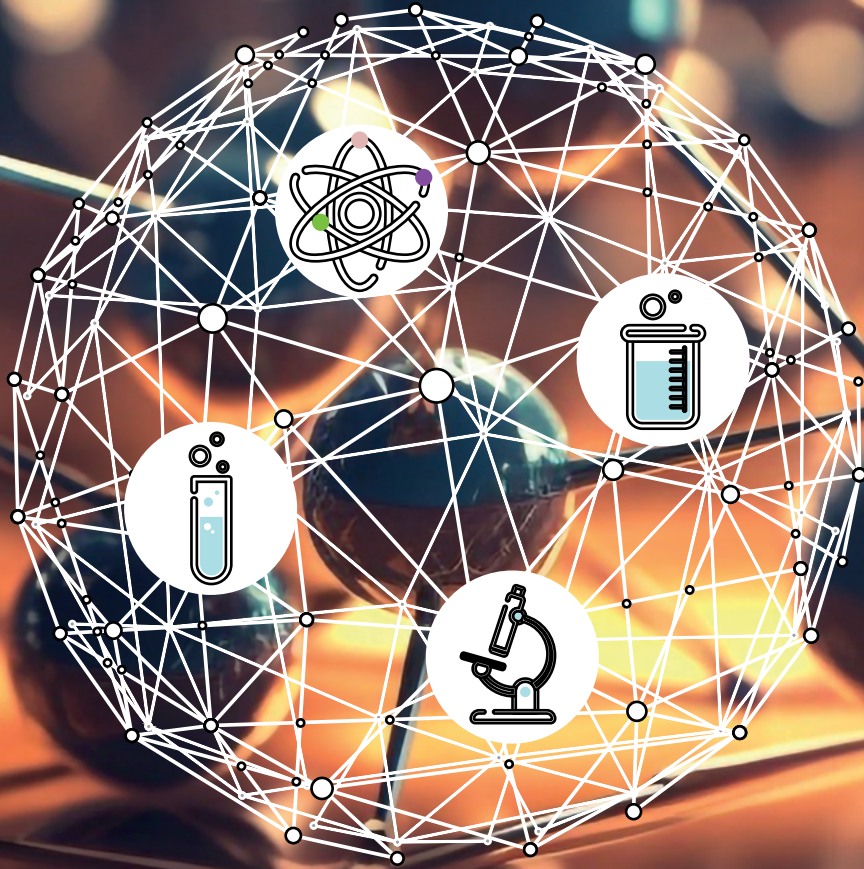


인증표준물질

Certified Reference Materials





중금속분석을 위한 시료전처리장비와 인증표준물질등 소모품 전문기업!

(주) 오디랩은 2008년 8월에 설립된 회사로 중금속분석에 사용되는 흑연블럭 산 분해장비인 에코프리 I, II, III 시리즈와 산 세척장치, 고순도 산 제조 장치, 유리분주기, ICP/ICP MS 소모품, 인증표준물질(CRM), 숙련도 평가물질 (PT) 등 을 제조, 수입판매하고 있습니다.

(주) 오디랩에서 제조 판매하는 흑연블럭 산 분해장비는 열선 가열판이나 마이크로웨이브의 단점을 보완한 제품으로 국내를 비롯하여 세계 7개국에 특허를 획득하였고 현재 해외로도 수출 중 에 있습니다.

또한 실험실에서 분석 데이터의 신뢰성확보를 위한 인증표준물질(CRM)과 표준물질(RM), 국제숙련도 물질을 전세계에서 수입하여 판매하고 있습니다. 인증표준물질은 고객이 찾으시는 제품을 탐색하여 드리고 있으며, 가장 근접한 제품으로 추천드리고 있습니다.

특히 유럽환경규제인 RoHS에 대응한 IEC62321시험법에 나오는 인증표준 물질을 국내 시험평가기관이나 국가기관에 공급하고 있으며, 환경부에서 실시하는 정도관리에 대응하여 LGC사에서 제공하는 환경관련 숙련도 물질을 공급하고 있습니다.

**저희 (주) 오디랩은 화학실험실의 동반자로서
분석의 재현성과 정확성, 신뢰성 확보를 위해
언제나 고객의 노력과 함께 하겠습니다**

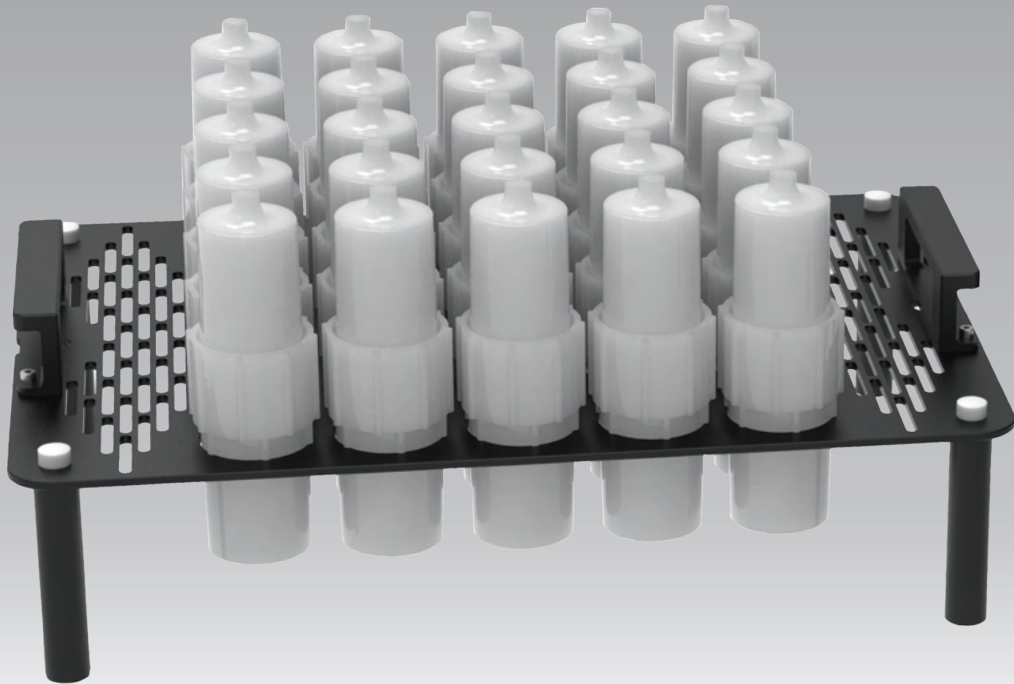


ODLAB

자동 산분해장비

ADS25





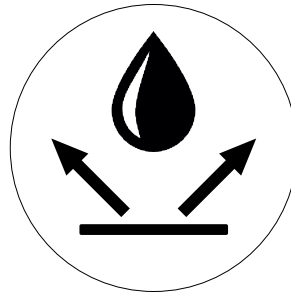
경량화 & 벤틸레이션

경량화 & 벤틸레이션 -



산순환 포집분해용기

산순환 포집분해용기 -



오염방지&내구성

오염방지&내구성 -



앱 연동 조작

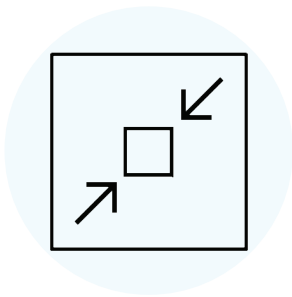
앱 연동 조작 -

이동 및 보관을 위해 플레이트를 타공디자인으로 경량화를 하였습니다 또한 타공을 통하여 원활하게 열기의 순환이 이루어 집니다.

좌우에 있는 리프트 장치로 산 순환 포집분해 용기 내부의 산을 가열 / 냉각 시켜서 사이펀 현상에 의해 리사이클 시켜 시료를 분해할 수 있도록 디자인 하였습니다.

SUS 재질사용 및 테프론 특수코팅을 하여 표면이 쉽게 오염되지 않도록 제작하였습니다. 또한 상부 가열부와 하부 전자제어부는 서로 격리, 밀봉되어 열 또는 산 증기로 인하여 전자제어장치가 손상되지않도록 되어있습니다.

20 Step 으로 가열 / 냉각 으로 분해조건을 프로그램화 할 수 있으며, 앱을 사용하여 조절가능합니다.



컴팩트한 사이즈

컴팩트한 사이즈 -



오토메틱 리프팅

오토메틱 리프팅 -



균일한 온도

균일한 온도 -

실험실 흡후드 내부에서 사용할 때 가장 적절한 사이즈로 설치 및 이동이 용이하고 전원스위치는 콘센트라인에 위치하고 있어서 산에대한 노출이 없고 내구성이 높습니다.

메뉴얼 및 프로그래밍 기능으로 반복적인 가열 / 냉각을 할 수있도록 리프팅 기능이 있습니다.

흑연 소재를 사용하여 균일한 온도를 제공하고 ($\pm 1^{\circ}\text{C}$ 온도편차를 갖는다) 제어는 0.2°C 로 제어된다.



수동 승강버튼

수동 승강버튼 -

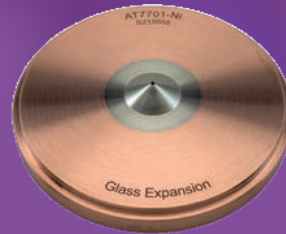
리프트 장치를 수동버튼을 사용하여 상부 랙(Rack)을 상하로 움직여 사용자가 원할 시 용기의 상태를 언제든지 확인 할 수 있습니다.



GLASS EXPANSION
Quality By Design

ICP-OES / ICP-MS

모든 메이커 (애질런트, 씨모, 퍼킨..etc) 전제품



Waters

Waters

Code	Product	Unit
BCR-505	ESTUARINE WATER - Trace elements The material has been filtered at 0.45 µm and acidified with HNO ₃ to around pH1.5 Certified value	1 L
	Cd 0.80 nmol/kg	Ni 24.1 nmol/kg
	Cu 29.4 nmol/kg	Zn 172 nmol/kg
BCR-505	COASTAL SEAWATER - Mercury The material has been filtered at 0.45 µm and acidified with HCl to around pH1.7 Certified value	1 L
	Hg 1.9 ng/kg	
BCR-505	SIMULATED RAINWATER The material has been filtered at 0.45 µm and acidified with HCl to around pH1.7 Certified value	95 mL
	Ammonium 0.910 ± 0.028 mg/L	Nitrate 2.01 ± 0.09 mg/L
	Chloride 1.96 ± 0.07 mg/L	Ortho-phosphate ... 1.00 ± 0.05 mg/L
	Fluoride 0.194 ± 0.008 mg/L	Sulfate 1.46 ± 0.04 mg/L
	Magnesium 0.145 ± 0.022 mg/L	
	Electrochemical property, Certified Value Conductivity (20°C) 18.7 ± 1.8 µS/cm	pH 6.3 ± 0.6
BCR-479	SIMULATED FRESH WATER - Nitrate, low level Certified value	100 mL
	NO ₃ As amount of substance content 214 µmol/kg	As mass fraction 13.3 mg/kg
BCR-480	SIMULATED FRESH WATER - Nitrate, high level Certified value	100 mL
	NO ₃ As amount of substance content 885 µmol/kg	As mass fraction 54.9 mg/kg
BCR-611	GROUNDWATER - Bromide (low level) The material consists of a groundwater sample at pH = 8.1 in a brown glass ampoule containing about 25 mL, each package containing four ampoules. Certified value	4x25 mL
	Br 93 µg/kg	
BCR-612	Ground water - Bromide (high level) The material consists of a groundwater sample at pH = 7.5 in a brown glass ampoule containing about 25 mL, each package containing four ampoules. Certified value	4x25 mL
	Br 252 µg/kg	
ERM-CA616	Ground water - Trace elements, conductivity, pH ERM-CA616 is a natural ground water fortified with ammonium dihydrogen phosphate	95 mL
	Mass Concentration, Certified Value	
	Calcium 42.6 ± 1.4 mg/L	Ortho-phosphate 2.24 ± 0.10 mg/L
	Chloride 44.6 ± 0.9 mg/L	Potassium 5.79 ± 0.15 mg/L

Waters

Code	Product	Unit
	Magnesium 10.1 ± 0.3 mg/L	Sulfate 27.9 ± 0.8 mg/L
	Electrochemical property, Certified Value	
	Conductivity (20°C..... 426 ± 5 µS/cm	pH 7.12 ± 0.18
ERM-CA615	Ground water - Trace elements	95 mL
	Certified Value	
	As 9.9 ± 0.7 µg/L	Hg 0.037 ± 0.004 µg/L
	Cd 0.106 ± 0.011 µg/L	Mn 107 ± 5 µg/L
	Fe 5.11 ± 0.26 mg/L	Ni 25.3 ± 1.1 µg/L
ERM-CA713	WASTEWATER	100 mL
	One unit consists of a flame-sealed borosilicate ampoule, containing approximately 100 mL wastewater effluent acidified with HNO ₃ to about pH 2.	
	Certified Value	
	As 10.8 µg/L	Hg 1.84 µg/L
	Cd 5.09 µg/L	Mn 95 µg/L
	Cr 20.9 µg/L	Ni 50.3 µg/L
	Cu 101 µg/L	Pb 49.7 µg/L
	Fe 445 µg/L	Se 4.9 µg/L
	Mass Concentration Value	
	Zn 78 µg/L	
ERM-CA400	SEAWATER	100 mL
	Each set of ERM-CA400 consists of three borosilicate glass ampoules, each containing 100 mL acidified (pH ≤ 2) coastal surface seawater. The material was spiked with Hg solution to obtain the desired concentration, filtered through 0.8 µm prefilter followed by a 0.45 µm filter and gamma-irradiated to prevent microbial growth. The spike constitutes that largest part of the Hg concentration and consists of entirely of Hg ²⁺ , which is not the case for natural seawaters, which also contain other species, amongst others dissolved gaseous Hg, monomethylHg, dimethylHg. The analytical behaviour of this CRM may differ from a routine sample of coastal seawater and users consequently should assess the commutability of this CRM for their method.	
	Certified Value	
	Hg mass concentration 16.8 ng/L	
	Hg mass fraction 16.4 ng/kg	
	True density at 20 °C 1.0226 g/cm ³	
ERM-CA403	SEAWATER	500 mL
	The sample consists of about 500 mL of seawater acidified to 1 < pH < 2 with hydrochloric acid.	
	Certified value	
	As 1.90 µg/L	Mn 24.1 µg/L
	Cd 0.094 µg/L	Mo 172 µg/L
	Co 0.80 µg/L	Ni 24.1 µg/L
	Cu 29.4 µg/L	Pb 172 µg/L

Waters

Code	Product	Unit
	<p>Density</p> <p>Certified value</p> <p>Density at 20 °C 1.02352 g/mL</p> <p>Mass concentration</p> <p>Range</p> <p>Cr 0.21 – 0.31 µg/L</p> <p>Fe 2.7 – 4.2 µg/L</p> <p>Se 0.060 – 0.094 µg/L</p>	<p>Mass concentration</p> <p>Indicative value</p> <p>Zn 4.6 µg/L</p>
IRMM- 428	<p>WATER</p> <p>The CRM is available in high density polyethylene (HDPE) bottles containing 410 mL of water.</p> <p>Certified value</p> <p>Perfluorobutane sulfonate (PFBS) 5.5 ng/L</p> <p>Perfluorohexane sulfonate (PFHxS) 3.6 µg/L</p> <p>Linear perfluorooctane sulfonate (L-PFOS) 9.6 µg/L</p> <p>Perfluoropentanoic acid (PFPeA) 4.0 µg/L</p> <p>Perfluorohexanoic acid (PFHxA) 7.4 µg/L</p> <p>Perfluoroheptanoic acid (PFHpA) 3.7 µg/L</p> <p>Mass Concentration</p> <p>Indicative value</p> <p>Perfluorononanoic acid (PFNA) 3.9 µg/L</p>	410 mL
ERM- CA100	<p>SURFACE WATER</p> <p>The CRM is available as unit kit that includes a plastic container with at least 1000 mL of surface water, an amber glass ampoule with at least 24 mL humic acids solution in water and an amber glass ampoule with at least 2 mL PAH solution in acetonitrile.</p> <p>The reconstitution protocol specified in the “Instructions for use” must be strictly followed to obtain the final CRM (approximate concentration of carbon: 0.02 g/L).</p> <p>Certified value</p> <p>Perfluorobutane sulfonate (PFBS) 5.5 ng/L</p> <p>Perfluorohexane sulfonate (PFHxS) 3.6 µg/L</p> <p>Linear perfluorooctane sulfonate (L-PFOS) 9.6 µg/L</p> <p>Perfluoropentanoic acid (PFPeA) 4.0 µg/L</p> <p>Perfluorohexanoic acid (PFHxA) 7.4 µg/L</p> <p>Perfluoroheptanoic acid (PFHpA) 3.7 µg/L</p> <p>Mass Concentration</p> <p>Indicative value</p> <p>Perfluorononanoic acid (PFNA) 3.9 µg/L</p>	1000 mL
ERM-AC626	<p>ARSENOBETAINE IN WATER</p> <p>The CRM is available in amber glass ampoules containing 1 mL of arsenobetaine aqueous solution closed under argon atmosphere.</p> <p>Mass Fraction, Certified Value</p> <p>Arsenobetaine 42.6 ± 1.4 mg/L</p>	1 mL

Waters

Code	Product	Unit
ERM-AE641	Cl in water	4 mL
	The spike isotopic reference material ERM-AE641 is supplied with a certified amount content of ^{35}Cl and a certified isotopic composition. The samples are supplied in flame-sealed quartz ampoules containing about 100 μmol chlorine in 4 mL of water.	
	Certified value	
	Amount content $\text{mol } (^{35}\text{Cl}) \cdot \text{g}^{-1} (\text{solution})$ 1.895 9 $\cdot 10^{-5}$ Amount ratio $n(^{37}\text{Cl})/n(^{35}\text{Cl})$ 0.319 77	
ERM-AE642	Cl in water	4 mL
	The spike isotopic reference material ERM-AE642 is supplied with a certified amount content of ^{37}Cl and a certified isotopic composition. The samples are supplied in flame-sealed quartz ampoules containing about 18 μmol chlorine in 4 mL of water.	
	Certified value	
	Amount content $\text{mol } (^{37}\text{Cl}) \cdot \text{g}^{-1} (\text{solution})$ 4.375 $\cdot 10^{-6}$ Amount ratio $n(^{35}\text{Cl})/n(^{37}\text{Cl})$ 0.019 14	
ERM-AE671	METHYLMERCURY IN 2 % ETHANOL/WATER	4 mL
	ERM-AE671 consists of pure, ^{202}Hg enriched methylmercury in 2 % ethanol/water solution. It is supplied in flame-sealed quartz ampoules, containing 5 g solution.	
	Certified value	
	Amount content $\text{mol } (\text{CH}_3(^{202}\text{Hg})\text{Cl}) \cdot \text{g}^{-1} (\text{solution})$ 15.1 $\cdot 10^{-9}$	
	Amount ratios of Hg isotopes in form of CH_3HgCl	
	$n(^{196}\text{Hg})/n(^{202}\text{Hg})$ 0.000 018	
	$n(^{198}\text{Hg})/n(^{202}\text{Hg})$ 0.000 62	
	$n(^{199}\text{Hg})/n(^{202}\text{Hg})$ 0.001 60	
	$n(^{200}\text{Hg})/n(^{202}\text{Hg})$ 0.005 50	
	$n(^{201}\text{Hg})/n(^{202}\text{Hg})$ 0.013 4	
	$n(^{204}\text{Hg})/n(^{202}\text{Hg})$ 0.002 60	
	Certified value	
	Amount content $\text{mol } (\text{CH}_3\text{HgCl}) \cdot \text{g}^{-1} (\text{solution})$ 15.5 $\cdot 10^{-9}$	
	Mass fractions $\text{g } (^{202}\text{Hg as CH}_3\text{HgCl}) \cdot \text{g}^{-1} (\text{solution})$ 3.05 $\cdot 10^{-6}$ $\text{g } (\text{Hg as CH}_3\text{HgCl}) \cdot \text{g}^{-1} (\text{solution})$ 3.12 $\cdot 10^{-6}$	
	Isotope amount fractions of Hg in the form of $\text{CH}_3\text{HgCl} \cdot (100)$	
	$n(^{196}\text{Hg})/n(\text{Hg})$ 0.001 8	
	$n(^{198}\text{Hg})/n(\text{Hg})$ 0.061	
$n(^{199}\text{Hg})/n(\text{Hg})$ 0.156 6		
$n(^{200}\text{Hg})/n(\text{Hg})$ 0.537		
$n(^{201}\text{Hg})/n(\text{Hg})$ 1.30		
$n(^{202}\text{Hg})/n(\text{Hg})$ 97.69		
$n(^{204}\text{Hg})/n(\text{Hg})$ 0.254		
Isotope mass fractions of Hg in the form of $\text{CH}_3\text{HgCl} \cdot (100)$		
$m(^{196}\text{Hg})/m(\text{Hg})$ 0.001 7		
$m(^{198}\text{Hg})/m(\text{Hg})$ 0.060		
$m(^{199}\text{Hg})/m(\text{Hg})$ 0.154 3		
$m(^{200}\text{Hg})/m(\text{Hg})$ 0.532		

Waters

Code	Product	Unit
	m(²⁰¹ Hg)/m(Hg)	1.30
	m(²⁰² Hg)/m(Hg)	97.70
	m(²⁰⁴ Hg)/m(Hg)	0.257
	Molar mass of Hg in the form of CH ₃ HgCl g · mol ⁻¹	201.944 7
SRM- 2900	Ethanol-Water Solution (Nominal Mass Fraction 95.6 %) Ethanol Certified Mass Fraction Value : 95.6 % ± 1.9 %	5 x 10 mL
SRM- 2899a	Ethanol-Water Solution (Nominal Mass Fraction 25 %) Ethanol Certified Mass Fraction Value : 24.95 % ± 0.52 %	5 x 10 mL
SRM- 2891	Ethanol-Water Solution (Nominal Mass Fraction 0.02 %) Ethanol Certified Mass Fraction: 0.01951 % ± 0.00018 %	5 x 1.2 mL
SRM- 2892	Ethanol-Water Solution (Nominal Mass Fraction 0.04 %) Ethanol Certified Mass Fraction: 0.01951 % ± 0.00018 %	5 x 1.2 mL
SRM- 2894	Ethanol-Water Solution (Nominal Mass Fraction 0.1 %) Ethanol Certified Mass Fraction Value: 0.100 84 % ± 0.000 83 %	5 x 1.2 mL
SRM- 2895	Ethanol-Water Solution (Nominal Mass Fraction 0.2 %) Ethanol Certified Mass Fraction Value: 0.1701 % ± 0.0014 %	5 x 1.2 mL
SRM- 2896	Ethanol-Water Solution (Nominal Mass Fraction 0.3 %) Ethanol Certified Mass Fraction Value: 0.2980 % ± 0.0030 %	5 x 1.2 mL
SRM- 2898a	Ethanol-Water Solution (Nominal Mass Fraction 6 %) Ethanol Certified Mass Fraction Value: 6.01 % ± 0.13 %	5 x 10 mL
SRM- 2897a	Ethanol-Water Solution (Nominal Mass Fraction 2 %) Ethanol Certified Mass Fraction Value: 2.001 % ± 0.045 %	5 x 10 mL
SRM- 2893a	Ethanol-Water Solution (Nominal Mass Fraction 0.08 %) Nominal Mass Fraction Level	5 x 1.2 mL
SRM- 1828c	Ethanol-Water Solutions (Six Levels) Certified Values of Ethanol in Water Nominal Mass Fraction Level	6 x 1.2 mL
 0.02 %	
 0.04 %	
 0.08 %	
 0.1 %	
 0.2 %	
 0.3 %	
SRM-1641e	Mercury in Water Certified Mass Fraction Value of Mercury	10 x 10 mL
	0.1016 mg/kg ± 0.0017 mg/kg	

Waters

Code	Product	Unit
SRM-1643f	Trace Elements in Water Certified Values, Expanded Uncertainties	10 x 10 mL
	Mass Fraction	
Aluminum (Al)	132.5 ± 1.2 µg/kg	Magnesium (Mg) 7 380 ± 58 µg/kg
Antimony (Sb)	54.90 ± 0.39 µg/kg	Manganese (Mn) 36.77 ± 0.58 µg/kg
Arsenic (As)	56.85 ± 0.37 µg/kg	Molybdenum (Mo) 114.2 ± 1.7 µg/kg
Barium (Ba)	513.1 ± 7.3 µg/kg	Nickel (Ni) 59.2 ± 1.4 µg/kg
Beryllium (Be)	13.53 ± 0.11 µg/kg	Potassium (K) 1 913.3 ± 9.0 µg/kg
Bismuth (Bi)	12.50 ± 0.10 µg/kg	Rubidium (Rb) 12.51 ± 0.12 µg/kg
Boron (B)	150.8 ± 6.6 µg/kg	Selenium (Se) 11.583 ± 0.078 µg/kg
Cadmium (Cd)	5.83 ± 0.13 µg/kg	Silver (Ag) 0.9606 ± 0.0053 µg/kg
Calcium (Ca)	29 140 ± 320 µg/kg	Sodium (Na) 18 640 ± 240 µg/kg
Chromium (Cr)	18.32 ± 0.10 µg/kg	Strontium (Sr) 311 ± 18 µg/kg
Cobalt (Co)	25.05 ± 0.17 µg/kg	Tellurium (Te) 0.9672 ± 0.0082 µg/kg
Copper (Cu)	21.44 ± 0.70 µg/kg	Thallium (Tl) 6.823 ± 0.034 µg/kg
Iron (Fe)	92.51 ± 0.77 µg/kg	Vanadium (V) 35.71 ± 0.27 µg/kg
Lead (Pb)	18.303 ± 0.081 µg/kg	Zinc (Zn) 73.7 ± 1.7 µg/kg
Lithium (Li)	16.42 ± 0.35 µg/kg	
SRM-1643f	Trace Elements in Natural Water Certified Values for Elements	10 x 10 mL
	Mass Fraction	
Aluminum (Al)	52.6 ± 1.8 µg/kg	Manganese (Mn) 40.07 ± 0.35 µg/kg
Antimony (Sb)	5.064 ± 0.045 µg/kg	Molybdenum (Mo) 45.24 ± 0.59 µg/kg
Arsenic (As)	8.010 ± 0.067 µg/kg	Nickel (Ni) 25.12 ± 0.12 µg/kg
Barium (Ba)	150.60 ± 0.74 µg/kg	Selenium (Se) 19.97 ± 0.16 µg/kg
Beryllium (Be)	3.002 ± 0.027 µg/kg	Silver (Ag) 8.017 ± 0.042 µg/kg
Boron (B)	300.7 ± 3.1 µg/kg	Sodium (Na) 18 640 ± 240 µg/kg
Cadmium (Cd)	5.83 ± 0.13 µg/kg	Strontium (Sr) 125.03 ± 0.86 µg/kg
Chromium (Cr)	40.22 ± 0.28 µg/kg	Thallium (Tl) 1.606 ± 0.015 µg/kg
Cobalt (Co)	20.08 ± 0.24 µg/kg	Uranium (U) 25.15 ± 0.26 µg/kg
Copper (Cu)	85.07 ± 0.48 µg/kg	Vanadium (V) 14.93 ± 0.21 µg/kg
Iron (Fe)	36.5 ± 1.7 µg/kg	Zinc (Zn) 55.20 ± 0.32 µg/kg
Lead (Pb)	12.005 ± 0.040 µg/kg	
SLRS-6	River Water Reference Material for Trace Metals	200 mL
Element	Mass fraction, µg/kg	Mass concentration, µg/L
aluminium (b,c,d)	33.9 ± 2.2	33.8 ± 2.2
antimony (a,b)	0.3377 ± 0.0058	0.3372 ± 0.0058
arsenic (b,c,e)	0.57 ± 0.08	0.57 ± 0.08
barium (a,b,c,d)	14.30 ± 0.48	14.28 ± 0.48
cadmium (a,b)	0.0063 ± 0.0014	0.0063 ± 0.0014
calcium (c,d)	8770 ± 200	8760 ± 200
chromium (a,b,d)	0.252 ± 0.012	0.252 ± 0.012
copper (a,b,c,d)	24.0 ± 1.8	23.9 ± 1.8
iron (a,b,c,d)	84.5 ± 3.6	84.3 ± 3.6
lead (a,b)	0.170 ± 0.026	0.170 ± 0.026
magnesium (c,d)	2137 ± 58	2133 ± 58
manganese (b,c,d)	2.12 ± 0.10	2.12 ± 0.10
molybdenum (a,b,d)	0.215 ± 0.018	0.215 ± 0.018
nickel (a,b,d)	0.617 ± 0.022	0.616 ± 0.022
potassium (c,d)	652 ± 54	651 ± 54

Waters

Code	Product	Unit
	sodium (c,d)	2770 ± 220 2760 ± 220
	strontium (a,b,c,d)	40.72 ± 0.32 40.66 ± 0.32
	uranium (a,b)	0.0699 ± 0.0034 0.0698 ± 0.0034
	vanadium (b,d)	0.352 ± 0.006 0.351 ± 0.006
	zinc (a,b,c,d)	1.76 ± 0.12 1.76 ± 0.12
	beryllium (b)	0.0066 ± 0.0022 0.0066 ± 0.0022
	cobalt (b)	0.053 ± 0.012 0.053 ± 0.012
NASS-7	Seawater Certified Reference Material for Trace Metals and other Constituents	200ml
	Element	Mass fraction, µg/kg Mass concentration, µg/L
	boron (a,b)	3670 ± 120 3750 ± 120
	cadmium (a,b,c)	0.0157 ± 0.0016 0.0161 ± 0.0016
	cobalt (b,c)	0.0143 ± 0.0014 0.0146 ± 0.0014
	copper (a,b,c)	0.195 ± 0.014 0.199 ± 0.014
	iron (a,c)	0.344 ± 0.026 0.351 ± 0.026
	manganese (b,c)	0.74 ± 0.06 0.75 ± 0.06
	molybdenum (a,b,c)	9.10 ± 0.40 9.29 ± 0.40
	nickel (a,b,c)	0.243 ± 0.018 0.248 ± 0.018
	lead (a,b,c)	0.0025 ± 0.0008 0.0026 ± 0.0008
	uranium (a,b,c)	2.81 ± 0.16 2.87 ± 0.16
	zinc (a,b,c)	0.41 ± 0.08 0.42 ± 0.08
CASS-6	Nearshore Seawater Certified Reference Material for Trace Metals and other Constituents	200 mL
	Element	Mass fraction, µg/kg Mass concentration, µg/L
	boron (a,b)	4010 ± 100 4090 ± 100
	cadmium (a,b,c)	0.0213 ± 0.0018 0.0217 ± 0.0018
	cobalt (b,c)	0.0659 ± 0.0052 0.0672 ± 0.0052
	copper (a,b,c)	0.520 ± 0.032 0.530 ± 0.032
	iron (a,c)	1.53 ± 0.12 1.56 ± 0.12
	manganese (b,c)	2.18 ± 0.12 2.22 ± 0.12
	molybdenum (a,b,c)	8.96 ± 0.52 9.15 ± 0.52
	nickel (a,b,c)	0.410 ± 0.040 0.418 ± 0.040
	lead (a,b,c)	0.0104 ± 0.0040 0.0106 ± 0.0040
	uranium (a,b,c)	2.86 ± 0.42 2.92 ± 0.42
	zinc (a,b,c)	1.24 ± 0.18 1.27 ± 0.18
MESS-4	Marine Sediment Certified Reference Material for total and extractable metal content	50 g
	Analyte	Mass fraction, mg/kg Type of value
	aluminium (c,d,e,h)	79 100 ± 2000 certified
	antimony (a,d,g)	1.07 ± 0.16 certified
	arsenic (b,e,d,g)	21.7 ± 2.8 certified
	barium (d,g)	920 information
	beryllium (b,c,d)	2.09 ± 0.28 certified
	bismuth (d)	2.7 information
	bromine (g)	60 information
	caesium (d,g)	10 information

Waters

Code	Product	Unit
	cadmium (a,d)	0.28 ± 0.04 certified
	calcium (c,d,e,h)	13 100 ± 600 certified
	carbon (i)	17 900 information
	cerium (d,g)	72 information
	chlorine (g,h)	13 100 ± 4400 certified
	chromium (a,d,e,g)	94.3 ± 1.8 certified
	cobalt (b,d,g)	13.0 ± 0.8 certified
	copper (a,c,d,e)	32.9 ± 1.8 certified
	dibutyltin (as Sn) (e,f)	< 0.005 information
	europium (g)	1.3 information
	gallium (d)	18 information
	germanium (d)	0.16 information
	hafnium (d,g)	3.0 information
	indium (d)	0.10 information
	iron (d,e,g,h)	37 900 ± 1600 certified
	lanthanum (d,g)	35 information
	lead (a,c,d,e)	21.5 ± 1.2 certified
	lithium (a,c,d,e)	65.3 ± 6.8 certified
	lutetium (g)	0.11 information
	magnesium (c,d,e,h)	15 800 ± 1200 certified
	manganese (b,c,d,e)	298 ± 14 certified
	mercury (a,f)	0.09 ± 0.04 reference
	molybdenum (a,c,d)	2.53 ± 0.12 reference
	monobutyltin (as Sn)	< 0.05 information
	neodymium (g)	42 information
	nickel (a,c,d,e)	42.8 ± 1.6 certified
	niobium (d)	12 information
	phosphorus (c,d,h)	1040 ± 160 certified
	potassium (c,d,e,h)	23 800 ± 1000 certified
	rhenium (d)	0.004 information
	rubidium (d,g)	180 information
	samarium (g)	5.5 information
	scandium (d,g)	13.4 information
	selenium (a,d)	1.5 information
	silicon (c,h)	278 000 ± 20 certified
	silver (a,c,d)	0.161 ± 0.024 certified
	sodium (d,e,g)	12 600 ± 800 certified
	strontium (a,c,d,e)	132 ± 8 certified
	sulfur (c,d,h,i)	1580 ± 200 certified
	tantalum (d)	1 information
	tellurium (d)	0.1 information
	thallium (a,d)	0.85 ± 0.10 certified
	thorium (d,g)	12 information
	tin (a,d,g)	2.35 ± 0.12 certified
	titanium (c,d,e,h)	3840 ± 220 certified
	tributyltin (as Sn) (e,f)	< 0.005 information
	tungsten (d)	1.3 information
	uranium (a,d,g)	3.4 ± 0.4 certified
	vanadium (b,c,d,e)	216 ± 8 certified
	ytterbium (g)	2 information
	yttrium (d,g)	20 information
	zinc (a,c,d,e)	147 ± 6 certified
	zirconium (d)	96 information

Waters

Code	Product	Unit
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PACS-3 Marine Sediment Certified Reference Material for total and extractable metal content 50 g

Element/ Substance	Mass fraction, mg/kg	Type
aluminium (c,d)	65800 ± 1200	certified
antimony (a,c)	14.7 ± 2.2	certified
arsenic (b,c)	30.3 ± 2.4	certified
beryllium (b)	1.06 ± 0.12	certified
cadmium (a)	2.23 ± 0.16	certified
calcium (c,d)	18900 ± 1200	certified
chromium (a,c)	90.6 ± 4.0	certified
cobalt (b)	12.1	information
copper (a,c)	326 ± 10	certified
iron (c,d)	41 060 ± 640	certified
lead (a,c)	188.0 ± 7.4	certified
lithium (a,c)	31.9 ± 4.2	certified
magnesium (c,d)	14020 ± 580	certified
manganese (b,c)	432 ± 16	certified
mercury (a)	2.98 ± 0.36	certified
molybdenum (a)	5.9	information
nickel (a,c)	39.5 ± 2.2	certified
phosphorus (c,d)	937 ± 44	certified
potassium (c,d)	12530 ± 400	certified
silicon (d)	261000 ± 34000	certified
silver (a)	1.10 ± 0.08	reference
sodium (c)	35 200 ± 3400	certified
strontium (a,c)	267 ± 10	certified
sulfur (d)	11 700 ± 4400	certified
tin (a,c)	22.0 ± 2.2	certified
titanium (c,d)	4420 ± 180	certified
uranium (a)	2.6	information
vanadium (b,c)	129 ± 8	certified
zinc (a,c)	376 ± 12	certified
monobutyltin (as Sn) (e,f)	1.47 ± 0.22	certified
dibutyltin (as Sn) (e,f)	0.631 ± 0.038	certified
tributyltin (as Sn) (e,f)	0.43 ± 0.06	certified

MOOS-3 Seawater certified reference material for nutrients 100 mL

Nutrient	Form	Molar concentration, μmol/L	Mass concentration, mg/L	Mass fraction, mg/kg
phosphate (a,b)	P	1.60 ± 0.15	0.050 ± 0.005	0.048 ± 0.004
	PO ₄ ³⁻	1.60 ± 0.15	0.152 ± 0.014	0.147 ± 0.013
silicate (a,c,d)	Si	30.4 ± 0.7	0.85 ± 0.02	0.83 ± 0.02
	SiO ₂	30.4 ± 0.7	1.83 ± 0.04	1.77 ± 0.04
nitrite (e)	N	3.54 ± 0.05	0.0496 ± 0.0007	0.0481 ± 0.0007
	NO ₂ ⁻	3.54 ± 0.05	0.1630 ± 0.0024	0.1581 ± 0.0023
nitrate (e)	N	23.0 ± 0.2	0.322 ± 0.003	0.313 ± 0.003
	NO ₃ ⁻	23.0 ± 0.2	1.427 ± 0.015	1.384 ± 0.015
nitrite + nitrate (f)	N	26.6 ± 0.3	0.372 ± 0.004	0.361 ± 0.003

Waters

Code	Product	Unit
SALT-1	Sea Salt Certified Reference Material for Nutrients in Seawater	4.1 g
Analyte	Amount concentration (in the 100 mL solution) µmol/L	Mass concentration (in the 100 mL solution) mg/L
phosphate, PO ₄ ³⁻ (a)	1.615 ± 0.030	0.1534 ± 0.0029
silicate, as SiO ₂ (a)	8.89 ± 0.31	0.534 ± 0.019
nitrate, NO ₃ ⁻ (b)	18.98 ± 0.45	1.177 ± 0.028
MESS-4	Marine Sediment Certified Reference Material for total and extractable metal content	50 g
Analyte	Mass fraction, mg/kg	Type of value
aluminium (c,d,e,h)	79100 ± 2000	certified
antimony (a,d,g)	1.07 ± 0.16	certified
arsenic (b,e,d,g)	21.7 ± 2.8	certified
barium (d,g)	920	information
beryllium (b,c,d)	2.09 ± 0.28	certified
bismuth (d)	2.7	information
bromine (g)	60	information
caesium (d,g)	10	information
cadmium (a,d)	0.28 ± 0.04	certified
calcium (c,d,e,h)	13100 ± 600	certified
carbon (i)	17900	information
cerium (d,g)	72	information
chlorine (g,h)	13100 ± 4400	certified
chromium (a,d,e,g)	94.3 ± 1.8	certified
cobalt (b,d,g)	13.0 ± 0.8	certified
copper (a,c,d,e)	32.9 ± 1.8	certified
dibutyltin (as Sn) (e,f)	< 0.005	information
europium (g)	1.3	information
gallium (d)	18	information
germanium (d)	0.16	information
hafnium (d,g)	3.0	information
indium (d)	0.10	information
HISS-1	Marine Sediment Certified Reference Material for total and extractable metal content	100 g
Analyte	Mass fraction, mg/kg	Type
aluminium (f,i,x)	7300 ± 500	certified
antimony (n,q)	0.13	information
arsenic (b,h,n)	0.801 ± 0.099	certified
beryllium (b, g)	0.129 ± 0.023	certified
cadmium (g,q)	0.024 ± 0.009	certified
calcium (f,i,n,x)	11400 ± 1000	certified
chlorine (n)	3500	information
chromium (n,q,x)	30.0 ± 6.8†	certified
cobalt (b,g,n)	0.65	information
copper (g,i,q)	2.29 ± 0.37	certified
iron (g,i,n,x)	2460 ± 90	certified

Waters

Code	Product	Unit
	lead (g,i,q)	3.13 ± 0.40 certified
	lithium (b,g,q)	2.83 ± 0.54 certified
	magnesium (f,i,x)	750 ± 160 certified
	manganese (b,g,i,n)	66.1 ± 4.2 certified
	mercury (a)	0.01 information
	molybdenum (q)	0.13 information
	nickel (g,q,x)	2.16 ± 0.29 certified
	potassium (i,n,x)	3320 ± 130 certified

SLEW-3

Estuarine Water Reference Material for Trace Metals

470 mL

Certified Values µg/kg

Arsenic	1.34
Cadmium	0.047
Chromium	0.181
Cobalt	0.040
Copper	1.53
Iron	0.561

Certified Values µg/kg

Lead	0.009
Manganese	1.59
Molybdenum	5.1*
Nickel	1.21
Uranium	4.32
Vanadium	2.54
Zinc	0.198

