

Table 1. Certified Values, Expanded Uncertainties, and Coverage Factors for Trace Elements in SRM 1643e

Element	Mass Fraction ( $\mu\text{g}/\text{kg}$ )			Mass Concentration ( $\mu\text{g}/\text{L}$ )			<i>k</i>
Aluminum	138.33	$\pm$	8.4	141.8	$\pm$	8.6	3.2
Antimony	56.88	$\pm$	0.60	58.30	$\pm$	0.61	2.0
Arsenic	58.98	$\pm$	0.70	60.45	$\pm$	0.72	2.0
Barium	531.0	$\pm$	5.6	544.2	$\pm$	5.8	2.0
Beryllium	13.64	$\pm$	0.16	13.98	$\pm$	0.17	2.0
Bismuth	13.75	$\pm$	0.15	14.09	$\pm$	0.15	2.0
Boron	154.0	$\pm$	3.8	157.9	$\pm$	3.9	2.4
Cadmium	6.408	$\pm$	0.071	6.568	$\pm$	0.073	2.0
Calcium	31 500	$\pm$	1 100	32 300	$\pm$	1 100	2.8
Chromium	19.90	$\pm$	0.23	20.40	$\pm$	0.24	2.0
Cobalt	26.40	$\pm$	0.32	27.06	$\pm$	0.32	2.0
Copper	22.20	$\pm$	0.31	22.76	$\pm$	0.31	2.1
Iron	95.7	$\pm$	1.4	98.1	$\pm$	1.4	2.0
Lead	19.15	$\pm$	0.20	19.63	$\pm$	0.21	2.0
Lithium	17.0	$\pm$	1.7	17.4	$\pm$	1.7	3.2
Magnesium	7 841	$\pm$	96	8 037	$\pm$	98	2.0
Manganese	38.02	$\pm$	0.44	38.97	$\pm$	0.45	2.0
Molybdenum	118.5	$\pm$	1.3	121.4	$\pm$	1.3	2.0
Nickel	60.89	$\pm$	0.67	62.41	$\pm$	0.69	2.0
Potassium	1 984	$\pm$	29	2 034	$\pm$	29	2.1
Rubidium	13.80	$\pm$	0.17	14.14	$\pm$	0.18	2.0
Selenium	11.68	$\pm$	0.13	11.97	$\pm$	0.14	2.0
Silver	1.036	$\pm$	0.073	1.062	$\pm$	0.075	3.2
Sodium	20 230	$\pm$	250	20 740	$\pm$	260	2.0
Strontium	315.2	$\pm$	3.5	323.1	$\pm$	3.6	2.0
Tellurium	1.07	$\pm$	0.11	1.09	$\pm$	0.11	3.2
Thallium	7.263	$\pm$	0.094	7.445	$\pm$	0.096	2.0
Vanadium	36.93	$\pm$	0.57	37.86	$\pm$	0.59	2.1
Zinc	76.5	$\pm$	2.1	78.5	$\pm$	2.2	2.6

**Preparation of Material:** SRM 1643e was prepared at NIST using only high purity reagents. The containers were acid cleaned before use. In the preparation, a polyethylene cylindrical tank was filled with deionized water and sufficient nitric acid to make the solution approximately 0.8 mol/L. Known masses of the matrix elements (sodium, potassium, calcium, and magnesium) were added to the tank solution as solutions prepared from the same primary materials used to prepare the SRM 3100 Series of Single Element Solutions. Known masses of the other elements were then added to the tank solution using weighed aliquots of the SRM 3100 Series. The final total mass of the tank solution was determined, allowing calculation of the gravimetrically prepared mass fraction for each element. Mass concentrations were calculated using the measured density of 1.025 g/mL. After mixing thoroughly, the solution was transferred to clean 250-milliliter polyethylene bottles.

#### INSTRUCTIONS FOR USE

**Precautions:** The SRM should be shaken before use because of possible water condensation. To prevent possible contamination of the SRM, **DO NOT** insert pipettes into the bottle. Samples should be decanted at a room temperature of 17 °C to 27 °C. After use, the bottle should be recapped tightly and returned to the aluminized plastic bag, which should be folded and sealed with sealing tape. This safeguard will protect the SRM from possible environmental contamination and long-term evaporation.

The accuracy of trace element determinations, especially at the  $\mu\text{g}/\text{L}$  level, is limited by contamination. Apparatus should be scrupulously cleaned and only high purity reagents employed. Sampling and manipulations, such as evaporations, should be done in a clean environment, such as a Class-100 clean hood.