GE IMS14B: The Determination of 36 Elements by Aqua Regia and ICP-MS.

1. Parameter(s) measured, unit(s):

Silver (Ag); Aluminum (Al); Arsenic (As); Barium (Ba); Bismuth (Bi); Calcium (Ca); Cadmium (Cd); Cerium (Ce); Chromium (Cr); Cobalt (Co); Copper (Cu); Iron (Fe); Gallium (Ga); Mercury (Hg); Potassium (K); Lanthanum (La); Magnesium (Mg); Manganese (Mn); Molybdenum (Mo); Sodium (Na); Nickel (Ni); Phosphorus (P); Lead (Pb); Rubidium (Rb); Antimony (Sb); Scandium (Sc); Tin (Sn); Strontium (Sr); Thallium (Tl);Thorium (Th); Titanium (Ti); Uranium (U); Vanadium (V); Tungsten (W); Yttrium (Y); Zinc (Zn) : ppm and %

2. Typical sample size:

0.25 g

3. Type of sample applicable (media):

Crushed and Pulverized rocks, soils and sediments

4. Sample preparation technique used:

Crushed and pulverized rock, soil and /or sediment samples are digested by Aqua Regia, 3:1 HCl: HNO_3.

5. Method of analysis used:

The digested sample solution is analyzed by inductively coupled plasma Mass Spectrometer (ICP-MS). Samples are analyzed against known calibration materials to provide quantitative analysis of the original sample.

6. Data reduction by:

The results are exported via computer, on line, data fed to the SGS Laboratory Information Management System (SLIM) with secure audit trail

7. Figures of Merit:

Element	Reporting Limit (ppm)	Upper Limit	Element	Reporting(ppm)	Upper Limit	Element	Reporting (ppm)	Upper Limit	Element	Reporting (ppm)	Upper Limit
Ag	0.01	10 ppm	Cu	0.5	1%	Ni	0.5	1%	Tl	0.02	1%
Al	0.01 (%)	10%	Fe	0.01 (%)	15%	P	50	1%	U	0.05	1%
As	1	1%	Ga	0.1	1%	Pb	0.2	1%	V	1	1%
Ba	5	1%	Hg	0.01	100 ppm	Rb	0.2	1%	W	0.1	1%
Bi	0.02	1%	K	0.01 (%)	10%	Sb	0.05	1%	Y	0.05	1%
Ca	0.01 (%)	15%	La	0.1	1%	Sc	0.1	1%	Zn	1	1%
Cd	0.01	1%	Mg	0.01 (%)	15%	Sn	0.3	0.1%			
Ce	0.05	0.1%	Mn	2	1%	Sr	0.5	1%			
Cr	1	1%	Mo	0.05	1%	Th	0.1	1%			
Co	0.10	1%	Na	0.01 (%)	10%	Ti	0.01 (%)	10%			

8. Quality control:

Instrument calibration is performed for each batch or work order and calibration checks are analyzed within each analytical run. Quality control materials include method blanks, replicates, duplicates and reference materials and are randomly inserted with the frequency set according to method protocols at ~14%.

Quality assurance measures of precision and accuracy are verified statistically using SLIM control charts with set criteria for data acceptance. Data that fails is subject to investigation and repeated as necessary.

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