

Client: A&S Research Inc
Job Number: 110609

Trace Impurities by SOP 7040, Rev 9
Inductively Coupled Plasma - Mass Spectrometry

Sample ID: SN Chunk 080911

	Detection			Detection	
	<u>ppm</u>	<u>Limit</u>		<u>ppm</u>	<u>Limit</u>
Aluminum	260	30	Molybdenum	9.3	0.05
Antimony	0.37	0.2	Neodymium	0.39	0.02
Arsenic	17	0.4	Nickel	52000	0.1
Barium	96	0.1	Niobium	0.37	0.1
Beryllium	ND	0.05	Osmium	2.2	0.09
Bismuth	ND	0.03	Palladium	3.3	0.02
Boron	15	3	Phosphorus	1600	10
Bromine	ND	5	Platinum	10	0.02
Cadmium	ND	0.09	Potassium	ND	50
Calcium	1500	30	Praseodymium	0.11	0.02
Cerium	0.85	0.03	Rhenium	0.66	0.02
Cesium	ND	0.02	Rhodium	2.8	0.02
Chromium	13	0.2	Rubidium	0.15	0.02
Cobalt	2200	0.09	Ruthenium	8.0	0.02
Copper	170	0.3	Samarium	0.13	0.02
Dysprosium	0.11	0.02	Selenium	2.5	1
Erbium	0.07	0.02	Silicon	2700	50
Europium	0.03	0.02	Silver	ND	0.02
Gadolinium	0.13	0.02	Sodium	230	10
Gallium	130	0.02	Strontium	10	0.2
Germanium	300	0.1	Tantalum	ND	0.07
Gold	0.90	0.09	Tellurium	ND	0.1
Hafnium	0.10	0.02	Thallium	ND	0.2
Holmium	ND	0.02	Thorium	0.23	0.02
Iodine	ND	0.9	Thulium	ND	0.02
Iridium	3.6	0.05	Tin	6.5	0.1
Iron	460000	4	Titanium	20	0.3
Lanthanum	ND	1	Tungsten	1.9	0.07
Lead	1.3	0.1	Uranium	0.21	0.02
Lithium	ND	1	Vanadium	21	1
Lutetium	ND	0.5	Ytterbium	0.05	0.02
Magnesium	890	5	Yttrium	0.88	0.4
Manganese	62	0.1	Zinc	44	2
Mercury	ND	0.1	Zirconium	4.4	0.3

Note: the entire sample (0.0058 g) was mixed with 0.5 mL nitric acid and 0.5 mL hydrochloric acid and heated on a hotblock set at 110°C for 1 hour. The mixture was cooled, 0.5 mL 30% hydrogen peroxide added, and heated 30 min. A portion remained undissolved; therefore, silicon or other elements that have low solubility in this acid mixture may be biased low. The solution was mixed with internal standards, diluted to 10 g, and a 1:100 dilution also analyzed by ICPMS.

Date Analyzed: 11-26-08

Elements Not Analyzed: All Gases, C, S, Sc, In, Tb

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Quality Control Summary

Sample: Laboratory Fortified Blank

Parts Per Million (µg/g)

<u>Analyte</u>	<u>Blank Result</u>	<u>Spike Conc</u>	<u>Spike Result</u>	<u>Spike % Rec</u>
Aluminum	28	172	198	99
Antimony	ND	172	152	88
Arsenic	ND	172	142	83
Barium	ND	172	168	98
Beryllium	ND	172	155	90
Boron	2.4	172	155	89
Cadmium	ND	172	155	90
Calcium	ND	17200	17300	101
Chromium	ND	172	169	98
Cobalt	ND	172	168	98
Copper	ND	172	163	95
Iron	ND	17200	17100	99
Lead	ND	172	164	95
Lithium	ND	172	171	99
Magnesium	ND	17200	17200	100
Manganese	ND	172	170	99
Mercury	0.06	17.2	15.9	92
Molybdenum	ND	172	173	101
Nickel	ND	172	172	100
Phosphorus	ND	17200	14900	87
Potassium	ND	17200	17200	100
Selenium	ND	1720	1270	74
Silicon	ND	17200	15300	89
Silver	ND	172	167	97
Sodium	ND	17200	17200	100
Strontium	ND	172	177	103
Thallium	ND	172	164	95
Titanium	ND	172	170	99
Vanadium	ND	172	168	98
Zinc	2	172	143	82

Date Analyzed: 11-26-08