

EnviroMAT - SS-1 Contaminated Soil

SUMMARY

The application note summarizes the digestion of SS-1, a contaminated soil matrix reference material using ColdBlock™ Digestion Pro Series Technology.

Instrument: ColdBlock CBM (with quartz test tubes), chiller, ICP-MS & ICP-OES

Published: July 2024

Digestion Time: 30 Minutes

Acid Used: HNO₃ & HCl

Average ColdBlock Recovery vs. CRM:

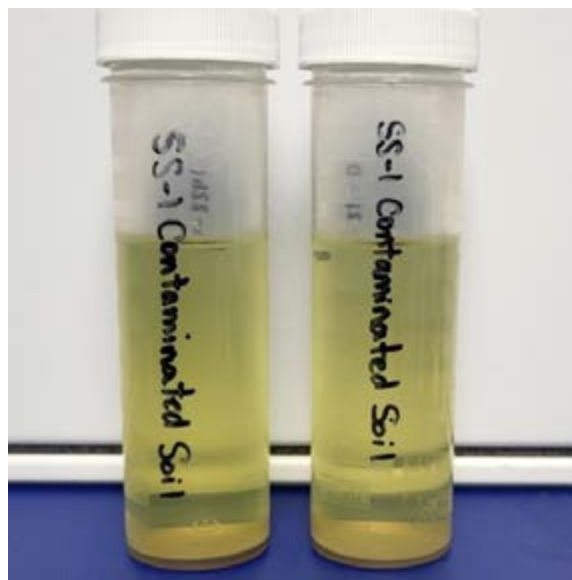
- 97% Boron
- 102% Mercury
- 102% Molybdenum

METHODOLOGY

1. Chiller temperature was set to -5°C
2. 0.5g of each sample was weighed and placed into a quartz ColdBlock™ Digestion vessel
3. 10 mL of HNO₃ was added
4. Sample was digested at 70% power for 20 minutes
5. 10mL of HCl was added and samples were digested again at 70% for 10 minutes
6. Samples were cooled and bulked to 40mL using 2% HNO₃_{v/v}

DISCUSSION

- Samples were filtered prior to analysis by ICP-MS & OES
- EnviroMAT SS-1 is a type B naturally contaminated soil. It is not spiked or fortified



SS-1 after digestion and bulk up to 40mL

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Results

Table 1 - Results of HNO₃ & HCl digestion - SS-1 Contaminated Soil

Method:	0.5g	10mL HNO ₃ 70% power for 20 minutes, then add 10mL HCl and digest again at 70% power for 10 minutes							
Element	Consensus Value (ppm)	+/-	Sample A	Sample B	Sample C	Average (ppm)	Stdev	RSD	Recovery
Ag	0.88	0.88	0.95	0.91	0.89	0.9	0.02	2.7%	104%
Al	12163	410	12779	12623	11859	12420	402	3.2%	102%
As	20.7	1.0	22.06	21.79	21.52	21.79	0.22	1.0%	105%
B	26.9	8.4	29.2	25.1	23.7	26	2.3	9.0%	97%
Ba	464	16	476	473	462	471	5.9	1.3%	101%
Be	0.48	0.05	0.46	0.47	0.5	0.477	0.017	3.6%	99%
Ca	50265	1213	49461	49546	48744	49250	359.7	0.7%	98%
Cd	3.2	0.2	3.2	3.3	3.2	3.2	0.05	1.5%	101%
Co	12.9	0.4	13.0	12.3	13.2	12.8	0.4	3.1%	99%
Cr	103	5	108	106	106	106.7	1.1	1.0%	104%
Cu	403	10	406	425	398	409	11.3	2.8%	102%
Fe	72000	2273	71986	73914	70996	72299	1212	1.7%	100%
Hg	0.41	0.02	0.40	0.45	0.41	0.42	0.02	5.1%	102%
K	2232	150	2288	2193	2199	2227	43.4	2.0%	100%
Li	14.3	1.4	14.2	14.3	13.6	14.0	0.3	2.2%	98%
Mg	9690	230	9867	10088	9683	9879	166	1.7%	102%
Mn	737	19	758	747	734	746	9.8	1.3%	101%
Mo	6.8	0.3	6.7	6.7	7.4	6.92	0.3	4.5%	102%
Na	650	64	739	742	736	739	2.4	0.3%	114%
Ni	59.2	1.3	62.6	63.6	63.7	63.3	0.5	0.8%	107%
P	1552	34	1621	1614	1643	1626	12.4	0.8%	105%
Pb	764	15	780	762	775	772.5	7.8	1.0%	101%
S	1916	140	1927	1914	1913	1918	6.4	0.3%	100%
Sb	5.5	1.1	5.60	5.2	6.0	5.6	0.3	5.8%	102%
Se	0.78	0.14	0.82	0.86	0.78	0.82	0.03	4.0%	105%
Sn	340	17	353.00	366	367	362.00	6.4	1.8%	106%
Sr	114	1	114	112	114	113.4	0.7	0.6%	99%
Ti	530	57	533	530	531	531.33	1.2	0.2%	100%
U	0.78	0.03	0.79	0.77	0.75	0.77	0.02	2.1%	99%
V	27.2	1.4	28.97	28.93	27.97	28.62	0.5	1.6%	105%
Zn	1114	37	1062	1057	1124	1081	30.4	2.8%	97%