ColdBlock™ Technologies Inc.

APPLICATION NOTE

Zinc Concentrate, AMIS 0620

SUMMARY

The application note summarizes the digestion of AMIS 0620, a zinc concentrate certified reference material using ColdBlock™ Digestion Pro Series Technology.

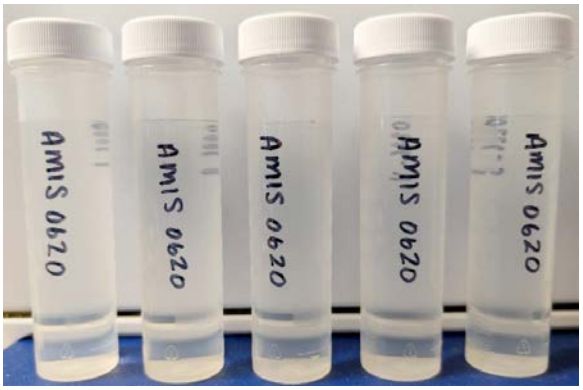
Instrument:	ColdBlock CBM Pro-Series sample digester, chiller, HF liners, ICP-OES
Published:	March 2025
Digestion Time:	30 Minutes
Acid Used:	HNO_3, HCl, HF, & H_3BO_3
Average ColdBlock Recovery vs. CRM:	■ 103% arsenic ■ 97% iron ■ 97% zinc

METHODOLOGY

1. Chiller temperature was set to -5°C
2. 0.25g of each sample was weighed and placed into a ColdBlock™ Digestion vessel
3. 20mL of reverse aqua regia + 3mL HF was added
4. Samples were digested at 80% power for 20 minutes
5. 20mL of 4% boric acid $_{v/v}$ was added
6. Samples were digested again at 80% power for 10 minutes
7. Samples were cooled and bulked to 50mL using 2% HNO_3

DISCUSSION

- The addition of Boric acid will help re-solubilize any insoluble fluorides and will help neutralize any remaining HF in solution
- After digestion, the samples were clear, and no visible sample material remained



AMIS 0620 after bulk-up to 50mL

The material for AMIS 0620 was provided by Black Mountain Mining and is a zinc concentrate made from Black Mountain broken hill type ore from the Northern Cape Province in South Africa. www.Amis.co.za

AMIS 0620; Zinc Concentrate, Black Mountain, Northern Cape, South Africa; AMIS, Matrix Reference Materials; Gauteng, South Africa (May 2019)

Results

AMIS 0620, Zinc Concentrate						
Method:	0.25g – Add 20mL reverse aqua regia (1:3, HCl: HNO3) + 3mL HF and digest at 80% power for 20 minutes. Add 20mL of 4% boric acid $_{v/v}$ and digest again at 80% power for 10 minutes. Let cool, and bulk to a final volume of 50mL with 2% HNO_3					
Element	AMIS Certified 4-Acid Value (mg/kg)	AMIS +/-	ColdBlock Average (mg/kg) n=5	ColdBlock Stdev	ColdBlock % RSD	ColdBlock % Recovery
Arsenic	64	15	66	3	4.3%	103%
Barium	192	32	197	2	1.1%	103%
Bismuth	205	11	193	2	1.2%	94%
Cadmium	1443	73	1430	14	0.9%	99%
Calcium	2944	213	2648	29	1.1%	90%
Chromium	104	30	100	3	3.2%	96%
Cobalt	1137	69	1205	10	0.8%	106%
Copper	9708	1349	9553	192	2.0%	98%
Iron	106900	2800	103993	954	0.9%	97%
Lead	36700	3900	36766	399	1.1%	100%
Magnesium	1610	125	1548	17	1.1%	96%
Manganese	12700	1000	12392	122	1.0%	98%
Nickel	83	5	95	2	1.7%	115%
Silver	52	5	49	2	4.4%	95%
Strontium	5	1	5	0.04	0.9%	101%
Sulfur*	298800	18000	266125	10977	4.1%	90%
Titanium	202	9	188	3	1.5%	93%
Zinc**	470400	1700	456702	4505	1.0%	97%

*Sulfur certified by combustion/leco

**Zinc certified by titration

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