ColdBlock™ Technologies Inc.

APPLICATION NOTE

Nickel Sulfide Ore, OREAS 77a

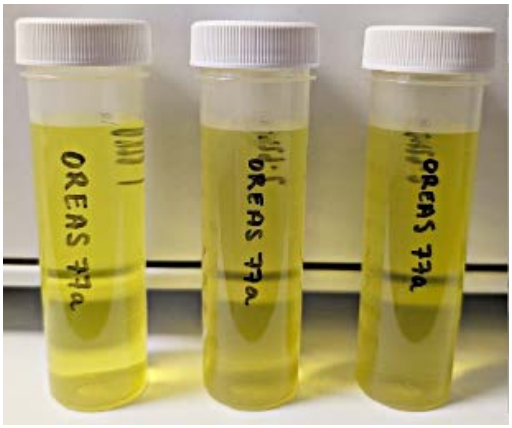
SUMMARY

The application note summarizes the digestion of OREAS 77a a nickel sulfide ore certified reference material using ColdBlock™ Digestion Pro Series Technology.

Instrument:	ColdBlock CBM Pro Series, chiller, ICP-OES
Published:	June 2025
Digestion Time:	35 Minutes
Acid Used:	HNO_3, HCl, HF & H_3BO_3
Average ColdBlock Recovery vs. CRM:	■ 104% arsenic ■ 98% nickel ■ 105% sulfur

METHODOLOGY

1. Set the chiller temperature to -5°C.
2. Weigh 0.25 g of each sample and transfer into a ColdBlock™ Digestion vessel
3. Add 20 mL of reverse aqua regia (add HNO_3 first, followed by HCl) and 3 mL of HF to each vessel.
4. Digest samples at 80% power for 20 minutes.
5. Add 20 mL of 4% boric acid ($_{w/v}$) to each sample.
6. Digest samples again at 80% power for 10 minutes.
7. Add 5 mL of HCl.
8. Digest at 100% power for 5 minutes.
9. Cool the samples and adjust the volume to 50 mL with DI water



OREAS 77a is prepared from high grade massive nickel sulfide ore and barren ultramafic material from the Cosmos Nickel Mine in the Kathleen Valley of Western Australia.

OREAS 77a; Nickel Sulfide Ore; OREAS, Ore Research & Exploration Pty Ltd; Victoria, Australia (November 2006)

DISCUSSION

- The addition of boric acid aids in the re-solubilization of insoluble fluorides and neutralizes residual hydrofluoric acid (HF). This step is crucial for sample dissolution and minimizing analyte loss during digestion.
- Following the digestion process, the samples were yellow and visibly clear, indicating that the majority sample matrix had dissolved. A trace amount of sample material settled on the bottom of the tube overnight.

Results

Nickel Sulfide Ore, OREAS 77a					
Method:	0.25g - Add 20mL reverse aqua regia + 3mL HF and digest at 80% power for 20 minutes. Add 20mL of 4% boric acid $_{w/v}$ and digest again at 80% power for 10 minutes. Add 5mL HCl, and digest again for 5 minutes. Let cool, and adjust the volume to 50mL with DI water				
Element	OREAS 77a Certified Values	ColdBlock Average	ColdBlock StDev +/-	ColdBlock RSD	ColdBlock Recovery vs Certified Value
Al (%)	0.767	0.730	0.001	0.2%	95%
As (ppm)	154	160	2.06	1.3%	104%
Co (ppm)	1714	1688	0.19	0.01%	99%
Cr (ppm)	709	733	5.54	0.8%	103%
Cu (ppm)	4311	4238	16.05	0.4%	98%
Fe (%)	34.3	32.5	0.22	0.7%	95%
Mg (%)	4.37	4.22	0.02	0.4%	97%
Ni (%)	10.59	10.41	0.07	0.7%	98%
S (%)	24.4	25.6	0.15	0.6%	105%

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