

APPLICATION NOTE

Nickel Sulphide Ore – OREAS 74b

SUMMARY

The application note summarizes the digestion of OREAS 74b, a nickel sulphide ore, 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:

- 95% arsenic
- 96% cobalt
- 101% nickel

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 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 25 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

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 visibly clear, indicating that the majority sample matrix had dissolved. A trace amount of sample material settled on the bottom of the tube overnight.



Reference material OREAS 74b is one of a suite of seven nickel sulphide CRMs prepared from high grade massive nickel sulphide ore and barren ultramafic material sourced from Xstrata Nickel's Prospero and Tapinos Nickel mines, located in Western Australia within the Agnew-Wiluna portion of the Norseman-Wiluna greenstone belt.

OREAS 74b; Nickel Sulphide Ore; OREAS, Ore Research & Exploration Pty; Victoria, Australia (October 2011) Certificate of Analysis. Retrieved from www.oreas.com/

Results

Nickel Sulphide Ore - OREAS 74b

Method:	0.25g - Add 20mL aqua regia + 3mL HF and digest at 80% power for 20 minutes. Add 25mL 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 Certified 4-Acid Values	ColdBlock Average	ColdBlock SD +/-	ColdBlock RSD	ColdBlock Recovery vs Certified Value
Ag (ppm)	0.568	<1	N/A	N/A	N/A
Al (%)	3.58	3.63	0.05	1.4%	101%
As (ppm)	603	584	14.4	2.5%	97%
Ba (ppm)	213	222	2.04	0.9%	104%
Bi (ppm)	1.35	<5	N/A	N/A	N/A
Ca (%)	3.07	3.26	0.03	0.9%	106%
Cd (ppm)	0.60	<1	N/A	N/A	N/A
Co (ppm)	490	488	4.77	1.0%	100%
Cu (ppm)	998	1046	12.05	1.2%	105%
Fe (%)	12.32	12.74	0.21	1.6%	103%
K (%)	0.729	0.740	0.01	1.4%	102%
Li (ppm)	27.7	27.9	0.3	1.1%	101%
Mg (%)	9.31	9.59	0.18	1.9%	103%
Mn (%)	0.091	0.09	0.001	1.1%	99%
Na (%)	0.719	0.720	0.02	2.8%	100%
Ni (%)	3.38	3.40	0.03	0.9%	101%
P (%)	0.0191	<0.02	N/A	N/A	N/A
Pb (ppm)	24.9	25.5	1.50	5.9%	102%
S (%)	6.57	6.58	0.08	1.2%	100%
Sb (ppm)	2.69	<5	N/A	N/A	N/A
Sr (ppm)	56.1	58.1	0.63	1.1%	104%
V (ppm)	60.7	63.2	0.71	1.1%	104%
Zn (ppm)	136	132	1.65	1.3%	97%
Zr (ppm)	65	64	0.71	1.1%	98%