ColdBlock™ Technologies Inc.

APPLICATION NOTE

OREAS-354 Zinc Concentrate

SUMMARY

This application note is for the digestion of OREAS-354, a Zinc Concentrate.

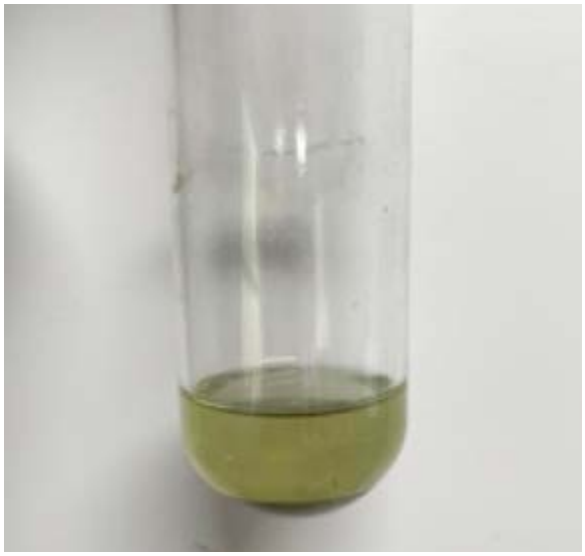
Instrument:	ColdBlock CB15S sample digester technology, chiller, ICP-OES
Published:	August 2022
Digestion Time:	20 Minutes
Acid Used:	Reverse Aqua Regia
Average ColdBlock Recovery vs. CRM:	■ 100% Zinc ■ 103% Lead ■ 99% Sulfur

METHODOLOGY

1. Chiller temperature was set to -5°C
2. 0.25g of OREAS-354 was weighed and placed into a ColdBlock digestion vessel
3. 20mL of Reverse Aqua Regia was added (HNO_3 is added first, followed by the HCl)
4. Sample was digested at 80% power for 20 minutes
5. Sample was cooled and bulked to 50mL using 2% $HNO_{3\ v/v}$

DISCUSSION

- Upon addition of HNO_3, the evolution of reddish brown ($N0_2$) fumes occurred
- After 20 minutes, the samples are green in color and the digested solution appears slightly opaque
- After bulking up, a minor amount of material settled on the bottom of the tube
- Hydrofluoric Acid can be added for a near total digestion to improve the recoveries of certain elements
- Boric acid can also be added to re-solubilize any insoluble fluorides and help neutralize any remaining HF.
- For improved silver recoveries bulk up using a solution of >20% $HCl_{\ v/v}$



OREAS 354 after 20-minute digestion

OREAS 354 is a certified reference material (CRM) sourced from zinc sulphide concentrate samples taken from the Dugald River metallurgical plant. The Dugald River deposit is located in the Mt Isa Inlier, ~65km north-west of Cloncurry in north-west Queensland, Australia.

OREAS-354
Zinc Concentrate

Results

Table: Results of Reverse Aqua Regia Digestion						
Elements	Expected Value	ColdBlock Value 1	ColdBlock Value 2	Average ColdBlock Values	% RSD	% Recovery
Zn wt. %	49.3	49.0	49.7	**49.4**	0.7%	**100%**
Pb wt. %	1.58	1.61	1.63	**1.62**	0.6%	**103%**
S wt. %	26.63	26.03	26.67	**26.35**	1.2%	**99%**
Cd ppm	1157	1116	1139	**1127.5**	1.0%	**97%**
Cu ppm	1387	1242	1278	**1260**	1.4%	**91%**
Fe wt. %	9.82	9.41	9.49	**9.45**	0.4%	**96%**
Mg ppm	540	488	516	**502.0**	2.8%	**93%**
Mn wt. %	1.54	1.48	1.49	**1.485**	0.3%	**96%**
Ag ppm	98	89	87	**88**	1.1%	**90%**

ColdBlock™ Technologies Inc.

info@coldblock.ca
coldblock.ca/contact-us