

# Zinc Concentrate, CZn-4

## SUMMARY

The application note summarizes the digestion of CZn-4, a zinc concentrate certified reference material using ColdBlock Digestion Pro Series Technology.

**Instrument:** ColdBlock CBM Pro-Series, chiller, HF liners, ICP-OES

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**Digestion Time:** 30 Minutes

**Acid Used:**  $\text{HNO}_3$ ,  $\text{HCl}$ ,  $\text{HF}$  &  $\text{H}_3\text{BO}_3$

**Average ColdBlock Recovery vs. CRM:**

- 102% lead
- 96% silver
- 101% zinc

## METHODOLOGY

1. Set the chiller temperature to  $-5^\circ\text{C}$ .
2. Weigh 0.25 g of each sample and transfer into a ColdBlock Digestion vessel with liner
3. Add 20 mL of aqua regia (add  $\text{HNO}_3$  first, followed by  $\text{HCl}$ ) and 3 mL of  $\text{HF}$  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. Cool the samples and adjust the volume to 50 mL with DI water

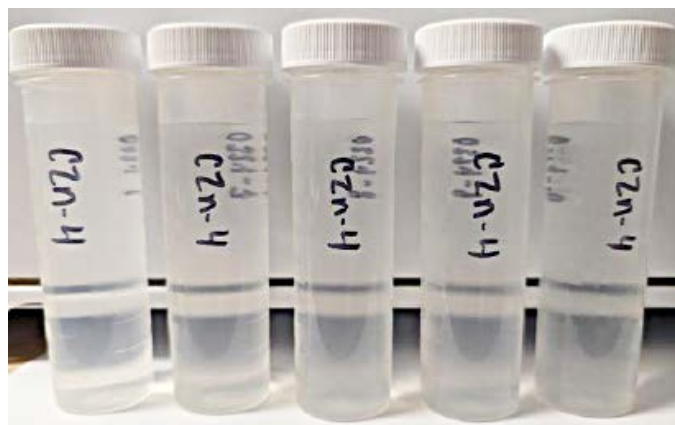


Figure 1- CZn-4 after bulking-up to 50mL

## DISCUSSION

- The addition of boric acid aids in the re-solubilization of insoluble fluorides and neutralizes residual hydrofluoric acid ( $\text{HF}$ ). 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 sample matrix had dissolved. A trace amount of material settled on the bottom of the tube

## Results

CZn-4, Zinc Concentrate					
Method:	0.25g - Add 20mL aqua regia + 3mL HF and digest at 80% power for 20 minutes. Add 20mL of 4% boric acid <sub>w/v</sub> and digest again at 80% power for 10 minutes. Let cool, and adjust the volume to 50mL with DI water				
Element	CZn-4 Certified Values	ColdBlock Average n=5	ColdBlock Stdev +/-	ColdBlock RSD	ColdBlock Recovery vs Certified Value
Ag (µg/g)	51.4	49.1	1.5	3.1%	96%
Al (%)	0.0715	0.0740	0.0030	4.1%	103%
As (%)	0.0356	0.0342	0.0007	2.0%	96%
Cd (%)	0.2604	0.2713	0.004	1.3%	104%
Co (µg/g)	93.5	99.3	1.6	1.6%	106%
Cu (%)	0.403	0.4032	0.005	1.2%	100%
Pb (%)	0.1861	0.1898	0.0025	1.3%	102%
Fe (%)	9.02	9.03	0.08	0.9%	100%
S (%)	33.07	32.36	0.82	2.5%	98%
Se (µg/g)	86.7	83.8	4.7	5.6%	97%
Zn (%)	55.24	55.83	0.81	1.5%	101%

The material for CZn-4 was donated by Xstrata Copper Canada Division, Kidd Metallurgical Site in Timmins, Ontario Canada  
 CCRMP CanmetMINING NRCAN (2010). Certificate of Analysis for CZN-4, Zinc Concentrate <https://natural-resources.canada.ca/>