

# Manganese Ore, OREAS 171

## SUMMARY

The application note summarizes the digestion of OREAS 171, a 35 wt.% manganese ore 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<sub>3</sub>, HCl, HF, & H<sub>3</sub>BO<sub>3</sub>

**Average ColdBlock Recovery vs. CRM:**

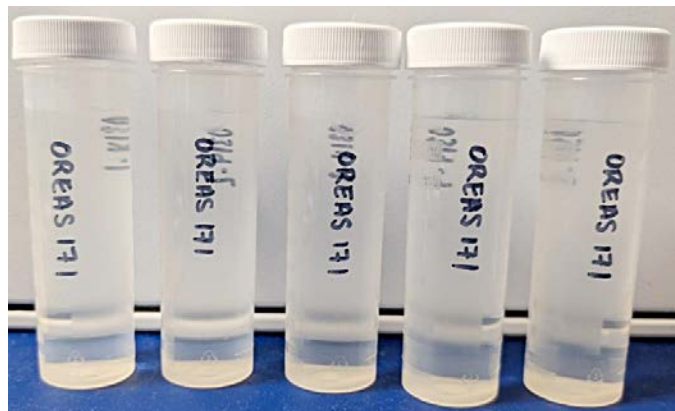
- 97% aluminum
- 99% iron
- 100% phosphorus

## 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 aqua regia + 3mL HF was added
4. Samples were digested at 80% power for 20 minutes
5. 20mL of 4% boric acid <sub>v/v</sub> was added
6. Samples were digested again at 80% power for 10 minutes
7. Samples were cooled and bulked to 50mL using 2% HNO<sub>3</sub>

## 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 mostly clear, and a minor amount of sample material remained



OREAS 171 after bulk-up to 50mL

The material for OREAS 171 was sourced from the Groote Eylandt Mining Company Pty Ltd (GEMCO) Mn deposit. Groote Eylandt is in the Gulf of Carpentaria off the coast of Australia's Northern Territory. [www.oreas.com](http://www.oreas.com)

OREAS 171; Manganese Ore; ORE Research & Exploration Pty Ltd; Bayswater North, Australia (Sep 2018)

## Results

OREAS 171, Manganese Ore					
Method:	0.25g - Add 20mL aqua regia (1:3, HNO <sub>3</sub> : HCl) + 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 <sub>3</sub>				
Element	AMIS Certified Borate Fusion XRF Values (mg/kg)	ColdBlock Average (mg/kg) n=5	ColdBlock Stdev	ColdBlock % RSD	ColdBlock % Recovery
Aluminum	38737	37657	1333	3.5%	97%
Arsenic*	47.1	44.5	2.9	3.1%	94%
Barium	2015	2031	23.0	1.1%	101%
Beryllium*	3.4	4.0	0.1	1.6%	103%
Calcium	579	585	8.5	1.4%	101%
Chromium	34.5	35.0	0.8	2.1%	102%
Cobalt	122	123	1.9	1.5%	101%
Copper	84	83	2.2	2.6%	99%
Iron	36600	36240	471	1.3%	99%
Magnesium	1309	1242	12.4	1.0%	95%
Manganese	351000	349278	3348	1.0%	100%
Nickel	72	76	2.2	3.0%	105%
Phosphorus	663	663	16.0	2.4%	100%
Potassium	17018	16871	573	3.4%	99%
Sodium	1751	1716	30.3	1.8%	98%
Strontium	244	244	3.5	1.4%	100%
Vanadium	233	240	2.9	1.2%	103%
Zinc	120	120	1.4	1.2%	100%

Certified results back calculated from oxide values.

\* Arsenic and Beryllium values are indicative values, by laser ablation ICP-MS