ColdBlock™ Technologies Inc

APPLICATION NOTE

IARM FCrP-20 – Ferrochrome Powder

SUMMARY

The application note summarizes the digestion of IARM FCrP-20, a Ferrochrome Powder Certified Reference Material using ColdBlock™ Digestion Pro Series Technology.

Instrument:	ColdBlock CBM sample digester, chiller, HF inserts, ICP-OES
Published:	March 2026
Digestion Time:	95.5 minutes
Acid Used:	H_2SO_4, HNO_3, HF
Average ColdBlock Recovery vs. CRM:	• 97% Cobalt • 100% Chromium • 102% Iron

METHODOLOGY

1. The chiller temperature was set to -5 °C.
2. Approximately 0.100 g of each sample was accurately weighed and transferred into a ColdBlock digestion vessel.
3. A reagent mixture of 20 mL 5 % H_2SO_4 $_{v/v}$ and 2 mL HF was added to each vessel.
4. Samples were digested at 100 % power for 5 minutes, followed by 50% power for 80 minutes.
5. An additional 5 mL HNO_3 was introduced to each vessel.
6. Samples were further digested at 40 % power for 10 minutes, followed by 100 % power for 30 seconds.
7. Digestates were allowed to cool, then quantitatively diluted to a final volume of 50mL using a solution of 2 % HNO_3 $_{v/v}$.

DISCUSSION

- An optional addition of boric acid (20mL of 4% $_{v/v}$ H_3BO_3) can be used to complex residual fluoride ions, which stabilizes the solution and enables safe analysis on sample introduction systems that are not equipped with inert HF kits.

RESULTS

IARM FCrP-20 - Ferrochrome Powder									
Element	Certified Value (wt.%)	+/-	Sample A	Sample B	Sample C	Average	Stdev	RSD	Recovery
Co	0.0360	0.0050	0.0351	0.0350	0.0350	0.0350	0.00007	0.2%	97%
Cr	68.8	0.6	69.5	69.7	68.1	69.1	0.7	1.0%	100%
Fe	20.6	0.4	21.6	20.8	20.8	21.1	0.3	1.6%	102%
Mg	0.1200	0.02	0.1092	0.1152	0.1101	0.1115	0.003	2.9%	93%
Mn	0.12	0.02	0.12	0.12	0.12	0.12	0.001	1.2%	98%
Ni	0.32	0.04	0.35	0.33	0.33	0.34	0.01	2.6%	106%
Si	0.33	0.03	0.33	0.36	0.33	0.34	0.01	3.6%	103%

IARM FCrP-20, Ferrochrome Powder; Analytical Reference Materials International; Manchester, NH 03103 (Oct 2020)

LGC Standards (ARMI MBH). (2020). IARM FCrP-20 Ferrochrome Powder Certified Reference Material, Certificate of Analysis. *United States.*