

APPLICATION NOTE

Inconel 718

SUMMARY

The application note summarizes the digestion of IARM 56H, an Inconel 718 Certified Reference Material by LGC ARMI, using ColdBlock™ Digestion Pro Series Technology.

Instrument: ColdBlock CBM sample digester, chiller, HF compatible liners, ICP-OES

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Digestion Time: 20 Minutes

Acid Used: Aqua Regia, HF

Average ColdBlock Recovery vs. CRM:

- 100% Chromium
- 101% Molybdenum
- 98% Niobium

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. 20 mL of Aqua Regia + 1mL HF was added
4. Sample was digested at 50% power for 20 minutes
5. Samples were cooled and bulked to 50mL using 2% HNO₃

DISCUSSION

- Inconel 718 is an austenitic Nickel Alloy that contains significant amounts of Cr, Mo & Nb. It is heat & corrosion resistant, often making it difficult to dissolve.
- After a 20-minute digestion, using ColdBlock Pro Series CBM, samples are clear and completely dissolved.
- Dropping the power to low (30-50%) will help dissolve heat resistant alloys
- Samples were analyzed by ICP-OES

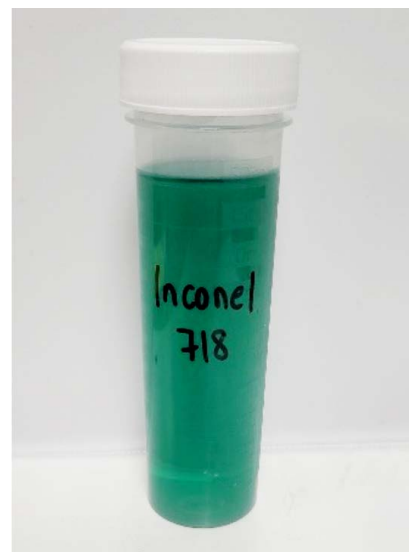


Figure 1 - Inconel 718 after bulk-up to 50mL

IARM 56H was sourced from LGC ARMI in chips form. IARM-56H; Inconel 718 Alloy; UNS N07718; LGC ARMI, Analytical Reference Materials International; Manchester, NH (January,2018)

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Results

Inconel 718										
Method:	0.25g	20mL Aqua Regia + 1mL HF, Digested at 80% power for 20 minutes								
Element	LGC ARMI Certified Value wt. %	Reference Value Limits		Sample A	Sample B	Sample C	Average (wt. %)	Stdev	% RSD	% Recovery vs Certified Value
		Low	High							
Al	0.51	0.49	0.53	0.51	0.52	0.51	0.51	0.005	0.9%	101%
Cr	17.86	17.8	17.92	17.74	17.91	17.86	17.84	0.071	0.4%	100%
Cu	0.012	0.01	0.014	0.013	0.012	0.012	0.01	0.000	3.8%	103%
Fe	18.6	18.5	18.7	18.9	18.4	18.7	18.67	0.205	1.1%	100%
Mn	0.04	0.037	0.0043	0.04	0.04	0.04	0.04	0.000	1.2%	97%
Mo	2.9	2.88	2.92	2.9	3.0	2.9	2.93	0.029	1.0%	101%
Nb	5.2	5.17	5.23	5.2	5.1	5.0	5.12	0.095	1.9%	98%
Ni	53.8	53.7	53.9	52.4	53.8	53.0	53.07	0.573	1.1%	99%
Si	0.054	0.0024	0.057	0.059	0.057	0.051	0.06	0.003	6.1%	103%
Ta	0.006	0.004	0.008	0.006	0.006	0.006	0.01	0.000	0.8%	98%
Ti	0.96	0.95	0.97	0.95	0.96	0.96	0.96	0.005	0.5%	100%