Certificate of Analysis 1063

Issue Date: 05-15-2025
Version: 01

CRM ITAK-884

Certified Reference Material – Copper Ore

Table 1 – ITAK-884 – Certified Values

Element/Unit	Certified Value [1]	s [2]	s_r [3]	s_L [4]	U [5]
Al (%) [c]	6.285	0.071	0.071	0.00065	± 0.0057
Ca (%) [b, c]	4.20	0.12	0.056	0.10	± 0.043
Co (g/t) [c]	73.4	2.7	1.0	2.5	± 1.0
Cr (g/t) [b, c]	1028	52	23	47	± 20
Cu - AAS (%) [a]	1.038	0.022	0.012	0.018	± 0.0066
Cu - ICP (%) [c]	1.039	0.043	0.0082	0.042	± 0.017
Fe (%) [c]	12.04	0.34	0.18	0.29	± 0.12
K (%) [b, c]	1.821	0.038	0.022	0.031	± 0.015
Mg (%) [c]	6.33	0.15	0.072	0.13	± 0.053
Mn (%) [c]	0.1694	0.0055	0.0032	0.0045	± 0.0018
Na (%) [c]	1.156	0.020	0.015	0.013	± 0.0066
Ni - AAS (%) [a]	0.0376	0.0018	0.00063	0.0017	± 0.00079
Ni - ICP (%) [c]	0.0442	0.0022	0.00085	0.0020	± 0.00078
S (%) [c]	0.842	0.046	0.046	0.00023	± 0.00082
Ti (%) [b, c]	0.843	0.012	0.011	0.0043	± 0.0030

[1] The Certified Value was calculated according to ISO Guide 35 and ISO 5725-2.

[2] The standard deviation for proficiency assessment was calculated according to ISO 13528 and 5725-2. This standard deviation can be used for control charts for individual analysis (*n=1)*.

[3] The within-laboratory standard deviation was calculated according to ISO 5725-2.

[4] The between-laboratory standard deviation was calculated according to ISO 5725-2.

[5] The extended standard uncertainty of the mean (α=5%) was calculated according to ISO Guide 35.

Note: The letters in front of the elements are codes for the Analytical Methods used.

DESCRIPTION

ITAK-884 was prepared from a sample of copper ore donated by a copper mining company in northeast Brazil in 2025.

This Certified Reference Material (CRM) is presented as a fine powder.

INTENDED USE AND INSTRUCTIONS

ITAK-884 provides important control in analytical data from exploration and can be used as a tool for grade control in routine mining and laboratory operations.

This Certified Reference Material can be used, for example, to calibrate analytical equipment, assess and develop new methods, validate analytical techniques, and arbitrate proficiency testing.

The bottles/sachets' content should be thoroughly mixed before taking samples of ITAK-884.

The Certified Reference Material should be used without pre-treatment. ITAK is not responsible for any changes after opening the bottles/sachets.

The Certified Reference Material should be stored in a dry place and without contact with excessive heat or moisture.

The minimum test portion of the Certified Reference Material is 0.5 g.

CHARACTERISATION AND STATISTICAL EVALUATION OF ANALYTICAL DATA

Eight specialised laboratories analysed ITAK-884. The statistical evaluation was carried out according to ISO GUIDE 35 and ISO 5725-2, using: identification and treatment of outliers, stragglers and technically invalid data, certified value calculation, standard deviation calculation, and extended standard uncertainty calculation.

The certified values are metrologically traceable to the International System of Units (SI) derived unit for mass fraction (expressed as percent).

The Technical Report RT-011/2025 STD contains full details of all manufacturing phases, certifying results, participating laboratories, and the statistical evaluation.
Note: This report is available for CRM users on the ITAK database.

ANALYTICAL METHODS

The methods used in the characterisation of CRM ITAK-884 are mentioned as follows:

- **a**: Acid digestion (HNO_3, HCl) and determination by Atomic Absorption Spectrometry (AAS).
- **b**: Acid digestion (HNO_3, $HClO_4$, HCl) and determination by Atomic Emission Spectrometry (ICP-OES).
- **c**: Acid digestion (HNO_3, $HClO_4$, HF, HCl) and determination by Atomic Emission Spectrometry (ICP-OES).

PERIOD OF VALIDITY

This CRM certification is valid until **May 15**, **2035**.

CERTIFICATE REPRODUCTION

This certificate must not be modified and may only be reproduced in its entirety and without change.

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