

ISE Furrengasse 21 6004 Luzern Switzerland

Lucerne, February 1, 2024

Analysis of copper ingot for chemical purity.
Your order of 28th January 2024.

ANALYSIS CERTIFICATE No. ISE-A24081010

Dear Ladies and Gentlemen,

according to above mentioned order we have analyzed a sample of your commodity, taken by the Institut für seltene Erden und Metalle AG, on 30th of January 2024 for the chemical purity and determination of particle form and size.

The sample was designated as:

Copper ingot
Lot No: 1506/Cu
Sample: ISE000237

According to the attached analytical report, the chemical purity grade of the copper ingot is:

**Cu (Remainder) = 99.999989% based on sum of metallic impurities according to
TU 24.44.22-001-75815004-2022**

The analytical reports are attached to this letter.

If you have questions about the results, please feel free to contact us.

Yours sincerely



Institut für seltene Erden und Metalle AG
Arndt Uhlendorff



Dr. Myint Sein
Elmaspecs / ISE Laboratory
Willich 31.01.2024

SAMPLE

ANALYSIS CERTIFICATE No. ISE-A24081010

GD-MS Analysis according to ISO/TS 15338:2009

Your order of: 28th of January 2024

Your order ID: ISE-A24081010

Material according:
to customer copper ingot
99.99x%

Your Sample ID: ISE202402010

Date of sample input: 30.01.2024

Elm-Laboratory ID: 1001015-2024

Results of the analysis on page 3

GD/MS Analytical Report

Customer:
Date: 01.02.2024

Analytic ID: ISE-A24081010
Sample ID: ISE202402010

Results of analysis:

Element	µg/g	Element	µg/g	Element	µg/g	Element	µg/g
Li	<0,01	Mn*	1,9	Ag*	8,5	Tm	<0,01
Be	<0,01	Fe*	20,7	Cd*	0,02	Yb	<0,01
B	<0,01	Co*	<0,01	In	0,02	Lu	<0,01
C	n.d.	Ni*	9,0	Sn*	0,30	Hf	<0,01
N	n.d.	Cu	Matrix	Sb*	1,8	Ta	<0,01
O	n.d.	Zn*	7,5	Te*	0,05	W	<0,01
F	0,12	Ga	0,01	I	<0,01	Re	<0,01
Na	0,05	Ge	0,02	Cs	<0,01	Os	<0,01
Mg*	<0,01	As*	0,83	Ba	<0,01	Ir	<0,01
Al*	0,02	Se*	0,11	La	<0,01	Pt	<0,01
Si*	0,01	Br	<0,01	Ce	<0,01	Au	<0,01
P*	3,3	Rb	<0,01	Pr	<0,01	Hg	<0,01
S*	3,8	Sr	<0,01	Nd	<0,01	Tl	<0,01
Cl	0,14	Y	<0,01	Sm	<0,01	Pb*	0,16
K	0,03	Zr	<0,01	Eu	<0,01	Bi*	0,05
Ca	<0,01	Nb	<0,01	Gd	<0,01	Th	<0,01
Sc	<0,01	Mo	0,01	Tb	<0,01	U	<0,001
Ti*	<0,01	Ru	<0,01	Dy	<0,01		
V	<0,01	Rh	0,01	Ho	<0,01		
Cr*	0,08	Pd	0,02	Er	<0,01		

n.d. = not determined

*Measurement against certified reference samples.

Other elements: evaluation using standard RSFs (tolerance factor max. ± 2.5)

Sum of impurities of Li, Be, Ti, V, Co, Mo, Cd, Pt, Au, Bi = 0,115 µg/g

Cu (Remainder) = 99.999989% based on sum of metallic impurities according to

TU 24.44.22-001-75815004-2022