

ISE Unter Altstadt 28 6300 Zug Schweiz

Kawa Homam Ghazi
Carrer de Blanes 9
08850 Gava Mar

Espana

Zug, 8th of July 2022

Analysis of copper powder for chemical purity and determination of particle form and size.
Your order of 14th June 2022.

Analysis report # ISE0002208148

Dear Mr. Kawa Homam Ghazi

according to above mentioned order we have analyzed a sample of your commodity, taken by the Institut für seltene Erden und Metalle AG, on 14th of June 2022 for the chemical purity, determination of particle form and size and Isotopic composition

The sample was designated as:

Copper powder
Sample: ISE000502
Lot # 1/500/Cu
Total Quantity: 500.000 grams

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

Copper: = 99.9998% based on sum of metallic impurities according to TU 1793-011-50316079-2004
= 99.9959% based on metal base
The particle form is dendritic, and the particle size is in average 105 µm
Isotopic composition: Cu63/Cu65

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
Arndt Uhlendorff



Dr. Myint Sein
Elmaspecs / ISE Laboratory
Willich, 23.06.2022

Analytic certificate #0002208148

GD-MS Analytic

Your order of:	14th of June 2022	Your order ID:	0002208148
Material according: to customer	Copper powder 99.9x%	Your Sample ID:	00020220245
Date of sample input:	14.06.2022	Elm-Laboratory ID:	1006011-2022

Results of the analysis on page 3



GD/MS Analytical Report

Customer: Kawa Homam Ghazi

Analytic ID: ISE0002208148

Results of analysis:

Element	µg/g	Element	µg/g	Element	µg/g	Element	µg/g
Li	<0,001	Mn*	0,02	Ag*	8,6	Tm	<0,001
Be*	0,001	Fe*	0,50	Cd*	0,004	Yb	<0,01
B	0,002	Co*	<0,001	In	<0,001	Lu	<0,001
C	n.d.	Ni*	0,03	Sn*	0,04	Hf	<0,001
N	n.d.	Cu	Matrix	Sb*	1,5	Ta	0,001
O	n.d.	Zn*	0,22	Te*	0,10	W	0,01
F	0,04	Ga	<0,001	I	0,003	Re	<0,001
Na	0,09	Ge	0,09	Cs	<0,001	Os	0,001
Mg*	0,11	As*	0,99	Ba	0,005	Ir	0,006
Al*	0,07	Se*	0,21	La	<0,001	Pt	0,002
Si*	0,70	Br	0,02	Ce	<0,001	Au	0,008
P*	0,02	Rb	<0,001	Pr	<0,001	Hg	0,009
S*	21	Sr	<0,001	Nd	<0,001	Tl	0,001
Cl	3,5	Y	<0,001	Sm	<0,001	Pb*	2,3
K	0,04	Zr*	0,001	Eu	<0,001	Bi*	0,06
Ca	0,09	Nb	0,001	Gd	<0,001	Th	<0,001
Sc	<0,001	Mo	<0,01	Tb	<0,001	U	<0,001
Ti*	0,06	Ru	<0,01	Dy	<0,001		
V	0,001	Rh	0,03	Ho	<0,001		

n.d. = not determined

*Measurement against certified reference samples.

Date: 08.07.2022

Sample ID: ISE00020220245

Total impurity without C, N and O: 40,568 µg/g.

Cu (Remainder) = 99,9959% metal basis

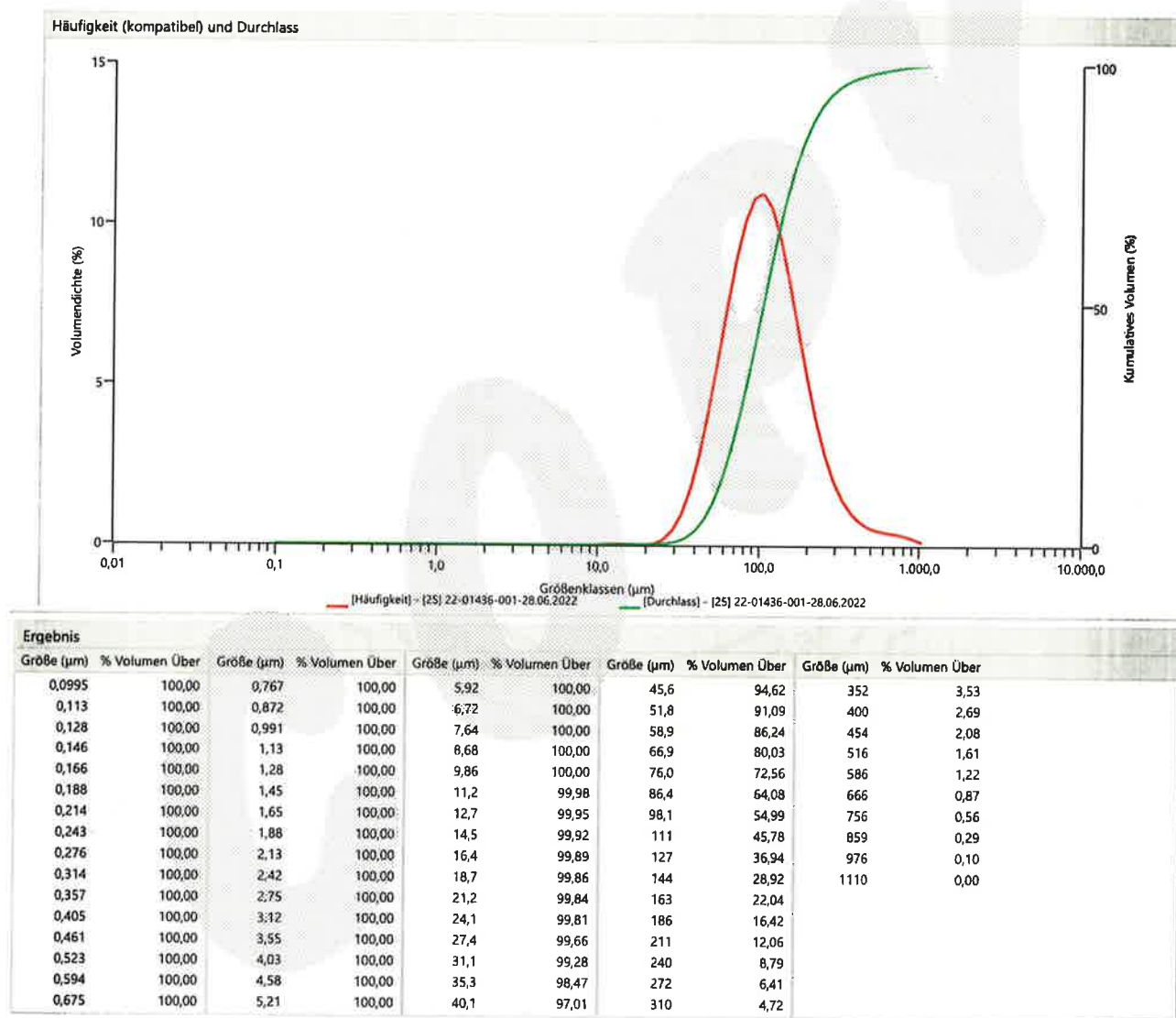
Sum of impurities of Al, Cd, Fe, Mg, Ni, Sb, Ti, Mo, Zn is less than 0,001%

Cu (Remainder) = 99.9998% according to TU 1793-011-50316079-2004


Particle analysis by laser diffraction

The particle size distribution of the sample was determined in double determination by laser diffraction. The dispersing medium was ethanol. The results (mean average values) are shown in the following table 1 and in diagram 1.

The powder sample was examined by digital microscope (see Figures 1 and 2).



These particles are in average from 105 µm

Digital Microscopy

The powder sample was examined by digital microscope (see Figures 1 and 2).

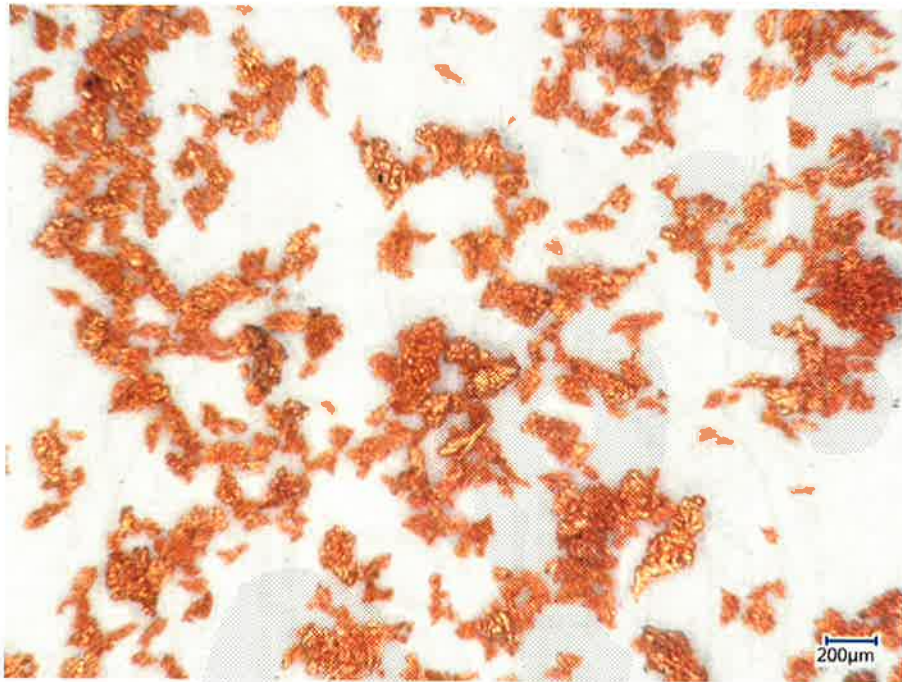


Figure 1: Light microscope image of "copper powder", x200



Figure 2: Light microscope image of the "copper powders", x200

These particles are dendritic.

Isotopic composition Isotope Ratio by GD-MS

Customer: Kawa Homam Ghazi
Date: 08.07.2022
Analytic ID: ISE0002208148
Sample ID: ISE00020220245
Copper powder sample ISE000502
TU 1793-011-50316079-2004

Isotop	Isotop contain, %
Cu63	68,89
Cu64	31,11

The ratio of Cu63/Cu65 = 2,21 (+/- 1% rel.)