



The Mineral Composition and Regulation of Copper Concentrates, Smelters and Refineries: ICSG Secretariat Final Report

The International Copper Study Group has released the final report of an extensive secretariat research project developed over the period 2017-2023 with the objective of understanding the changes in the composition of copper ores and concentrates processed in plants, smelters and refineries, and the regulations affecting this process.

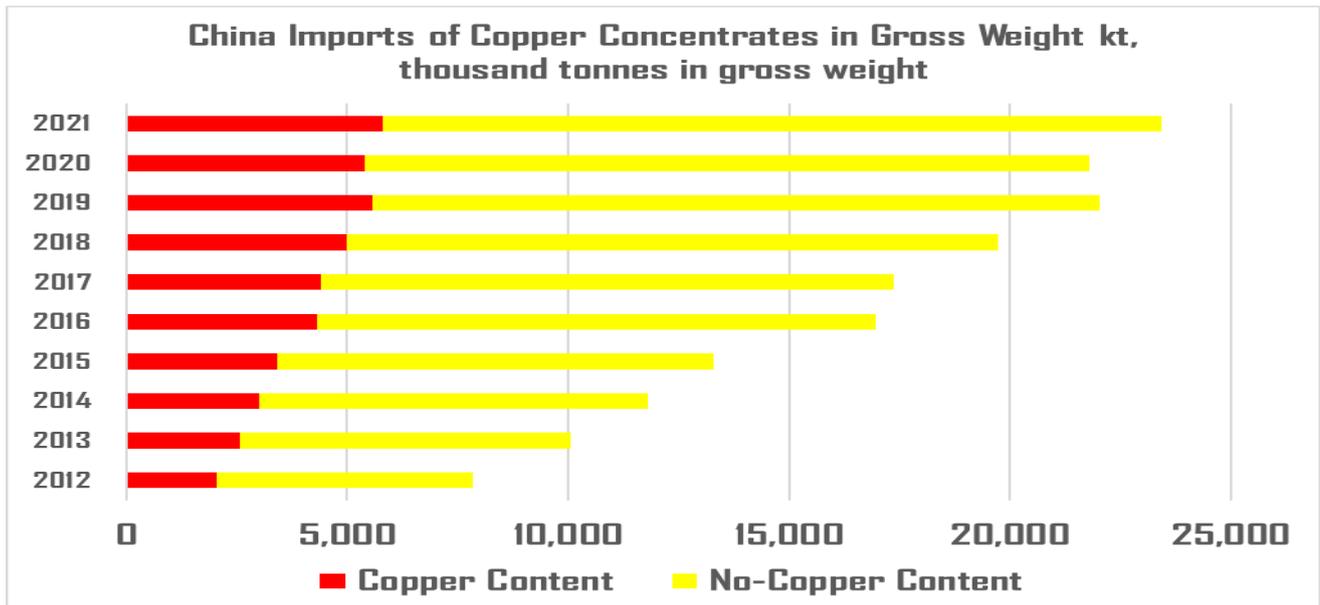
The report starts with a review of the basic concepts related to the mineral composition of copper ores and concentrates, then a detailed quantification of the production and international trade in copper concentrates. A detailed analysis of the mineral composition in most of copper mines and projects is included with detailed databases of the information available by mine. The impact of the changing composition of minerals in copper concentrates, focused mainly on hazardous waste and valuable minerals and the implications of the changes for copper smelters and refineries in different countries is discussed in detail.

A detailed analysis of the current regulatory restrictions on the management of increasingly complex copper concentrates is also discussed with emerging trends regarding the regulation of copper concentrates production, trade, use and hazardous waste stabilization and disposal.

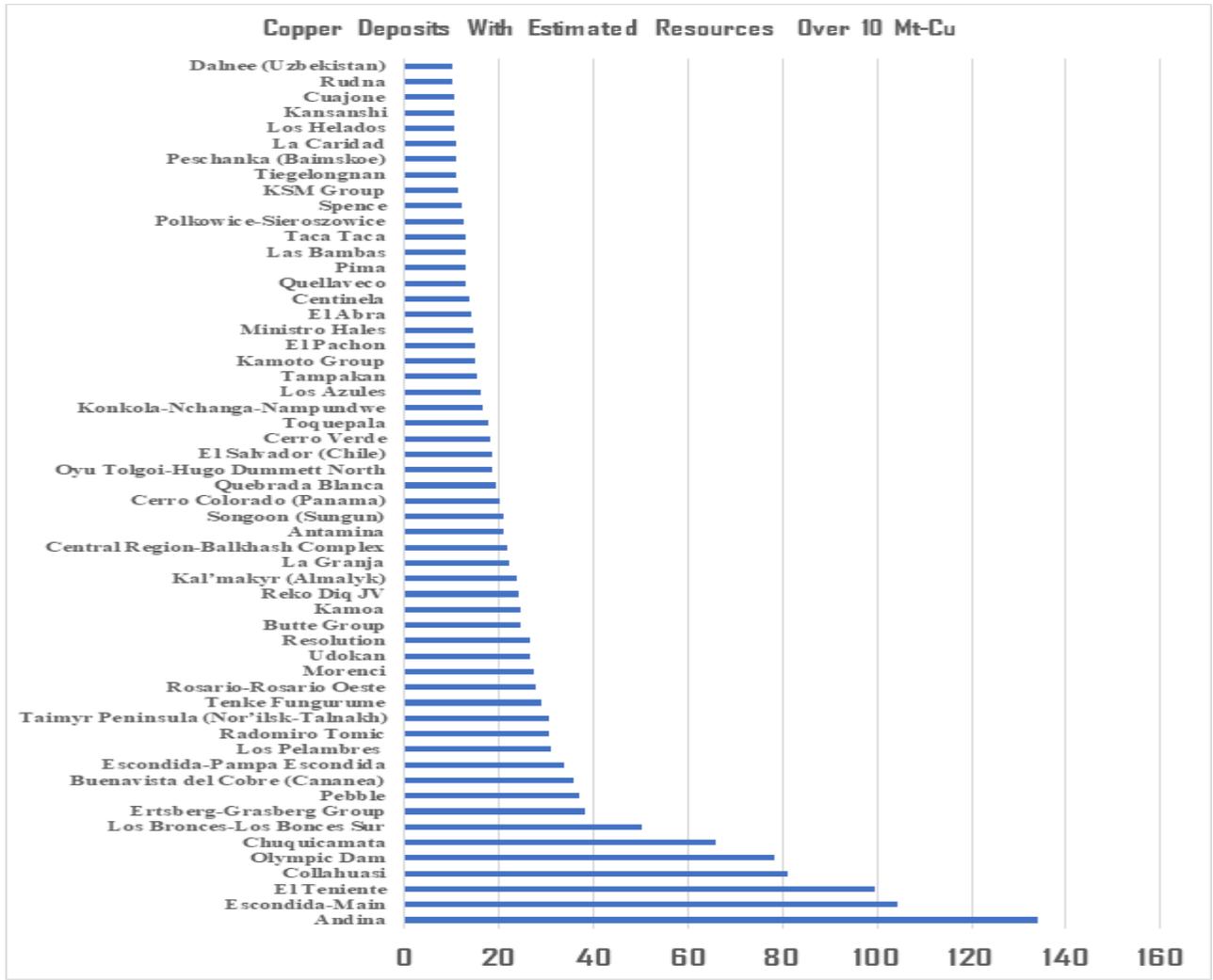
A complete section is dedicated to the review of hazardous waste in copper concentrates in China, in particular import trends and the recent evolution of complex and less hazardous copper concentrate, blending plants both in China and the rest of the world. A full chapter is dedicated to study the copper industry response to increasing copper concentrates complexity and to governmental regulatory changes discussed previously.

A careful technical analysis on the changing mineral composition of copper concentrates in recent years is attempted, and a detailed analysis of the mineral composition in the reported exports of Chilean copper concentrates is provided. The report also discuss the different positions of industry and governments on mineral policy options to face the challenges related to processing increasingly complex mineral composition of ores and concentrates.

The annex of this report is including two large databases with information for every copper mine about the mineral composition of every copper mine available at the ICSG Secretariat.



Source: ICSG Secretariat 2022, based on ICSG Report on China Copper Industry and Fabrication Update Published in 2022 and ICSG Statistical Yearbook 2022.



Source: ICSG Secretariat, based on ICSG Mineral Resources Database 2022. The database is included in the annex of this report.

Global Ranking of Gold Content in Resources, Reserves and Reported Mineral Composition of Copper Mines and Projects.

International Copper, Nickel and Lead-Zinc Study Groups and a team of experts coordinated by RMIT University, Melbourne, Australia. 2015 Data. Published in 2022.

		Count	2,301.0	2,301.0	2,236	1,136	998	249	197	339.00	423	653	15	3	6	180	183	101	71	71	20	11	7	14	14	46	-		
		640.9		3,034.7																									
		Reserve/Resource																											
Deposit/Project Name	Country	Reserve/Resource		Cu	Au	Ag	Ni	Co	Mo	Pb	Zn	Re	Se	Te	Pt	Pd	Rh	Ru	Ir	Fe	Sn	In	W	U3O8	Other	Other	Company		
		Mt Cu	Mt Au	%	g/t	g/t	%	%	%	%	%	g/t	%	%	g/t	%	%	Other	Other										
Al Amar	Saudi Arabia	-	0.0	0.88	33	31					7.86																	unknown	
Mahd adh Dahab	Saudi Arabia	-	0.0	0.64	27	73					2.58																	unknown	
Hand Camp	Canada	-	0.1	2.62	13.4	56																						unknown	
Pimenton	Chile	-	0.0	1.3	12.3																							Cerro Grande Mining	
Mastra	Turkey	-	0.0	0.2	12.1	4.7				0.2	0.2																	unknown	
Sababablanca	Colombia	-	0.0	5	11																							unknown	
Wilaikuh	Laos	-	-	-	11																							Geolbi	
Johnson River	USA	-	0.0	0.76	11.0	8.2				1.17	8.37																	unknown	
Greenwood-Golden Crown	Canada	-	0.0	0.53	10.67																							Golden Dawn Minerals	
Eastmain-Ruby Hill	Canada	-	0.0	0.23	9.39																							Eastmain Resources	
Vuelta Falsa	Spain	-	0.0	1.27	9	307				8.8	20.7																	unknown	
Durhie	Canada	-	0.0	0.52	8.76	130.2				1.3	7.1																	unknown	
Mam	Canada	-	0.0	1	8.56	17.12																	0.08					unknown	
Hot Maden	Turkey	-	0.2	2.0	8.0																							Mariana Resources	
Kainantu	Papua New Guinea	-	0.1	1.8	8.0	30																						K92 Mining	
Salgadinho	Portugal	-	0.3	3	8	40																						Colt Resources	
Barrett	USA	-	0.0	1.75	7.9	20.6					2																	unknown	
Bulyanulu	Tanzania	-	0.3	0.53	7.65	6.61																						Barriok Gold	
Golden Dream-El khom	USA	-	0.0	0.41	7.58																							unknown	
Nasonovskoye	Kyrgyzstan	0.7	0.0	0.6	7.5																							unknown	
Sapes (Sappes)	Greece	-	0.0	0.1	7.43																							Eldorado Gold	
Al Gehab	Saudi Arabia	-	0.0	1.28	7.38	0.98					0.87																	unknown	
North Kaluga	Russia	-	0.0	5.81	6.7	101																						Polymetal International	
TB Lev.	Kyrgyzstan	-	0.0	0.25	6.5																							unknown	
San Gabriel (Carteras del Hallazgo)	Peru	-	0.0	0.06	6.44	8.1																						Buenaventura	
Greenwood-Lexington/Grenoble	Canada	-	0.0	1.05	6.41																							Golden Dawn Minerals	
Deflector	Australia	-	0.0	0.9	6.4																							Doray Minerals	
Upper Beaver	Canada	-	0.1	0.39	6.17																							Yamana Gold, Agnico	
Dolinnoe (Dolinnoye)	Kazakhstan	-	0.0	0.3	6.1	73				1.1	1.5																	Eagle Mines	
Vostochno-Semenovskoye	Russia	-	0.0	0.7	6.1	6.7					4.7																	KazZinc (Glencore)	
Chang'an	China	-	0.1	1.5	6.0				0.12																			unknown	
La Mejicana	Argentina	-	0.0	1.1	6	64																						unknown	
Ghal'e Zari	Iran	-	0.0	0.4	6																							unknown	
Turner-Albright	USA	-	0.1	3.4	5.9	51.1					7.2																	unknown	
Solwara 1	Papua New Guinea	-	0.2	7.7	5.8	30					0.7																	Nautilus Minerals	
Ikar	Afghanistan	-	0.0	0.13	5.6	4.7																						unknown	
Pusticamica Lake-Benoit (Benoist)	Canada	-	0.0	0.27	5.52	12.1																						Carter Resources	
Maiskoe	Russia	-	0.0	1.06	5.5	6.9					4.38																	unknown	
Gladhammar	Sweden	0.1	0.0	0.27	5.5	14																						Wiking Mineral	
Cedar Bay	Canada	-	0.0	0.97	5.45																							Chibougamau	
Chunderloo North	Australia	-	0.0	1.6	5.4																							Independent Mines	
Bend	USA	-	0.1	1.8	5.1	9.7																						Neometals	
Gunung Rosa	Indonesia	0.2	0.0	0.30	5.01	12.0				0.47	1.60																	Aquila Resources Inc	
Coricancha	Peru	-	0.0	0.47	4.93	216.8				1.63	3.00																	Paramount Mining	
La Plata	Ecuador	-	0.0	4.06	4.84	54.4				0.7	4.2																	Great Panther Silver	
Estrades-Caribou	Canada	-	0.0	0.85	4.80	153				0.85	9.29																	unknown	
El Vall e-Boinas/Caris	Spain	-	0.1	0.57	4.73	10.4																						Cogitare Resources	
LaRonde	Canada	-	0.1	0.24	4.66	18.2					0.84																	Orvana Minerals	
Inmont	Canada	1.2	0.0	1.7	4.57						0.3																	Agnico Eagle Mines	
San José de Gracia	Mexico	0.8	0.0	0.20	4.54	9.8				0.03	0.18																	unknown	
Zackly	USA	-	0.0	2.19	4.53	28.5																						Goldgroup Mining	
Coka Marin	Serbia	-	0.0	1.1	4.5	42				0.4	1.1																	unknown	
Balta Tau	Russia	-	0.1	3	4.5						5.1																	unknown	
Yubileiny (Yubilenoe)	Kazakhstan	-	0.0	0.40	4.5																							Union Transnationale	
Silver Coin	Canada	-	0.0	0.26	4.42	18.52				0.28	0.74																	Miniere	
Bateman Bay	Canada	-	0.0	2.64	4.35																							Jayden Resources	
Mount Washington-Lakeview-Domin	Canada	-	0.0	0.75	4.34	20.7																						Chibougamau	
Kaluginskoye	Russia	-	0.0	3.86	4.16	56.8					2.73																	Independent Mines	
Nuqrah North/South	Saudi Arabia	-	0.0	1.04	4.14	180.6				2.82	6.83																	North Bay Resources	
Lenora	Canada	1.0	0.0	1.6	4.11	141				0.65	6.6																	(?)	
Hope Brook	Canada	-	0.0	0.08	4.01																							unknown	
Rea-Extra High (K7)	Canada	-	0.0	0.5	4	55				4.8	6.1																	Coastal Gold	
																													37 Capital

Source: ICSG Secretariat, based on ICSG Mineral Resources Database 2022. The database is included in the annex of this report.



International Copper Study Group Order Form

PUBLICATION	Member Country	Non Member Country	Total
The Mineral Composition and Regulation of Copper Concentrates, Smelters and Refineries (2023 Edition)	€500	€1000	€
<input type="radio"/> 20% discount for Copper Bulletin subscribers	€400	€800	€

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