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The ReAK international research project for the reduction of the arsenic content in copper concentrates

As a research partner, Envirochemie is developing an efficient oxidation process to convert arsenic from copper concentrates into a harmless, disposable form.

Chile is the world's largest copper producer and copper exporter with 27% of global production. However, copper mining is associated with economic and ecological challenges: The copper content in the ore currently being mined is between 0.5 and two per cent, but the level of contamination with arsenic, antimony and bismuth is quite high. Arsenic, in particular, is a highly toxic, inorganic pollutant that not only poses a hazard to the health of human beings, but also to the entire ecosystem as well. Existing processes for the separation and stabilisation of arsenic are currently economically insufficient.

The primary objective of the "ReAK - Reduction of arsenic in copper concentrations" project funded by the German Federal Ministry of Education and Research (BMBF) is the optimisation and further development of existing processes as well as the establishment of new processes to deal with arsenic copper ores and their concentrations.

The research project is taking a look at the entire process chain of the copper production of copper ores from the separation of by-products, the stabilisation of the arsenic to the disposal of the residue. The arsenic needs to be separated and converted from As(III) to As(V). In this form, it has stable bounds and can be deposited without any harmful effects.

In this regard, Envirochemie GmbH is working on innovative oxidation technologies to oxidise As(III) to As(V) in an economic and ecological manner. In addition, Envirochemie is also enhancing its own Envirochem AOP product line. Using oxidation processes with hydrogen peroxide and UV light or ozone and ultrasound, highly reactive, so-called hydroxyl radicals are formed which should oxidise the arsenic. Which process combination under which process conditions are best suited for an efficient and environmentally-friendly oxidation of the arsenic in the copper mining residue is currently being researched in comprehensive laboratory studies at Envirochemie at its in-house technical centre.

The company will also be working in close cooperation with nine national project partners (Fraunhofer IWKS, Aurubis AG, Borregaard Deutschland GmbH, Federal Institute for Geosciences and Natural Resources (BGR), EKOF Mining & Water Solution GmbH, Outotec GmbH & Co.KG, Freiberg University of Mining and Technology, Wismut GmbH) and seven international project partners (Alta Ley, Deutsch-Chilenische Industrie- und Handelskammer, EcoMetales, Pontificia Universidad Católica de Chile, Sustainable Minerals Institute, International Centre of Excellence, Universidad de Concepción, Universidad de Santiago de Chile).

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