

PRESS RELEASE

Green & Urban Mining

Research project involving BRAIN AG paves the way for low-impact copper production through bio-leaching

- **Bio-leaching process allows copper to be extracted almost completely from shale deposits**
- **Research results underscore the significance of Green & Urban Mining to extract and recover metals from ores and waste streams**
- **BRAIN BioXtractor also offers various bio-based solutions for the enrichment of precious metals like gold and silver for the purposes of an efficient circular economy**

An international research team involving scientists from BRAIN AG has succeeded in extracting nearly the entire copper content from local shale deposits harnessing micro-organisms in combination with a bio-leaching process. For the Franco-German research project, co-managed by the French Geology and Mining Research Bureau (Bureau de recherches géologiques et minières, BRGM) and the German Helmholtz-Zentrum Dresden-Rossendorf (HZDR), it was key to develop an energy and raw material efficient recovery process with a small ecological footprint to utilize this local primary resource.

In the early extraction phase, the bacteria employed in the bio-leaching process first convert insoluble ore minerals into water-soluble salts. Downstream, a bio-chemical precipitation process then helps recover up to 97 per cent of the dissolved copper.

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Within the research project, BRAIN brought its specific capabilities to bear which helped identify carbonate-dissolving, metal-resistant micro-organisms from its proprietary BioArchive. This “toolbox of nature” contains more than 53,000 micro-organisms. In addition, BRAIN also provided its distinct expertise in the realm of physiological and genetic micro-organism characterization.

“This successful research project underscores the increasing significance of Green Mining and Urban Mining, both of which are areas in which we conduct intense research. We focus on the low-impact and efficient extraction and recovery of precious metals, such as gold, silver and other technology metals, from ores and waste streams. Source materials include e.g. electronic scrap, incineration bottom ashes and metallurgical slags,” says Dr Guido Meurer, Member of the Management Board and Unit Head Producer Strain Development at BRAIN.

New processes which allow for the sustainable extraction and recovery of metals are an increasingly important field of research and development, especially for regions such as Germany, where raw materials are scarce. Experts also predict a strongly increasing demand in copper to meet global needs, e.g. to usher in the era of electric vehicles.

Says Dr Esther Gabor, Program Manager Green & Urban Mining at BRAIN: “There is an increasing demand in precious metals, which play a key role in many high-tech applications. Based on biotechnological processes, BRAIN has developed various bio-based solutions for Green and Urban Mining as they are essential for an efficient circular economy.”

A recently finalized demonstration unit, the BRAIN BioXtractor, offers powerful and safe biological process solutions to extract and recover precious metals from side and waste streams as well as from primary resources. Currently the system is being made ready to get explored by enterprises interested in a test phase prior to joint further development and commercialization or licensing the technology.

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The copper recovery through bio-leaching research project in which BRAIN was involved formed part of the EcoMetals scheme co-funded by the German Federal Ministry of Education and Research (Bundesministerium für Bildung und Forschung, BMBF | FKZ 033RF001) and the French National Research Agency (Agence Nationale de la Recherche, ANR). Germany was represented by the Freiberg Helmholtz Institute for Resource Technology (HIF), a constituent part of HZDR, which also coordinated the German efforts, and amongst others, scientists from the Federal Institute for Geosciences and Natural Resources (Bundesanstalt für Geowissenschaften und Rohstoffe, BGR). The research results were presented on the occasion of the 22nd International Biohydrometallurgy Symposium held at Freiberg Technical University for Mining (TU Bergakademie Freiberg) in late September 2017.

Further information

- HZDR Press Release (German only): Nachhaltige Rohstofftechnologien dank Bakterien: <https://www.hzdr.de/db/Cms?pOid=41595&pNid=0>
- BGR Press Release (German only): Wissenschaftler gewinnen durch Biolaugung Kupfer aus heimischem Kupferschiefer: https://www.bgr.bund.de/DE/Gemeinsames/Oeffentlichkeitsarbeit/Pressemitteilung/BGR/bgr-2017-09-12_Kupferschiefer.html
- 22. International Biohydrometallurgy Symposium: <http://dechema.de/en/IBS2017.html>
- BRAIN Press Release: BRAIN as an industrial alliance partner in the French-German research programme “EcoMetals”: <https://www.brain-biotech.de/en/press/BRAINAG-as-an-industrial-alliance-partner-in-the-French-German-research-programme-EcoMetals>
- BRAIN BioXtractor: <https://www.brain-biotech.de/en/bioxtractor>

About BRAIN

B.R.A.I.N. Biotechnology Research and Information Network AG (BRAIN AG; ISIN DE0005203947 / WKN 520394) is one of Europe's leading technology companies in the field of industrial biotechnology, the core discipline of Bioeconomy. As such, BRAIN identifies previously untapped, efficient enzymes, microbial producer organisms or natural substances from complex biological systems that can be put to industrial use. The innovative solutions and products developed by help of this „Toolbox of Nature” are successfully applied in the chemistry, the cosmetics and the food industries. BRAIN's business model is based on two pillars – BioScience and BioIndustrial. The BioScience comprises its frequently exclusive collaboration business with industrial partners. BioIndustrial comprises the development and commercialization of BRAIN's own products and active product components. Further information is available at www.brain-biotech.de/en.