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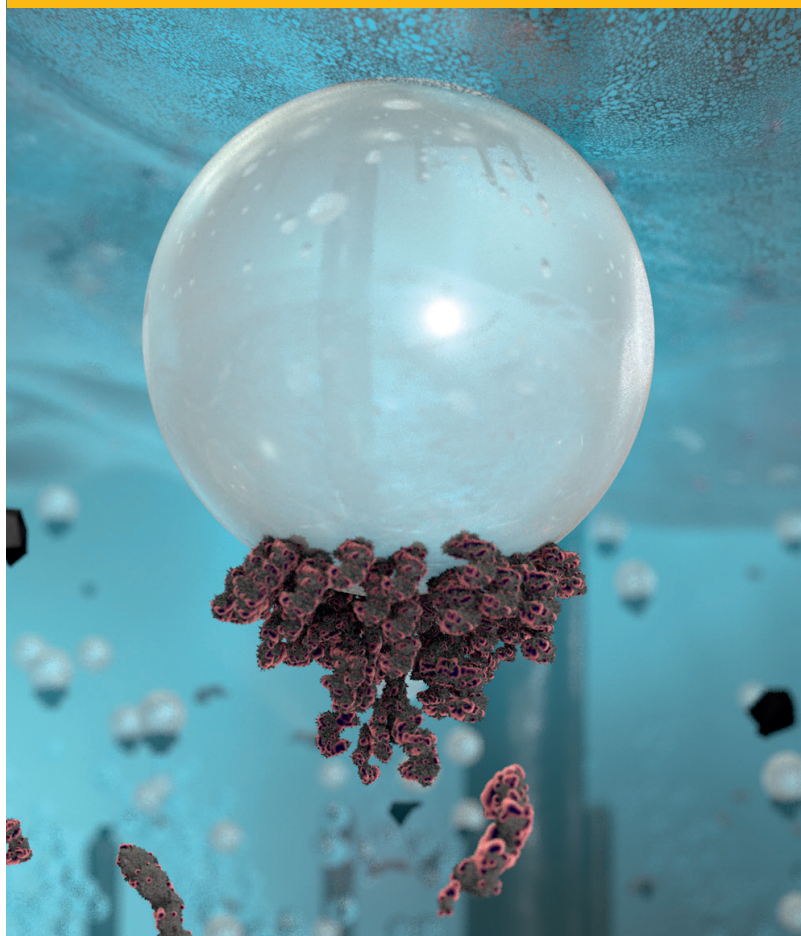
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Beneficiation of ultra-fine particles: From micro to industrial level



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Helmholtz Institute Freiberg for Resource Technology



HELMHOLTZ
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THE BACKGROUND

Sorting the wheat from the chaff

The miners of earlier centuries could rely on their own eyes: valuable minerals were visibly distinguishable from the dross and thus easy to separate from each other. Over time, it became more difficult to exploit the increasingly fine minerals distributed in the rock. For the past 150 years, the flotation process has been used widely. Several billion tonnes of fine-grained raw materials are processed annually in this way in countries around the world, in order to enrich the metal content. But the limits of the method are soon reached.

Nowadays, the valuable elements are often bound up in ultra-fine particles that are smaller than a grain of flour (< 20 micrometers). Furthermore, multiple metals may be present. The Helmholtz Institute Freiberg for Resource Technology (HIF) is researching innovative technologies for the efficient processing of valuable elements from complex natural ores and residues, e.g. from tailings.



The HIF researchers and their local partners have the necessary infrastructure to cover the entire range of operations for the processing of raw materials – from the laboratory stage to pilot scale.

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THE GOAL

Beneficiating complex raw materials

Molecular processes play an important role in the beneficiation of complex resources. But we cannot yet claim to have a fundamental understanding of these mechanisms. Consequently, the research team at HIF are studying the basics. The aim is to further develop existing procedures and then to get them working on a pilot scale.

How do individual ore particles behave during flotation? How do their surfaces react to the addition of chemicals? What interactions occur at the interfaces to other particles? The findings will allow conclusions to be drawn as to the conditions under which minerals in ores are best separated in the form of a metal concentrate.

The researchers are currently contributing their skills, knowledge and infrastructure to the EU NetFlot project. This network of partners from science, research and industry seeks to consolidate European expertise in the field of flotation. Innovations developed in collaboration can be quickly realized as concrete technologies. And the raw materials required by modern industry are then obtained in an efficient way.

Our strengths

// Together with our local partners, we have the necessary infrastructure to cover the entire range of operations for the processing of raw materials – from the laboratory stage to pilot scale.

// Collaboration between multidisciplinary teams at the Helmholtz-Zentrum Dresden-Rossendorf enables us to give detailed descriptions of ore particles and interface processes using Mineral Liberation Analysis (MLA) and other methods.

// We collaborate closely with the chemical industry to jointly develop new reactants. By networking extensively in the mining industry, we are able to test processes directly at the workplace.

Interested in working with us? Get in touch!