

Exploring the potential of structured inorganic materials to recover metals from aqueous streams

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The growing demand for critical raw materials (CRMs) for renewable energy and low-carbon technologies is pushing for alternative approaches to traditional mining of primary resources, which faces demand, environmental and social challenges. A possible solution lies in the extraction of secondary and unconventional resources, such as mine tailings, wastes, geothermal brines, mine waters, and thermal springs, to increase the production in a sustainable and environmentally friendly way. In this context, inorganic sorbents have emerged as highly attractive materials for metal recovery, thanks to their selectivity, stability, and recyclability. By selectively extracting target metals from complex mixtures, inorganic sorbents reduce the extraction of unwanted impurities that complicate downstream processing and reduce the final product purity. Their versatility also allows the recovery of a wide range of metals from various sources, making them a promising tool in meeting the demand for CRMs while minimizing environmental impact.

During this talk we will focus on the synthesis of structured inorganic sorbents such as LDH, titanates and show their performance for the recovery of metals from aqueous streams. A focus is on how we can link the synthesis parameter to the metal sorption performance and adapt the material properties to the intended streams. We will focus on the different use-cases, one being the recovery of technology metals from side streams of an aluminium refinery and on using new sources for recovering Li.