Special Issue

New Trends in Sustainable Extraction of Energy-Critical Minerals

Message from the Guest Editor

The global transition to clean energy technologies has intensified the demand for energy-critical minerals, essential for renewable energy systems, energy storage, and advanced electronics. However, conventional extractive metallurgy and mineral processing methods are often energy-intensive, costly, and of environmental concern. This Special Issue aims to highlight innovative approaches that enhance the efficiency, selectivity, and environmental performance of energy-critical mineral extraction and processing. Key topics include, but are not limited to, advancements in hydrometallurgy, novel ligands for solvent extraction and saponification, bio-based extraction techniques, ionic liquid and deep eutectic solvent applications, and electrochemical- and membrane-based separations. Additionally, this Special Issue will explore circular economy strategies, including recycling, urban mining, and closed-loop processing, as well as the role of machine learning and process modeling in optimizing extraction techniques. Researchers, engineers, and scientists are invited to contribute original studies and reviews that shape the future of sustainable extractive metallurgy.

Guest Editor

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