

Session Title: Mineral-Fluid Reactions in Sustainable Mineral Processing and Extractive Metallurgy towards a Carbon Neutral Future

Theme: The dynamical world of minerals

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Minerals are essential sources of metals for the development of renewable energy technologies that are highly demand as we move towards a carbon neutral future. The processing of minerals containing the required technologically important metals (e.g., Li, Ni, Cu, Co, V, In, Ge, and the rare earth elements, REEs) and the extraction of these metals from ore minerals are important steps for the target applications. These steps involve the reactions between ore minerals and fluids, such as the dissolution of minerals into aqueous solutions and the precipitation of new minerals on mineral grain surface from supersaturated solutions. Sustainable mineral processing and extractive metallurgy calls for the development of energy efficient processes with minimum environmental impact. To achieve this goal, it is vital to have a deep knowledge of the mineral-fluid reactions that are taking place in mineral processing and extractive metallurgy, as well as in mine closure processes. Especially, the controls on the rate limiting steps and the acceleration of reaction rate by enhancing mineral reactivity and permeability are important topics for today's mineral scientists and engineers. Hence, this session invites mechanistic, microstructural, and kinetic investigations on mineral-fluid reactions that are responsible for minerals leaching, including stirred tank reactor leaching, high pressure leaching, and the environmentally more friendly heap leaching and in situ leaching processes, and reactions responsible for mineral flotation, acid mine drainage minimization and the capture and long-term storage of atmospheric carbon dioxide gas by mineral carbonation reactions.