

FEMS EUROMAT23

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FEMS EUROMAT is the most important international congress in materials science and technology in Europe. It continues a successful congress series promoting the transfer of knowledge and the exchange of experience between academia and industry. **Extended submission deadline: 15 March 2023**

Area E: Energy and Transportation

E06: Beyond Lithium Batteries

The current leading technology in electrochemical storage is the lithium ion battery (LIB). However, the high demand for Li-ion batteries leads to challenges and risks, especially with regard to the availability of the materials used. For this reason, research has been going on for some time into alternatives, the so-called "post-lithium batteries", in which Li is to be replaced by Na, K, Zn, Ca, Mg, or Al, among others. Recently, the sodium-ion battery (SIB) has shown the potential to develop into an alternative storage medium for both mobile and stationary applications. SIBs contain neither lithium nor rare and/or toxic transition metals but are based on commonly occurring metals such as aluminum, magnesium, manganese, and iron in addition to sodium. The decisive disadvantage so far is the lower gravimetric and volumetric storage capacity of SIBs and the lower cycle stability compared to LIBs. On the other hand, in addition to the more sustainable composition, there are also a series of advantages, including price, faster loading and higher residual capacity at low temperatures, and manufacturing technology, which is very similar to that for LIBs.

In several multivalent systems, safe metal anodes can be used, which enable high volumetric capacities. Several breakthroughs were achieved, and important progress has been made in the last years, in particular in the development of electrolytes with mild chemistry and high efficiency and in the development of first conversion and intercalation-type cathodes. Fundamental studies have elucidated mechanisms of multivalent intercalation or chemical interaction of the electrolyte with the electrodes.

This symposium aims to cover all the above-mentioned aspects for post-lithium batteries, which are summarized in the following list of topics:

- Sodium- and potassium-ion materials and cells
- Materials for multivalent systems
- Electrolytes for mono- and multivalent systems
- Insertion and conversion mechanisms in post-Li electrodes
- Advanced modeling of battery materials
- Integration, control, and modeling of battery packs
- Advanced characterization techniques
- Recycling

The symposium is devoted to recent advances in understanding, analyzing, and designing energy storage technologies based on mono- and multivalent charge transfer ions beyond lithium. The symposium will accept contributions from theoreticians, material scientists, surface and operando analytical scientists, and engineers with the aim of getting an overall view on the materials, the interfacial processes, and structure-performance relationships to boost future development.

Symposium Organizer



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