DEPARTMENT OF CHEMISTRY AND PHYSICS OF MATERIALS

ANNOUNCEMENT

PARIS LODRON UNIVERSITÄT SALZBURG

Vortragsankündigung

Mittwoch, 15. November 2023, 11.15 Uhr im SR I

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"Materials for electrochemical energy conversion and storage in solid oxide cells"

Electrochemical solid oxide cells are among the most promising future technologies for efficient and sustainable energy conversion and storage. Solid oxide fuel cells (SOFCs) convert the chemical energy of a fuel into electrical energy with high efficiency and without NO_x-emissions. Solid oxide electrolyzer cells (SOECs) split water into O_2 and H_2, and thus electrical energy can be stored in form of chemical energy. SOECs are also capable of co-electrolysis, converting H_2O/CO_2 mixtures into synthesis gas (H_2/CO) for production of methane, methanol, ammonia, etc. ("power-to-gas" concept) in a catalytic reactor.

In our research, we develop materials for solid oxide cells, and investigate their fundamental properties such as crystal structure, thermal and chemical expansion, mass- and charge transport etc. Promising compositions are processed into porous electrodes, where the focus is put on the relationships between material properties, morphology and electrochemistry of the air electrode and the air electrode-electrolyte interface. Current objectives are to increase cell performance, efficiency and lifetime, but also to replace critical raw materials such as Co and Sr in cell components as well as to reduce material development cycles and the number of tests to evaluate and optimize cells. For this purpose, competences in the field of material development, electrode and cell preparation as well as electrochemical characterization are combined with detailed microstructural and chemical analyses in cooperation with our project partners. The goal is to develop a knowledge-based design approach for the next generation of solid oxide cells for future energy systems.