Argonne NATIONAL LABORATORY

MSD Seminar

# Materials Science Division Seminar

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**"The Swiss Competence Center for Energy Research Heat & Electricity Storage: Background, Topics and Contributions from Paul Scherrer Institute"**

**Host: Vojislav Stamenkovic**

**October 19, 11:00 a.m. - ESB 241 Seminar Room**

**Abstract:**
The future of the Swiss energy supply, after the nuclear energy phase out, will heavily rely on intermittent renewable energies such as solar or wind. To guarantee the continuous (temporal and regional), reliable, and cost-efficient supply of power, heat, and fuels derived from these energy sources, it is critical to develop the science and technology of electricity storage comprising advanced rechargeable batteries and synthetic fuels (hydrogen, hydrocarbons), respectively. In the heat storage domain short-term and seasonal heat storage solutions also call for new developments.
The establishment of the Swiss Competence Centers for Energy Research (SCCER) is a key-element to realize the Swiss Energy Strategy 2050. It addresses the inter-university coordination of energy research across Switzerland.
The SCCER Heat & Electricity Storage
Within the framework of the SCCERs, the SCCER on Heat and Electricity Storage is dedicated to active research on different related topics organized in five work packages.
i) Advanced Battery and Battery Materials with the focus is on Li- and Na-type batteries in terms of energy density, cost and the high explorative area of beyond Li-ion technologies
ii) Thermal Energy Storage with a focus on buildings and processes by exploring advanced adiabatic compressed air storage (AA-CAES), pumped heat electric storage (PHES) and high-temperature process heat.
iii) Hydrogen Generation and Storage by exploring emerging technologies in the field including redox flow batteries, radically lower cost catalysts, and high energy density liquid storage routes.
iv) Development of advanced catalysts for CO2 reduction focusing on the reduction of CO2 by catalytic and electrocatalytic (co-electolysis) means aiming at high efficiencies and selectivities for syngas/hydrocarbon production
v) Technology Interaction of Storage Systems explores the storage technology in a wider context to make the SCCER more powerful. Questions of technology interaction are part of the research, covering a wide range of aspects from socio-economical aspects to system integration and modeling.
This talk will summarize the activities within the SCCER Heat & Electricity Storage carried out at Paul Scherrer Institute ranging from research on Na-ion batteries, fundamental understandings of electrochemical CO2 reduction as well as development of cell level co-electrolysis devices, life-cycle analysis of storage systems and, finally, development and construction of a 100 kW Energy System Integration Platform.