

Corso di Studio CHIMICA E TECNOLOGIE PER L'AMBIENTE E PER I MATERIALI Curriculum Ambiente, Energia; Rifiuti - Sede Rimini Curriculum Materiali - Sede di Faenza

Il Prof. LORENZO STIEVANO, Institut Charles Gerhardt Montpellier, UMR 5253 CNRS-UM-ENSCM, Université de Montpellier, Francia, invitato dal Corso di Studio (Docenti proponenti: Prof. Marco Giorgetti, Prof. Mario Berrettoni) terrà due giornate di conferenze (6 ore) presso le sedi di Rimini e Faenza dal titolo "**Advances in lithium and sodium batteries**", con il seguente calendario:

FAENZA, Martedì 23 Maggio (ore 13-19)

RIMINI, Giovedì 25 Maggio (ore 9-12; 15-18)

Abstract

The development of affordable and long-life electrochemical energy storage systems with increasing energy density is essential for the development of sustainable energy technologies. Batteries are actually fundamental parts of nomad electronics, and are expected to be more and more important for electric-driven transportation and for the storage of the energy generated from renewable resources.

Li-ion batteries (LIB) provide nowadays the best performance in terms of energy density and represent one of the major research fields in materials chemistry of the last ten years. In this presentation an introduction to LIB and to their applications will be followed by a detailed review of electrode materials, electrolytes and additives for LIB. Finally, future directions for LIB will be presented, including innovating systems based on different alkali and alkaline-earth metals.



Lorenzo Stievano received his PhD from the University of Ferrara, Italy, in 1999 after graduating at the University of Venice, Italy. He is Full Professor of Inorganic Chemistry at the University of Montpellier, Institut Charles Gerhardt for Molecular Chemistry and Materials since 2009. His current research interests focus on the study of inorganic materials for energy conversion and storage applications, going from the synthesis and the characterisation of advanced materials to the development of in situ and operando analytical methods for the comprehension of their working mechanism.

Detailed content of the lectures - Plan

- Introduction to electrochemical energy storage
 - \circ $\;$ Introduction to batteries and battery performance
 - Type of batteries
 - Applications and future developments: the importance of energy storage
- Lithium based systems:
 - o Why Li? Advantages and resources
 - Primary Li batteries
 - Secondary batteries: from Li metal to Li-ion systems
 - The "rocking chair" mechanism
 - Components and performance
 - Electrode materials and working mechanisms
 - Electrolytes
- Post-Li-ion systems
 - Li-air and Li-sulfur systems
 - Other alkaline and alkali-earth metals
- Cutting edge research on Li and post-Li batteries
- Conclusions