В четверг 18/06/15 в аудитории 446 в 10-30 состоятся доклады ведущих ученых в области материаловедения и электрохимической энергетики

Prof. Lu Li
National University of Singapore

Lu Li received his B.Eng and M. Eng from Tsinghua University, China, and his Ph.D from the Katholiek Universiteit Leuven, Belgium. After four years of doctoral study and two years of post-doctoral work at the Department of Metallurgy and Materials Engineering, Catholic University of Leuven, Belgium. He joined the Department of Mechanical Engineering, National University of Singapore in 1991 and is a Full Professor. Dr. Lu is heavily involved in the research of functional materials, mainly in two directions: i) materials for Li-ion rechargeable batteries which include traditional bulk batteries and all-solid-state batteries, and for supercapacitors, and ii) piezoelectric and ferroelectric materials. Dr. Lu is the Editor-in-Chief of Functional Materials Letters, Associate Editor of Materials Technology particularly in charge of functional materials, and member of Editorial Board of Scientific Reports in charge of energy storage materials. Dr. Lu is also Guest Professor of Zhejiang University, China and Honoria Professor, Queensland University, Australia.

Explore $Li_4Ti_5O_{12}$-based anode materials for high-power lithium-ion batteries

Lithium-ion batteries (LIBs) are popular electrochemical devices nowadays. Due to their unique merits in terms of high operating voltage, high energy density, low self-discharge and absence of memory effects, they are widely used in portable electronic devices, such as notebook PCs, mobile phones, tablets and digital cameras. Furthermore, to meet the environmental concerns, their applications have been extended to electric vehicles (EVs) and hybrid electrical vehicles (HEVs). However, the current LIBs are handicapped by several critical disadvantages, such as low power density, short cycling life and poor safety. Therefore, there is urgency to develop the LIBs with a high power density, good cyclic stability and low cost in order to significantly penetrate the EVs/HEVs market. To achieve this goal, $Li_4Ti_5O_{12}$ (LTO) has been considered as promising anode material due to its high working potential, safety and advanced cyclic stability. However, its electrochemical performances are greatly limited by its intrinsically poor conductivity and overly high working potential. To overcome these two limitations and thus improve the electrochemical performances, several strategies, including crystal-structure modifying, compositing, hierarchical particle structuring and combined ones, have been used to engineering. They are able to enhance the electronic conductivity and Li^+ ion diffusion coefficient in LTO particles, improve the electrical conduction, decrease the LTO particle size, and/or lower the working potential of LTO. The material structures, properties and electrochemical performances of the prepared LTO-based materials have intensively and systematically been investigated. Several promising LTO-based materials with high power density and good cyclic stability have been obtained, thus may find their practical applications in EVs/HEVs.