

学术报告

题目: All-solid-State Li-ion
microbatteries based on
self-supported titania
nanotubes

报告人: Prof. Thierry Djenizian
Aix-Marseille University, France

时间: 7月7日(周一) 下午 2:00

地点: 卢嘉锡楼报告厅 (202)

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固体表面物理化学国家重点实验室
化学化工学院
7月3日

All-solid-State Li-ion microbatteries based on self-supported titania nanotubes

Thierry Djenizian
MADIREL Laboratory
Aix-Marseille University

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Abstract

Nowadays, lithium-ion batteries (LIBs) are widely used to power portable devices, microelectronics, vehicles, etc. With many advantages such as high surface area and improved charge transport, self-supported 3-D nanostructured metal oxides are promising electrode materials for LIBs and their impact is particularly significant when considering the miniaturization of energy storage systems and the development of 3D microbatteries [1-3].

During this talk, it will be presented the fabrication and use of materials derived from self-organized titania nanotubes (TiO_2nts) as negative 3D self-supported electrodes for microbatteries [4-8]. This kind of 3D nanostructured electrodes is particularly interesting due to better electrochemical performance in terms of kinetics and stability during cycling.

Then, the fabrication of an all-solid-state Rocking-chair battery composed of vertical arrays of TiO_2nts as anode, a polymer thin film as electrolyte, and a $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ (LNMO) layer as cathode will be shown [9]. According to the electrochemical tests, this 2D full-solid microbattery showing an operating voltage of 2.1V exhibits high performance such as good discharge capacity and good capacity retention with high coulombic efficiency.

Finally, the current approaches developed at MADIREL to achieve the fabrication of a full 3D microcell will be highlighted. Particularly, the conformal electrodeposition of polymer electrolytes into the titania nanotubes [10] and their potential filling will be discussed.

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