

Palestra de Pesquisador Visitante:

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Local: Anfiteatro do PPGEM (Bl 4, prédio 74, 2º andar, Campus do Vale)

Data/hora: Terça-feira, 7 de dezembro, as 14:30h

Título:

Electrochemical fabrication of one-dimensional nanomaterials for micro power sources

RESUMO:

The spectacular development of on-board solutions for electronic devices and microelectromechanical systems (MEMS) has enhanced the race towards the miniaturization of low power sources at the micrometer scale. Particularly, the fabrication of rechargeable microbatteries has opened interesting perspectives for a large number of applications (smartcards, RFID tags, sensors, medical implants, etc...), which is associated to a strong economical impact.

This presentation reviews a recent development on 1D nanomaterials used as negative electrodes for Li-ion microbatteries. Particularly, the possibility to exploit self-organized titania nanotubes as an alternative anode for Li-ion batteries with enhanced electrochemical performances are introduced. Principle and formation mechanism of self-organized TiO₂ nanotubes by anodization as well as the growth of metallic nanowires by electrodeposition will be presented. Then, electrochemical performance of electrodes composed of self-organized TiO₂ nanotubes and composite TiO₂ nanotubes-oxide nanowires will be given. Finally, the electrochemical deposition of copolymer thin film electrolyte (PMMA-b-PEO) into self-organized titania nanotubes will be presented opening perspectives for the fabrication of a on-chip and flexible microbatteries entirely prepared by electrochemical techniques.

Recent publications

1. G. Ortiz, I. Hanzu, P. Knauth, P. Lavela, J. L. Tirado, and T. Djenizian, "Nanoarchitected TiO₂/SnO: A Future Negative Electrode for High Power Density Li-Ion Microbatteries?", **Chem. Mat.**, 22, 1926, (2010).
2. G. Ortiz, I. Hanzu, P. Knauth, P. Lavela, J. L. Tirado, and T. Djenizian, "A novel architected negative electrode based on titania nanotube and iron oxide nanowire composites for Li-ion microbatteries", **J. Mat. Chem.**, 20, 4041, (2010).
3. G. Ortiz, I. Hanzu, T. Djenizian, P. Lavela, J. L. Tirado, and P. Knauth, "Alternative Li-ion battery electrode based on self-organized titania nanotubes", **Chem. Mat.**, 21, 63 (2009).
4. G. Ortiz, I. Hanzu, P. Knauth, P. Lavela, J. L. Tirado, and T. Djenizian, "TiO₂ nanotubes manufactured by anodization of Ti thin films for on-chip Li-ion 2D microbatteries", **Electrochim. Acta**, 54, 4262 (2009).
5. G. Ortiz, I. Hanzu, P. Knauth, P. Lavela, J. L. Tirado, and T. Djenizian, "Nanocomposite Electrode for Li-Ion Microbatteries Based on SnO on Nanotubular Titania Matrix", **Electrochem. Solid St. Lett.**, 12, A186, (2009).

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