FORTH / ICE-HT

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SPEAKER: **Professor Sviatoslav A. Kirillov**
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THEME: **Novel materials for lithium batteries and hybrid devices of high energy and pulse power**

PLACE: FORTH/ICE-HT auditorium

DATE: Tuesday, 29th of May, 2007

TIME: 12:00

ABSTRACT: In this talk, activities of Joint Department of Electrochemical Energy Systems (JDEES), the leading institution in Ukraine in the field of novel chemical power sources of various types and purposes, will be overviewed. Main directions of works of JDEES are (i) R&D of power sources, including secondary lithium-ion batteries, supercapacitors and the so-called hybrid devices, (ii) synthesis and modification of electrode materials, and (iii) studies of common and non-traditional electrolytes. Synthesis and testing of lithiated titanium oxide, the so-called zero-strain material to replace intercalated graphite anodes, will be described in some detail. Using our regulated hydrolysis method, we are able to produce nanosized titanium oxide with specific surface areas exciding 500 m2/g, which is proven to be prospective for electrochemical and environmental applications. Modified oxy-acid routes for synthesizing single and mixed oxides will be illuminated. Materials obtained demonstrate high activity in lithium batteries (LiCoO2, LiMn2O4 and lithiated spinels) and, as follows from the tests performed in Ukraine and at ICE/HT, in catalytic applications (CuO, MnO2, CeO2 and their mixtures). Studies of non-traditional electrolyte systems for lithium power sources will also be mentioned. These electrolytes have extremely broad electrochemical windows (exceeding 6 V), and from this point of view are prospective for the use in high voltage batteries employing novel cathode materials.