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O.S.A.1.

SONOELECTROCHEMISTRY – A VERSATILE TOOL FOR THE PREPARATION OF NANOMATERIALS

Chr. Argirusis[1,2], S. Martens[2], P. Sakkas[1], G. Sourkouni[2,3], O. Schneider[2,4]
[1]*National Technical University of Athens; School of Chemical Engineering, Zografou, Greece,*
[2]*Clausthal University of Technology, Institute of Metallurgy, Clausthal-Zellerfeld, Germany*
[3]*Clausthal University of Technology, Energy Research Centre Lower Saxony, Goslar, Germany*
[4]*Technische Universität München, Department of Physics, Chair for Energy Conversion and Storage, Garching, Germany*

Sonoelectrochemistry, the application of ultrasound in electrochemistry has become increasingly popular in the past decade, especially in the field of materials science because of its potential in the production of nanomaterials, metals, alloys and composites. The major effects of ultrasound in electrochemical reactions are the enhanced mass transport due to acoustic streaming, influence of cavitation on reaction mechanism and surface cleaning and erosion. Electrochemical experiments can be performed by positioning the horn face to face to the working electrode with a distance between 1-80 mm, or by using the ultrasonic horn generating the ultrasound itself as the cathode, which is especially suitable for the production of nano-powders. Both approaches are discussed along with the possibility to use an Electrochemical Quartz Crystal Microbalance to monitor the process.

O.S.A.2.

SYNTHESES AND CHARACTERIZATIONS OF $LiFePO_4$ POWDERS

D. Jugović[1], M. Kuzmanović[1], M. Mitrić[2], N. Cvjetićanin[3], D. Uskoković[1]
[1]*Institute of Technical Sciences of SASA, Belgrade, Serbia,*
[2]*The Vinča Institute of Nuclear Sciences, University of Belgrade, Serbia,*
[3]*Faculty of Physical Chemistry, University of Belgrade, Serbia*

The olivine type compositions $LiMPO_4$ (M = Fe, Mn, Co) are among the most attractive materials for the positive electrode of lithium-ion battery. The benefits of using $LiFePO_4$ are excellent cycle life, high structural stability, low cost and environmental friendliness. Here will be presented our efforts to obtain $LiFePO_4$ powders through several synthesis methods. The differences in phase purity, microstructure, morphology, and electrochemical performances of synthesized powders were investigated by using several techniques such as X-ray powder diffraction, scanning electron microscopy, galvanostatic cycling, Mossbauer spectroscopy, and thermogravimetry. It was found that carbon coated, nanostructured particles with minimal structural imperfections showed the best electrochemical performances.