Programme & The Book of Abstracts

Nineteenth Annual Conference

YUCOMAT 2017

Herceg Novi, Montenegro, September 4-8, 2017

Organised by

MATERIALS RESEARCH SOCIETY OF SERBIA

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NINETEENTH ANNUAL CONFERENCE

YUCOMAT 2017

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O.S.II.2.

Interrelations between positive and negative coercive fields of ferroelectric domains measured by variable amplitude cycling

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Ferroelectric materials are used for a wide range of modern microelectronics applications, especially memory devices. Understanding a switching behavior in these materials characterized by coercive electric fields plays a significant role in the engineering of such devices. The joint distribution function of ferroelectric coercive fields in PZT-based capacitors is measured by running linear-sweep cyclic voltammetry with a progressively changing maximum voltage. In this approach, the correlation degree of positive and negative coercive fields is estimated based on the changes in the negative peak of current-voltage curves with each step of the maximum cyclic voltage scanning the positive peak. As at each maximum voltage step a different number of ferroelectric domains changes their polarization, the changes in the negative peak provide the distribution of negative coercive fields for the domains with a known value of the positive coercive field. It is found that correlations between the positive and negative coercive fields are smaller than one would expect from the symmetric model of ferroelectric switching. We have also observed a peak-splitting effect and identified some of its features. The suggested approach of determining the joint distribution function is general and thus can be applied to other materials and devices.

O.S.II.3.

Synthesis and characterization of $Li_2FeP_2O_7$ cathode material

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The search for alternative cathode materials for Li-ion batteries has recently emerged $Li_2FeP_2O_7$ pyrophosphate as a new potential competitor for $LiFePO_4$ material. It has a possibility to offer good rate capability, lithium ion diffusivity and volumetric energy density, and is a material of high safety and low raw materials cost. In addition, there is the probability of releasing the second Li-atom at a higher redox potential of 5.2 V, where the theoretical capacity would reach 220 mAhg−1. Optimized solid state reaction is used for the synthesis of pure $Li_2FeP_2O_7$ powder and a composite $Li_2FeP_2O_7$/C. The synthesized powders are characterized by X-ray powder diffraction, field emission scanning electron microscopy, FTIR spectroscopy, and galvanostatic charge/discharge cycling.

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