

Programme & The Book of Abstracts

Nineteenth Annual Conference

YUCOMAT 2017

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Organised by

MATERIALS RESEARCH SOCIETY OF SERBIA

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NINETEENTH ANNUAL CONFERENCE

YUCOMAT 2017

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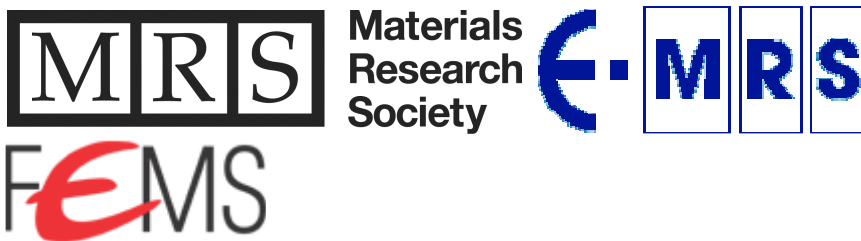
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P.S.C.9.

Accelerated service life test of electrodeposited NiSn coatings as bifunctional hydrogen and oxygen evolution catalysts for alkaline water electrolysis

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Electrodeposited NiSn alloy coatings were tested for application as cathodes and anodes in the cell for alkaline water electrolysis in 30 wt.% KOH at 80 °C. The "accelerated service life test" (ASLT) was performed for HER and OER reactions, and compared to those for Ni electrode. The morphology and chemical compositions of the NiSn and Ni coatings were investigated by SEM and EDS, while their surface composition was investigated by XPS before and after the ASLT for both reactions, respectively. It was shown that the cell voltage at $j = 0.3 \text{ A cm}^{-2}$ saving with the NiSn electrodes amounts to about 435 mV before and about 304 mV after the ASLT. SEM results showed that no changes in the morphology of as prepared samples could be detected after the ASLTs for both reactions. EDS and XPS analysis confirmed that some changes occurred during the ASLT, particularly for the oxygen content in the surface layer.

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P.S.C.10.

Zero-dimensional hexagonal stanene nanostructures in magnetic field

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Stanene, low-buckled honeycomb monolayer of tin atoms has been recently synthesized via molecular beam epitaxy. First-principles calculations predicted that stanene is quantum spin Hall insulator, which is a consequence of intrinsic spin-orbit coupling. Stanene has the largest nontrivial bandgap of all group IV monolayers, thus it is the most promising candidate for novel applications considering the quantum spin Hall effect. In this paper, by means of a comprehensive model we explore the bulk-edge correspondence in (quasi) zero-dimensional structures with closed edges subjected to perpendicular magnetic field. The hexagonal flakes and nanorings with zigzag and armchair edges are analyzed. In both of them helical edge states circulating around the outer and inner edges are found. The edge states are found to have properties strongly dependent on the structure geometry and are affected by the edge type.

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