

# PREPARATION AND INVESTIGATION OF 3D ZINC-NICKEL COATINGS FOR OXYGEN EVOLUTION REACTION

A. Balčiūnaitė<sup>\*</sup>, A. Antanaitis, L. Tamašauskaitė-Tamašiūnaitė, E. Norkus

*Department of Catalysis, Center for Physical Sciences and Technology, Vilnius, Lithuania*

*\* [aldona.balciunaite@ftmc.lt](mailto:aldona.balciunaite@ftmc.lt)*

Here we present a simple approach to prepare 3D structure zinc-nickel coatings on titanium (ZnNi/Ti) by electrochemical method. ZnNi coatings were electroplated on the Ti surface from a bath containing 1 M Zn(NO<sub>3</sub>)<sub>2</sub>, and 1 M NiSO<sub>4</sub>. The electrochemical deposition was carried out at the different current densities and times: i) 500 mAcm<sup>-2</sup> for 1 min; ii) 50 mAcm<sup>-2</sup> for 1 min and 500 mAcm<sup>-2</sup> for 5 min; iii) 50 mAcm<sup>-2</sup> for 1.5 min, 250 mAcm<sup>-2</sup> for 1.5 min and 500 mAcm<sup>-2</sup> for 2 min. The morphology and composition of the catalysts were examined using scanning electron microscopy, energy dispersive X-ray spectroscopy, X-ray diffraction, and inductively coupled plasma optical emission spectroscopy. The electrocatalytic properties of the prepared ZnNi/Ti catalysts for oxygen evolution reaction were investigated by recording linear scan voltammograms in a 1 M KOH solution at a potential scan rate of 10 mV s<sup>-1</sup> in a potential range from OCP up to 1 V vs. Ag/AgCl/KCl<sub>sat</sub> at a temperature of 25 up to 75 °C. The highest electroactivity for oxygen evolution reaction was obtained using ZnNi/Ti coating, which contains 20 at.% of Zn and 80 at.% of Ni.

Acknowledgment. This project has received funding from European Social Fund (project No 09.3.3-LMT-K-712-19-0138) under grant agreement with the Research Council of Lithuania (LMTLT).