Contribution ID: **187** Contribution code: **S11-EPASE-210** Type: **Poster presentation (virtual)**

Study of Zn electrode active mass with added cuprates ceramic by electrochemical impedance spectroscopy

Wednesday, 31 August 2022 11:24 (2 minutes)

The nickel-zinc electrochemical system is a promising candidate for alkaline batteries due to its low toxicity, high energy densities and power. Their main disadvantage is the solubility of the zinc electrode and the formation of dendrites during operation. Previous studies having used B(Pb)SCCO ceramic as additive in the Zn electrode mass proved its positive effect on improving the electrochemical properties [1,2]. Recently, the silver (Ag) is emerging as a promising component for the development of high-performance anodic materials for Zn-nickel batteries [3]. In the present work the effect of Ag additives, as well as conductive ceramics B(Pb)SCCO on the electrical properties and behavior of the Zn electrode was studied. The incorporation of these additives in the Zn electrode active mass was assisted by ultrasonic treatment. The phase composition and morphology of the electrode material were characterized by scanning electron microscopy (SEM) and X-ray diffraction (XRD). Zn electrodes prepared by inserting a Zn paste with a different amount of additive B(Pb)SCCO 2212 and Ag into the copper foam matrix were used as working electrode. The electrochemical behavior of the modified Zn electrodes was investigated using a three-electrode configuration in a 7M KOH electrolyte. The effect of the additives on the AC electrical response of the studied electrochemical system was estimated by electrochemical impedance spectroscopy (EIS).

Acknowledgements: The authors acknowledge the financial support by the National Science Fund (NSF) of Bulgaria contract № KP-06-N58/6 from 19.11.2021 granted under "Competition for financing fundamental scientific research - 2021".

References:

1. M. Mladenov *et al.*, Electrode mass for zinc electrode of alkaline rechargeable batteries, BG Patent Reg. No 66730/28.08.2018

2. A. K. Stoyanova-Ivanova *et al.*, Comptes rendus de l'Acad´emie bulgare des Sciences,75, No 3, 2022, pp. 358-366

3. Y. Rong, Z. Yang, L. Deng, Z. Fu, Ceramics International 46 (2020) 16908

Primary authors: Prof. STOYANOVA-IVANOVA, Angelina (Georgi Nadjakov Institute of Solid State Physics, Bulgarian Academy of Sciences); Mr PETKOV, Ognyan (Georgi Nadjakov Institute of Solid State Physics, Bulgarian Academy of Sciences); Prof. LEFTEROVA, Elefteria (Institute of Electrochemistry and Energy Systems "Academician Evgeni Budevski", Bulgarian Academy of Sciences); Prof. MARINOV, Yordan (Georgi Nadjakov Institute of Solid State Physics, Bulgarian Academy of Sciences); Dr IVANOVA, Galia (Institute of Electrochemistry and Energy Systems "Academician Evgeni Budevski", Bulgarian Academy of Sciences); Prof. HADJICHRISTOV, Georgi (Georgi Nadjakov Institute of Solid State Physics, Bulgarian Academy of Sciences); Prof. STOYANOVA, Antonia (Institute of Electrochemistry and Energy Systems "Academician Evgeni Budevski", Bulgarian Academy of Sciences)

Presenter: Mr PETKOV, Ognyan (Georgi Nadjakov Institute of Solid State Physics, Bulgarian Academy of Sciences)

Session Classification: Poster session (virtual)

Track Classification: Scientific Sections: S11 Environmental Physics – Alternative Sources of Energy