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BOOK OF ABSTRACTS

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ELECTROCHEMICAL POTENTIAL OF POLY(VINYL ALCOHOL) MODIFIED BACTERIAL NANOCELLULOSE AS PLATINUM NANOPARTICLES SUPPORT

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Abstract

Bacterial nanocellulose (BNC) has gain on its popularity in the last decades and it has attracted a contemporary research interest as a promising material suitable for different applications (in medicine as a material for biomedical implants or scaffolds, in pharmacy as controlled release drug carriers, in industry as barriers, membranes, and absorbers, and electronics. BNC is hydroxyl group rich biopolymer which further provides various possibilities for modifications and the production of composites. Poly(vinyl alcohol), PVA, polymer of excellent film forming capacity, high thermal stability, flexibility, good chemical resistance, and mechanical properties has been recognized as promising material for BNC/PVA composite preparation. PVA is chemically compatible with BNC, due to their polarity and large amount of hydroxyl groups forming strong inter-molecular hydrogen bonds. The main objective of this work was to prepare new platinum supported catalyst on BNC/PVA composite as nanoparticles carrier, designed for electrocatalytic applications. For that purpose, BNC/Pt suspension was mixed with 1 wt% PVA solution and BNC/PVA/Pt catalyst in the form of film was successfully synthesized. The structure and thermal properties of catalyst were characterized by ATR-FTIR and TG analysis, respectively, while its crystallinity was investigated by XRD analysis. Electrocatalytic potential of BNC/PVA/Pt catalyst was tested in methanol oxidation reaction. Remarkable catalytic activity of new Pt based catalyst was confirmed. The obtained results for catalyst activity was comparable to those obtained for preferentially used carbon based Pt supports pointing that BNC based composited can be considered as great substitution of carbon based materials with the green one.

Keywords: bacterial nanocellulose, poly(vinyl alcohol), Pt nanoparticles, methanol oxidation.

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