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RSE-SEE

South-East Europe

Second Regional Symposium on Electrochemistry

South-East Europe

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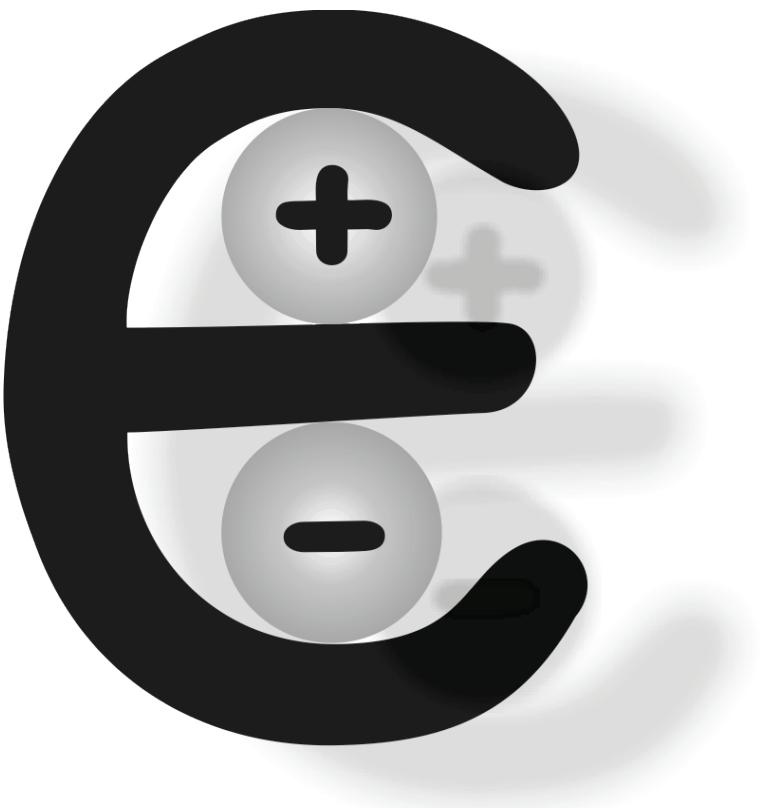

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O-12

The electrochemical synthesis of different Ag/PVP nanocomposites

Željka Jovanović, Vladimir Panić*, Vesna Mišković-Stanković, Branislav Nikolić
Faculty of Technology and Metallurgy, University of Belgrade
Karnegijeva 4, 11000 Belgrade, Serbia
**ICTM – Department of Electrochemistry, University of Belgrade*
Njegoševa 12, 11000 Belgrade, Serbia

The potential use of Ag/poly(*N*-vinyl-2-pyrrolidone) (PVP) nanocomposites is in wound dressings or soft tissue implants, where Ag nanoparticles (AgNPs) serve as the antimicrobial agent. Ag/PVP nanocomposites were electrochemically synthesized, by the electrochemical reduction of Ag^+ ions into the AgNPs in the PVP aqueous solution and within the crosslinked PVP matrix, forming the non-crosslinked and crosslinked Ag/PVP nanocomposite, respectively. The synthesis of AgNPs was performed in an electrochemical cell with Pt working and counter electrodes and the saturated calomel electrode (SCE) as the reference. The non-crosslinked Ag/PVP nanocomposite was obtained by galvanostatic reduction of Ag^+ ions from the aqueous solution consisted of 0.10 M KNO_3, 3.9 mM $AgNO_3$ and 10 wt. % PVP. The crosslinked Ag/PVP nanocomposite was obtained by *in situ* potentiostatic reduction of Ag^+ ions within PVP hydrogel, previously prepared by *γ*-irradiation of the 10 wt. % PVP aqueous solution. Hydrogels were swollen in two different aqueous solutions ((a) 3.9 mM $AgNO_3$, (b) 3.9 mM $AgNO_3$ + 0.10 M KNO_3) for 24 h. Ag/PVP nanocomposite systems were characterized by UV-Vis spectroscopy, FTIR, TEM, XRD, Z-sizer analysis and cyclic voltammetry.

O-13

Electrochemical characterization of the excitable iron-nitric acid system

Marianna Kourouzidou, Michael Pagitsas, Dimitra Sazou
Department of Chemistry, Aristotle University of Thessaloniki
54 124 Thessaloniki, Greece

This study addresses the non-linear behavior of the Fe|HNO_3 system at concentrated nitric acid solutions (c_{HNO_3} = 11-14.4 M). Three distinct states are distinguished, namely active, partially passive and passive, characterized by equilibrium potential values. Different electrochemical processes dependent on the c_{HNO3} and applied potential control the different states. Within the concentration range 11-14.4, the equilibrium open circuit potential, called also as “mixed potential” takes values ranged between ~800 - 840 mV. This potential regime is located within the passive state of the Fe|HNO_3 system and starts at the Flade potential. It is suggested that the passive state within the range determined between the “mixed potential” and Flade potential is a stable but excitable attractor. When an appropriate cathodic current is applied, a dissolution reaction is initiated locally by breaking the passive oxide film.