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BIOCERAMIC  
MATERIALS



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# WELCOME

The aim of the conference is to overview and share information about the latest achievements in bioceramic nanotechnologies with the scientific community. Over the duration of the conference, scientists from the fields of chemistry, physics, technology, medicine and implantology will be able to acquaint themselves with synthesis methods, unique properties, and applications of bioceramic nanomaterials.

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## Electrochemical Synthesis of Dendritic Gold Nanostructures and Application for the Development of Glucose Biosensor

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### ABSTRACT

An important task for modern medicine is achieving comprehensive and accurate diagnosis of diseases. The new medical diagnostic achievement – bioanalytical methods and biosensors could help to solve the analytical problems. Nanoscience and nanotechnology breakthroughs have a high impact on the different fields of science, including analytical and bioanalytical chemistry, medicine and pharmacy. Gold micro- and nano-structures have received considerable attention due to their attractive physical and chemical properties [1]. Immobilization of glucose oxidase (GOx) on the gold nanoparticles allows to improve stability and sensitivity of glucose biosensors. These biosensors exhibited a high selectivity and can be used for the glucose detection in the blood even in the presence of other electrochemically active substances. Additionally, gold nanoparticles are biocompatible, can ensure good enzymatic activity and higher GOx uploading on the same electrode surface using different immobilisation methods [2,3].

In this work the optimal conditions for electrochemical synthesis of dendritic gold nanostructures on the graphite rod electrode were determined. Different GOx immobilisation methods – adsorption and covalent immobilisation through self-assembled monolayer without and with cross-linking, were applied for the development of electrochemical glucose biosensor. All electrochemical measurements were performed with a computerized potentiostat/galvanostat PGSTAT 30/Autolab (EcoChemie, Netherlands) with GPES 4.9 using three-electrode system. Glucose biosensor based on GOx covalently immobilised on DGNs/GR electrode surface modified with 11-mercaptoundecanoic acid possesses better stability, higher sensitivity, and lower limit of detection.

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