

Bioactive Ag-, Zn- and Cu- incorporated calcium phosphate coatings: Microstructure, physicochemical and biological properties**Mariya B Sedelnikova**

Institute of Strength Physics and Materials Science of SB RAS, Russia

Bio composites combining a metal base and a bioactive calcium phosphate coating are promising materials for traumatology, orthopaedics and dental implantology. A serious problem in biomedicine is bacterial infection of medical implants. It is necessary to develop biocoatings with high antibacterial activity, biosafety, and Osseo conductivity. The use of the microelements such as Ag-, Zn- and Cu- in trace amounts allows to produce a directional antimicrobial effect in the postoperative period and to minimize the risk of pathogenic microorganism evolution. Microarc oxidation is a relatively new surface treatment technique, being famous for its ability to form in-situ grown porous and homogeneous coatings on the surface of valve metals, such as Ti, Al, Mg, Nb, their alloys, etc.

In present research work the study of the CaP bio coatings with Ag, Zn and Cu incorporation produced by a (MAO) method on the titanium substrate were carried out. The coatings were formed in the anodic potentiostatic regime for 5–10min under the applied voltages of 200–450V. The Zn- and Cu-incorporated coatings were deposited in the electrolyte containing 30%

aqueous solution of phosphoric acid, calcium carbonate and Zn- or Cu-substituted hydroxyapatite ($\text{Ca}_{9.9}\text{Zn}_{0.1}(\text{PO}_4)_6(\text{OH})_2$ or $\text{Ca}_{9.9}\text{Cu}_{0.1}(\text{PO}_4)_6(\text{OH})_2$). To synthesize the Ag-incorporated coatings the electrolyte containing Na_2HPO_4 , NaOH, AgNO_3 and $\beta\text{-Ca}_3(\text{PO}_4)_2$ powder was used.

The comparative investigation of the Ag-, Zn- and Cu-incorporated CaP coatings showed that the electrolyte composition influences considerably on the morphology, structure and properties of the coatings. In addition, the applied voltage effects significantly on the coating phase composition, thickness and roughness. Introduction of Ag, Zn and Cu microelements into the coatings provides the formation of their antibacterial properties.

Speaker Biography

Mariya B Sedelnikova has completed her PhD and received the degree of technical sciences at the age of 45 years from Tomsk Polytechnic University, Russia. She is the senior researcher of Institute of Strength Physics and Materials Science of SB RAS. She has over 100 publications.

e: smasha5@yandex.ru

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