Contribution ID: **162** Type: **Poster**

Phase composition of coatings formed by the gas-detonation spraying of hydroxyapatite powder

Friday 7 November 2025 12:05 (5 minutes)

Recently, biocompatible coatings for medical implants have become widely used. To improve their functionality and safety, it is necessary to understand the mechanisms of coating formation. In this study we present an analysis of the phase composition of biocompatible coatings produced from hydroxyapatite (HA) powder using the gas-detonation spraying technique. The coatings were deposited onto various substrates, including metals (copper, medical, and technical titanium), quartz plates, and polymers (polyetheretherketone, fluoroplastic). Raman spectroscopy was employed for structural characterization. It was found that all studied coatings contain crystalline HA and additional (secondary) phases. It was shown that secondary phase depends on the substrate material, namely, for metal substrates it is amorphous HA, for polymer substrates it is tricalcium phosphate. The study of coatings with different thicknesses showed the formation of a transition layer between coating and substrate, which differs in phase composition from the main coating. In the case of polymer substrates, it is characterized by an increased tricalcium phosphate content, while for metal substrates the intermediate layer is determined by a reduced content of amorphous HA. In addition, it was observed that an increase in the distance between the gun and the metal substrate leads to a decrease in the content of amorphous HA in the coating. The obtained experimental data allow us to suppose a formation mechanism of the sprayed coatings based on the macro-characteristics of substrate material, namely, hardness and thermal conductivity.

Type of presence

Presence at Taras Shevchenko National University

Author: Dr VORONA, Igor (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine)

Co-authors: Dr BELYAEV, Alexander (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Dr NASIEKA, Iurii (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Dr VALAKH, Mykhaylo (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Ms ISAIEVA, Oksana (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); NOSENKO, Valentyna (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Mr LOZINSKII, Volodymyr (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Mr TEMCHENKO, Volodymyr (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine); Dr YUKHYMCHUK, Volodymyr (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine)

Presenter: NOSENKO, Valentyna (V.Ye. Lashkaryov Institute of Semiconductor Physics, National Academy of Sciences of Ukraine)

Session Classification: Poster Session