**Applications of Robotic Microplasma Spraying for Manufacturing Ceramic Coatings for Medical Implants and Resistance Heating Elements**

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In this joint study of Kazakhstani and Ukrainian scientists, the possibilities of using microplasma spraying (MPS) of ceramic coatings for various purposes were investigated, including MPS of hydroxyapatite (HA) powder to obtain biocompatible coatings on medical implants and MPS of two-layer Al2O3/TiO2 coating onto the steel resistive heating element (RHE) to increase the efficiency of its work by increasing its heat transfer coefficient. Robot aided MPS of HA powder with various spraying parameters has been carried out and coatings have been evaluated with the use of Scanning Electron Microscopy (SEM) and X-Ray diffraction analysis to establish an influence of MPS parameters on the coating microstructure and phase composition. Resistive paths from Al2O3/TiO2 of 4 mm wide with Al2O3 low layer thickness of 300±50 µm and with TiO2 top layer thickness of 150±50 µm were produced and electrical conductivity of the RHE coating depending on the heating temperature was tested. MPS parameters to obtain HA coatings with the desired porosity, phase composition and crystallinity suitable for medical applications were established and the possibility of manufacturing the RHE coatings by MPS was proved experimentally. The main MPS parameters affecting the coatings porosity were established. The new robot assisted MPS technique resulting from this research provides a promising solution for medical implant and RHE manufacturing.

Keywords: Microplasma Spraying (MPS), ceramic coatings, hydroxyapatite (HA), resistance heating element (RHE), electrical conductivity, porosity.