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Microplasma deposition of biocompatible coatings using an intelligent robotic system for plasma processing(Article)(Открытый доступ)

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This paper presents the method of microplasma deposition of biocompatible coatings using an intelligent robotic system for plasma processing. The two-layer coatings from biocompatible materials, namely from titanium wire and hydroxyapatite powders are sprayed on the surface of titanium substrates. The synthesis of hydroxyapatite powder suitable for applying biocompatible coatings onto medical implants is provided by chemical precipitation. Optimization of the synthesis parameters is carried out by the mathematical modelling method. The porosity of coatings is controlled by changing the spraying regime. The use of the intelligent robotic system for plasma processing allows movement of a robot arm along a given 3D-trajectory and accurate maintenance of plasma spraying parameters: the trajectory and travel speed of the plasma source, an angle between the sprayed surface and the plasma jet, and the distance from the plasma source to the surface of substrates. The composition and regimes of microplasma spraying of biocompatible coatings using an intelligent robotic system for plasma processing have been developed. 