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Characterization of the advanced Ti-Ag coatings deposited by Thermionic Vacuum Arc method for biomedical applications

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The aim of this paper is to report on the results of the morphology, structure and wettability of the Ti-Ag films deposited by using the Thermionic Vacuum Arc (TVA) method. The morphology and the structure of the thin films surface were examined using a TEM (Phillips CM 120 ST, acceleration voltage of 120 kV, resolution point of 1.4 Å and a magnification of 1.2 M) and Scanning Electron Microscopy (SEM, Zeiss EVO 50 SEM). Wettability of the surface was calculated by the contact angle method. The measurement was performed by establishing the tangent angle of a sessile liquid drop on a solid surface, defined by the mechanical equilibrium of the drop under the action of three interfacial tension solid-vapour, solid-liquid and liquid – vapour, by meaning of the performed analysis software See System. All of these results were developed taking into account the Ti-Ag are difficult to be processed. However, Ti-Ag coatings are used in various medical applications due to bio- and chemically inert, being presented as prospective biomaterials in artificial hips, pins for setting bones and for other biological implants. Thermionic Vacuum Arc can be ignited in vacuum between a heated cathode surrounded by an electron focusing Wehnelt cylinder and an anode containing the material to be deposited (Ti-Ag). The TVA method is an original discharge type in pure vapour plasma, which can become one of the most suitable technology to significantly improve the quality of the surfaces covered with different materials. Two types of substrates were used in this work: silicon wafer and glass. Before the deposition, the substrates were chemically cleaned in ultrasonic bath with a highly effective special cleaner. The uniformity, low roughness and smoothness suggest that Ti-Ag thin films deposited by TVA technology could be considered as valuable advanced coatings titanium-based materials for biomedical applications

Biography

Aurelia Mandes has completed her PhD from PhD School at Physics Faculty from Bucharest University Romania. She is a Post-Doctoral Researcher at Ovidius University, Faculty of Applied Sciences and Engineering, Constanța, Romania. She has published more than 24 papers in reputed international journals (*J Appl Phys*, *Contrib Plasma Phys*, *Eur. Phys. J. D*) and three Chapters in books at Wiley – VCH Publisher 2010, NOVA Publisher 2012 and IN TECH Publisher 2016. She has expertise in deposition and characterization of nanostructured thin films obtained by the Thermionic Vacuum Arc (TVA) technology

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