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Growth and characterization of Ag-Ti thin films obtained by thermionic vacuum arc (TVA) method for biomedical applications

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Silver and silver-based compounds are known as potent antibacterial agents having a large spectrum of activity and they have been studied in biomedical applications for many years. Furthermore, in weird situations, the incorporation of silver into Ti compounds can modify their properties by acting as a solid lubricant. It is bioinert, it does not react with anything inside the body, making it the prime candidate for use in procedures such as dental implants, orthopaedic rods, bone plates and other prosthetics. The aim of this paper is to investigate the growth and structure properties of Ag-Ti thin films deposited by thermionic vacuum arc (TVA) technology on silicon, glass and OLC 45 special substrate. TVA method consists from an externally heated cathode surrounded by a Wehnelt cylinder that concentrates high voltage accelerated electrons on the anode material. The anode is a crucible with a spoon like shape which contains the material to be deposited (Ag-Ti). Due to the applied high voltage, continuous evaporating anode material ensures the metal vapor density in steady state in order to ignite and to maintain a bright discharge in carbon vapors in the inter-electrodes space. Because the discharge sustaining gas is just the evaporating atoms in vacuum, the carbon film deposition is carried out in high purity conditions. The properties of the deposited Ag-Ti thin films were investigated in terms of morphology, tribology and wettability. The thin films were characterized using Scanning Electron Microscopy with energy-dispersive X-ray detection (SEM/EDX). Also, the free surface energy has been evaluated by means of Surface Energy Evaluation System using contact angle method. With this measurement we can evaluate the hydrophilicity or hydrophobicity of a thin film.

Biography

Aurelia Mandes has completed her Doctoral studies at the University of Bucharest in 2010 with the thesis entitled Comparative study of carbon nanostructures deposited by the thermionic vacuum arc method and magnetron sputtering. She has 24 papers published in international journals and three chapters in books.

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