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Studies on the CTi an CAg biomaterials obtained by thermionic vacuum arc technique

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Metal containing DLC films with properties intermediate between DLC and metal carbides have been shown to improve the adhesion and the wear properties. Studies have shown that carbon thin films are suitable as surface coatings on biomedical devices. Doping of carbon with selective elements is an attractive method to enhance the biological and other properties of the thin film. In this work, Silver was chosen as the dopant because of its anti-bacterial properties. As the chemical interactions between Ag and C generally are very weak, and the interactions between the used transition metals and C are strong, it was expected that Ag to form a separate phase. This was observed as the nanocomposite films were consisting of Ag grains embedded in a nanocrystalline or nanocomposite matrix. Titanium carbide (TiC) hard films are considered as high technology materials due to their unique characteristics that have made them of particular interest in a wide variety of applications. TiC it is one of the tribological thin film materials originally developed to replace highly toxic hexavalent chromium (HCr) for prosthetic joints. CAg and CTi nanocomposites thin films were prepared on glass and silicon substrates by Thermionic Vacuum Arc method in a single-gun configuration. After the ignition of the plasma, the shuttle was removed, allowing homogeneous thickness and composition in the substrates over an area of 10 cm². Under certain operating electrical parameters, the plasma becomes stable and can be maintained for as long as the anode material is present. During the deposition, the substrate holder was not rotated. The substrate was kept at ground potential during the deposition of the metal plasma. The results showed that the films' hardness could be significantly increased, and the wear resistance as well. This is due to the microstructure of the films comprising nanocrystalline grains in an amorphous carbon matrix.

Biography

Virginia Dinca-Balan has completed her PhD from PhD School at Physics Faculty from Bucharest University Romania. She is an Assist Prof Dr. at "Ovidius" University of Constanta, Romania, Medicine Faculty on Biophysics and Medical Physics discipline. She published more than 22 papers in reputed international journals (e.g. *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

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