

Nanocomposites and nanomaterials

Properties nanostructured DLC:Ag/ PMMA composites for dental applications

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Ag-incorporated diamond-like carbon films (DLC:Ag) demonstrate have increasingly gained attention due to of wide applications in optical device applications [1], biomedical implants due to surface anti-bacterial properties [2].

This work will focus on the preparation and characterization diamond-like carbon films with embedded Ag nanoparticles deposited on polymer dental materials. DLC-Ag films were deposited on dental parts made of poly methyl methacrylate (PMMA) resin by reactive magnetron sputtering. Metallic nanocomposite films were studied by scanning electron microscope and atomic force microscope was used to define thickness of DLC:Ag films as well as to study the surface morphology and size distribution of Ag nanoparticles. Micro- and nanohardness of the nanocomposite films were measured. Tribological properties of DLC:Ag were researched. We can conclude that this nanocomposite film is excellent as a coating material of a polymer artificial tooth in terms of high wear resistance and biological compatibility.

1. Yaremchuk I, Tamulevičienė A, Tamulevičius T, Šlapikas K, Balevičius Z, Tamulevičius S. Modeling of the plasmonic properties of DLC-Ag nanocomposite films// Phys. Status Solidi (a).- 2014.- 211. –P. 329–335.

2. Endrino J, Sánchez-López J, Galindo R, Horwat D, Anders A: Beneficial silver: antibacterial nanocomposite Ag-DLC coating to reduce osteolysis of orthopaedic implants// Journal of Physics.- 2010.- 252. -P 012005-72.