

PO3067

Mechanical and bio-properties of Cr-DLC films deposited by dual pulsed laser ablation

Petr Písařík¹, Miroslav Jelínek¹, Tomáš Kocourek², Jan Mikšovký¹, Karel Jurek², Jaroslav Lukeš³, Zdeněk Tolde⁴

¹Faculty of Biomedical Engineering, CTU, Kladno, Czech Republic ²Institute of Physics ASCR v.v.i., Prague, Czech Republic ³Faculty of Mechanical Engineering, CTU, Prague, Czech Republic ⁴Innovation Centre for Diagnostics And Application of Materials, CTU, Prague, Czech Republic

petr.pisarik@fbmi.cvut.cz

Diamond-like carbon (DLC) and Cr-containing diamond-like carbon (Cr-DLC) layers were studied for potential medical applications. DLC, Cr-DLC and Cr layers were deposited on silicon, titanium and chromium substrate by dual pulsed laser ablation using two KrF excimer lasers and two targets (graphite and chromium). The topology of layers was studied using scanning electron microscopy (SEM). The composition was analyzed using wavelength-dependent X-ray analysis (WDX analysis) and X-ray diffraction (XRD). Mechanical properties of the films were investigated by indentation and scratch test as a function of Cr content. The values of hardness and reduced Young's modulus in Cr-DLC layers containing DLC films were found to be comparatively less than that of DLC films. On the other hand Cr doped improved adhesion of DLC layers. Ethylene glycol, diodomethane and deionized water were used to measure their contact angles, which were used to evaluate the surface energy.

Keywords

Chromium doped diamond-like carbon
Sp³/sp² ratio
Surface morphology
Mechanical properties
Dual Pulsed laser deposition