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D. Nowak, B. Januszewicz, P. Niedzielski

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Morphology, mechanical and tribological properties of hybrid carbon layer fabricated by Radio Frequency Plasma Assisted Chemical Vapor Deposition

D. Nowak, B. Januszewicz, P. Niedzielski

Institute of Materials Science and Engineering, Lodz University of Technology, 1/15  
Stefanowskiego St., Lodz 90-924, Poland

Abstract

Improvement of mechanical properties and simultaneous preservation of corrosion resistance of austenitic steels applied as medical implants is the subject of numerous papers published in the last years.

Conventional thermal treatments are eliminated due to susceptibility of this group of materials to elevated temperatures.

Commercial solutions allowing modification of austenitic steels implants are based on carbon coatings deposition on their surfaces.

The authors of publication present results of researches on an innovative solution - hybrid carbon layer created in a single stage process carried out inside a RFPACVD (Radio Frequency Plasma Assisted Chemical Vapour Deposition) reactor. The developed hybrid process allows to create simultaneously a diffusive carbon layer and adhesive carbon coating. Mechanical and tribological tests proved that modified austenitic steels are characterised by increased hardness and wear resistance in comparison to currently applied carbon coatings.

Keywords: austenitic stainless steel, S-phase, hybrid carbon layer, implants, CVD, hardness, wear

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