

# STRUCTURE AND MECHANICAL PROPERTIES OF BIOCOMPATIBLE ZrN FILM ON VARIOUS SUBSTRATES

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## ABSTRACT

Zirconium nitride is considered as a promising material for strengthening the surface of various materials, especially those designed for hard tissue surgery. In this study, two kinds of ZrN films were prepared by PVD methods: magnetron sputtering and cathodic arc evaporation. ZrN films were deposited on various substrates: non-modified and ground CFRC (carbon reinforced carbon composites), Ti Gr. 2 and high-alloy steel X153CrMoV12. Structure of ZrN films was measured by rtg. diffraction (Parallel Beam and Bragg Brentano configuration), as well as, mechanical properties (hardness, elastic modulus and adhesion) were measured.

There were found significant differences in structure ZrN films prepared by various methods and differences in mechanical properties. We found that all samples gave good support for the adhesion and growth of human-osteoblast-like MG 63 cells, though the cell numbers on these materials were often lower than on standard cell culture polystyrene dishes and microscopic glass coverslips. Nevertheless, ZrN films can be considered as suitable materials for surface modification of bone implants in order to improve their mechanical properties and their integration with the surrounding tissue.