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# ADVANCED STRUCTURAL CHARACTERIZATION OF BIOCOMPATIBLE Ag-TiCN COATINGS

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**Abstract:** One of the main reasons for biomedical implants failure is the generation of wear debris together with microbial infection. To overcome this problem it has been proposed the use of very low wear coatings as diamond-like carbon (DLC), transition-metal carbides ($MeC_x$) or nitrides ($MeN_x$) in combination with antibacterial elements such silver, gold or copper. The present work explores the potentialities of silver-containing carbon/nitride (Ag-TiCN) based coatings to be used as protective thin films for biomedical implants. Samples were prepared by DC unbalanced reactive magnetron sputtering with contents of Ag ranging from 0 to 20 at.% and Ti from 35 to 15 at.% while keeping C, N and O content constant. The coatings were fully characterized in terms of structure (XRD, Raman) and depth profiling composition by GDOES and RBS (using the nitrogen resonance at 3.70 MeV $He^+$ ions). In particular, we have selected three samples with different Ag contents (0, 6 and 20%) and carried out and advanced surface characterization using XPS, ARXPS and HR-SEM to study the segregation of silver towards the surface. We have correlated the structure and composition of the films with their biological properties. Microbial adhesion was assessed for both bacteria (*Staphylococcus epidermidis*) and yeast (*Candida albicans*).