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Tribo-corrosion and biological behavior of HAP-SiC bioactive coatings with addition of TiO2

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In the last years, the increased number of younger patients requiring implant replacements has emphasized the need for dental prosthetic and joint restorations with improved performance and longevity. For this reason, a marked trend in biomedical field is to increase the performance and service life of metallic implants. For this purpose, the materials' biocompatibility must be properly combined with high strength, ductility and good mechanical properties, wear and corrosion resistance. Therefore, a large variety of
coating types have been proposed as possible candidates to fulfil at least some of these requirements.
This work was aimed at developing a new type of coating (HAP-SiC-TiO_2) intended to be used as corrosion resistant in time, antibacterial and bioactivite coating for orthopeadic implants. The coatings were prepared on Ti6Al4V substrates by the magnetron sputtering method. The elemental and phase composition,
texture, hardness, roughness, corrosion and tribo-corrosion performance of the coatings and also the antibacterial and biocompatible properties , in comparison with the uncoated substrates, were investigated. The results indicated that the corrosion resistance and the antibacterial properties of the films depended on the TiO_2 content. The corrosion and tribo-corrosion tests in SBF solution revealed a high corrosion resistance
and low friction coeficient of the coated samples. Improved mechanical properties, corrosion, tribo-corrosion and antibacterial behaviour were found by adding SiC and TiO_2 to the basic HAP structure.

Keywords
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corrosion resistance
antibacterial properties