

Bioactivity study of Co-Cr alloys doped with tantalum for biomedical applications

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Co-Cr alloys are well known because of its high wear resistance, mechanical strength and corrosion resistance due to the chromium oxide passive layer formation that protects the material surface [1]. The addition of alloying elements, particularly Mo and W, improve the properties of Co-Cr bioalloys, although these materials can still be improved to meet the requirements for a biomaterial. Thus, considering that tantalum is a bioactive metal, it can be an interesting option to improve the biocompatibility properties of these alloys [2]. The present study aims the synthesis and in vitro evaluation bioactivity of Co-Cr alloy doped with tantalum. The synthesized alloys were submitted to a surface treatment and subsequently immersed in Simulated Body Fluid (SBF) for 28 days. The samples bioactivity was evaluated by using X-ray Diffraction (DRX), Scanning Electron Microscopy (SEM), Dispersive Energy Spectroscopy (EDS) and Atomic Force Microscopy (AFM) techniques. X-ray diffraction analysis in the SBF immersed samples shown a small intensity peak characteristic of hydroxyapatite while MEV and EDS results revealed a surface structure with the presence of P, Mg, Ca and O elements. The grain growth dynamics on the samples surfaces was observed by using AFM measurements.

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References:

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