XXII B-MRS Meeting 2024

September 29th to October 3rd

PROCEEDINGS

Sociedade Brasileira de Pesquisa em Materiais

Proceedings of the XXII B-MRS Meeting

Santos, SP 2024

Conteúdo, revisão textual e gramatical: Resposanbilidade dos respectivos autores.

ISBN: 978-85-63273-63-5

Obtaining optimized TiO_2 nanotubes on biomedical Ti cp

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TiO_2 nanotubes have attracted significant research interest due to their high specific surface area, high charge transfer, and in the biological area, the nano modification of titanium surfaces has the potential to induce osteogenic activity on the implant surface [1]. TiO_2 nanotubes can be obtained by different techniques such as sol-gel, electrophoretic deposition, and electrochemical anodization. For biomedical applications, adhesion and mechanical integrity are very important, in this sense, the anodizing method is the one that presents the best results, and also, under optimized conditions, it is an efficient and economical method for obtaining self-organized nanotubes [2-3]. According to the literature [1-3], the characteristics of TiO_2 nanotubes (such as geometry, length, diameter) obtained by electrochemical anodization, depend on various experimental conditions. Thus, obtaining nanotubes on Ti requires extensive optimization of the electrochemical parameters used. Therefore, the aim of the present study was to obtain self-organized nanotubes, with optimized characteristics (diameter, geometry, and length) on the surface of biomedical Ti cp by electrochemical anodization. The nanostructures were obtained applying different potentials, from 10 to 60V, during 1h to 6h, using aqueous and organic solutions. SEM analysis showed that highly organized nanotubes could be obtained on all studied experimental conditions, with different characteristics, while using organic solutions, the nanotubes presented a well-defined geometry.".

Acknowledgments:
FAPESP: 2022/04561-6

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