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Analysis of Electrochemical Corrosion in Metal form of Ti-Ta-Sn and 316-L Screw in Hank's Solution by SEM

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The most widely used alloys are Ti-6Al-4Vn, Ti Grade 4, 316-L, due to their excellent mechanical properties and resistance to corrosion. The use of titanium in biomedical applications has been considered one of the most used metallic materials in the restoration of tissues and replacement of bone implants. In this article, the corrosion effects of the Ti-Ta-Sn alloy were studied in order to improve the electrochemical properties of some previously studied and existing biomaterials [1-3]. However, poor wear resistance and hardness of Ti are two drawbacks of its application. Outstanding mechanical and chemical properties of Ti including high strength to weight ratio, light weight, high melting point,

corrosion resistance, and biocompatibility make it a backbone material in industry [4]. Where the morphology and composition of the coatings obtained by means of scanning electron microscopy (SEM) was studied. The electrochemical study was carried out in a cell with 3 electrodes in Hank's solution at 37 ° C. SEM was subsequently carried out where a morphology with shades of gray is observed in the micrographs, presenting an excellent homogeneous alloy. The results show that the temperature and the pH value of the solution had an obvious effect on the microstructure of the Ti-Ta-Sn alloy and on the coating of the 316-L screw. The corrosion in the piece 316-L only presented uplift in the form of layers, in the Ti-Ta-Sn alloy there are cracks and bubble-shaped pits. When the pH value of the solution is high, the microcracks become relatively smaller. Therefore, the high pH value of the solution increases the compactness of the coatings. The greater compactness of the coatings favors the improvement of the corrosion resistance. The study of electrochemical corrosion, in general, displayed good stability in the passive state, which improves corrosion resistance. Both samples were prepared at 37ºC with a pH value of 6.5. We conclude that the Ti-Ta-Sn alloy in comparison with the commercial material 316-L presents an excellent behavior as a biomaterial, taking into account the passivation of the corrosion resistance [1].

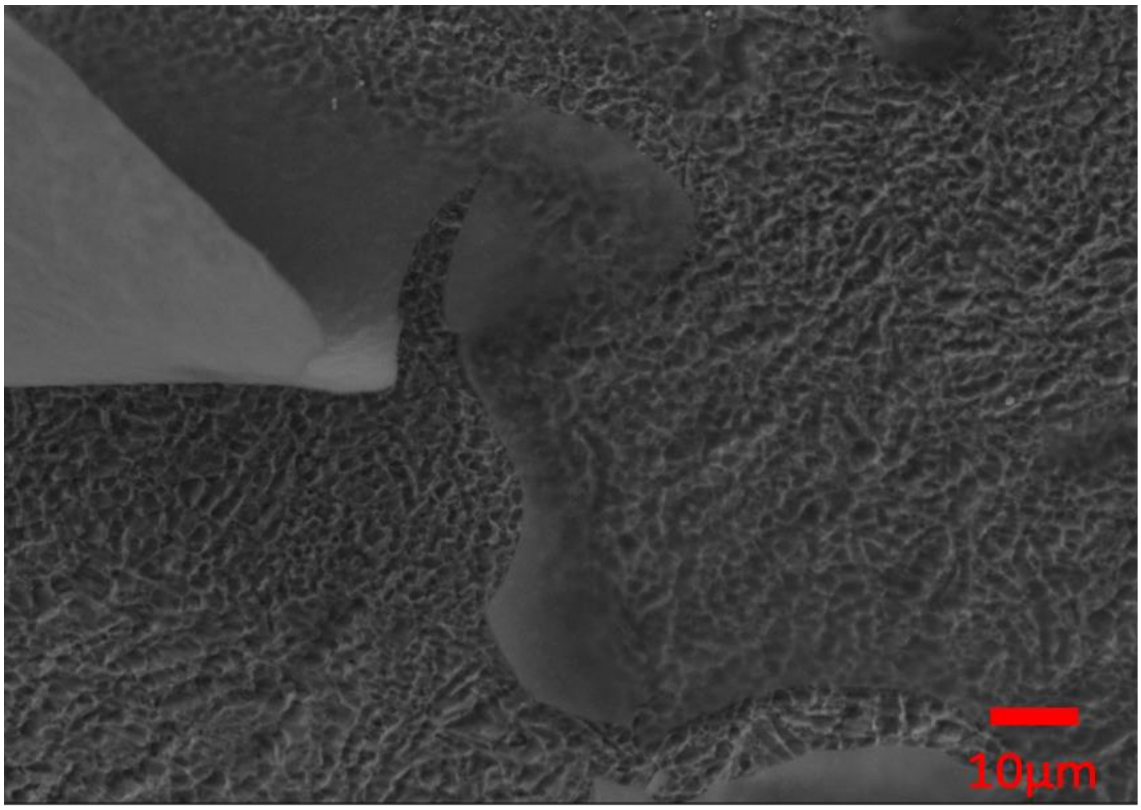

Figure 1. Fig. 1. Morphology of the 316-L coatings prepared in the solutions at temperature 37°C.

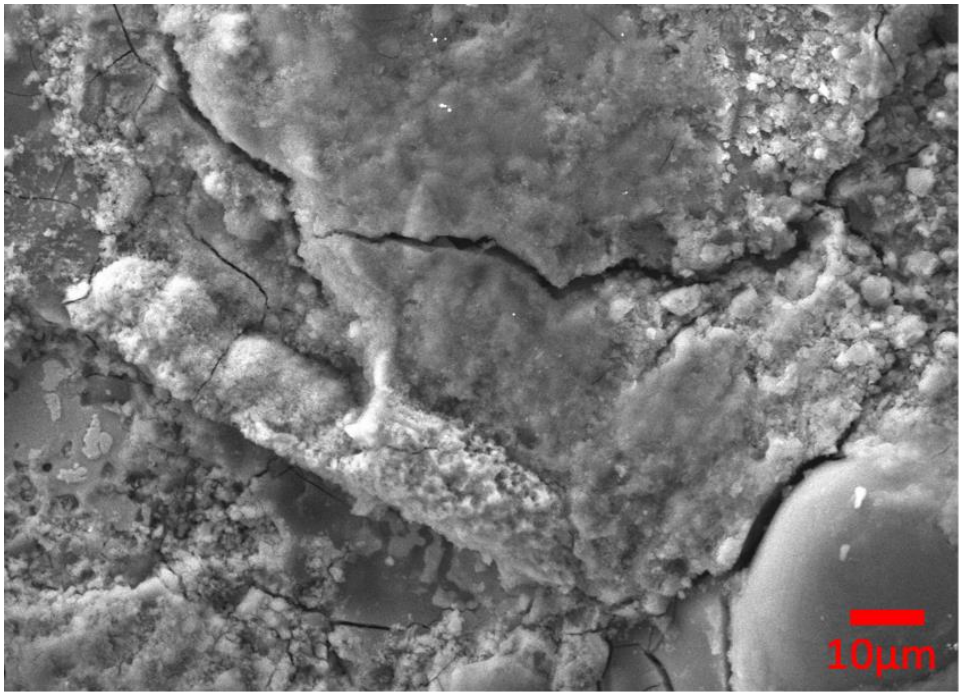

Figure 2. Fig. 2. Morphology of the alloys Ti-Ta-Sn without coatings prepared in the solutions at temperature, 37°C.

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