

ELECTROCHEMICAL CHARACTERIZATION OF Ti-10Mo-20Nb ALLOY HOT SWAGED AND AGED FOR BIOMEDICAL APPLICATIONS

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Abstract

Beta titanium alloys were developed for biomedical applications due to the combination of its mechanical properties including low Young's modulus, high strength, fatigue resistance, good ductility and with excellent corrosion resistance. Besides, the absence of toxic elements such as Nb, Ta, Mo, and Zr is an important advantage. With such properties this type alloy has been developed for orthopedics applications. Previous studies had shown that the Ti-10Mo-20Nb alloy hot swaged and aged at 500°C presented higher hardness/elastic modulus ratio compared to commercially Ti-6Al-4V, indicating a great potential for biomedical application. However additional studies are needed such as corrosion resistance. Therefore, the objective of this work was to analyze the electrochemical behavior of the Ti-10Mo-20Nb alloy aged at 500°C/4h, respectively. The electrochemical behavior was carried through by potentiodynamic polarization curves in Ringer's solutions to simulate the body fluid. The Ti-10Mo-20Nb alloy showed to be more resistant to corrosion when compared to commercially Ti-6Al-4V alloy.

Keywords: Ti-Mo-Nb alloys; microstructure; Corrosion, hot swaging