

MECHANICAL BEHAVIOR OF Ti–10Mo–20Nb ALLOY HOT SWAGED AND AGED FOR BIOMEDICAL APPLICATION

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Metastable β -Ti alloys composed of nontoxic elements are being developed for biomedical applications. Mechanical properties of β -Ti alloys are highly dependent of the final microstructure which is controlled by the thermomechanical treatments. These alloys for biomedical application require high mechanical strength and a low Young's modulus to avoid stress shielding. Previous work on the development of Ti- 10Mo –20Nb alloy showed than the better properties (hardness and Young's Modulus) were obtained in the aging at 500 °C/4h after hot swaging. This paper presents the microstructure and mechanical properties of the Ti-10Mo-20Nb hot swaged and aged at 500°C for 4h under high vacuum and then water quenched. The structure alloy was characterized by X-ray diffraction and transmission electron microscopy. Tensile tests were carried out at room temperature. The results show a microstructure consisting of fine α phase dispersed in a β matrix and good mechanical properties including low elastic modulus. The results indicate that Ti-10Mo-20Nb alloy can be a promising alternative for biomedical application.

Keywords: Ti-Mo-Nb alloy; microstructure; Mechanical Properties