

STUDY OF ANELASTIC SPECTRUM OF TERNARY TITANIUM ALLOYS FOR BIOMEDICAL APPLICATIONS

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1. Introduction

Titanium alloys have been widely used as biomaterials, especially for orthopedic prostheses and dental implants. The most titanium alloys used as biomaterials contain aluminum and vanadium elements, and these elements cause cytotoxic effects in the human body. Ti-20Zr-xMo and Ti-10Zr-yMo alloys system are promising alloys for biomaterial applications, because they have no cytotoxic elements.

2. Experimental or Theory

The alloys were melted using an arc-melting furnace with a non-consumable tungsten electrode and water-cooled copper crucible, in argon-controlled atmosphere and, hot-rolled in order to obtain the samples for elastic modulus test. The materials characterization was made by x-ray diffraction (XRD), optical microscopy (OM) and scanning electron microscopy (SEM) measurements. The measurements of elastic modulus (Young's modulus) were performed using dynamic mechanical analyzer (DMA) and free decay vibrations (Sonelastic equipment).

3. Results and Discussions

The results of XRD and SEM micrographs showed that in the prepared alloys have coexistence of alpha', alpha'' and beta phases, showing the beta stabilizing character of the added elements in alloys and for the elastic modulus, it can be observed that the addition of the solute in the two systems decreases the Young modulus as confirmed by thermoactivated process in Anelastic Spectrum.

4. References

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