ELASTIC MODULUS OF NEW TERNARY TITANIUM ALLOYS FOR BIOMEDICAL APPLICATIONS

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Ti-6Al-4V is the most widely titanium alloy used as biomaterials, but vanadium and aluminum cause cytotoxic effects on human body. To circumvent this situation, these elements have been replaced by others beta stabilizers elements such as zirconium, niobium, molybdenum and tantalum, that decrease beta-transus temperature and improve elastic modulus of the alloy, being promising materials. Ti-20Zr-xMo and Ti-10Zr-yMo alloys system are promising alloys for biomedical applications, because they have no cytotoxic elements. 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, optical microscopy and scanning electron microscopy measurements. The measurements of elastic modulus were performed using dynamic mechanical analyzer and free decay vibrations. Another method to characterize the young modulus were performed by a Sonelastic equipament. 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 few addition of the solute in the two systems decreases the Young modulus. (Financial support: CNPq and FAPESP).