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MICROCHARACTERIZATION AND YOUNG MODULUS STUDY OF Ti-10Mo-XZr SYSTEM FOR BIOMEDICAL APPLICATIONS.

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Titanium alloys with presence of ? stabilizers (Mo, Zr,Ta, V,Nb) are using in different areas of engineering, from aerospace to biomedical applications. Ti-6Al-4V is the most widely used titanium alloy biomaterial , but vanadium and aluminum cause cytotoxic effects in the human body. To circumvent such effects, these elements could been replaced by other beta-stabilizer elements, such as zirconium, niobium, molybdenum, and tantalum, which decrease the beta-transus temperature and improve the elastic modulus of the alloy. Ti-20Zr-xMo and Ti-10MO-XZr alloys system are promising alloys for biomedical applications because they have no cytotoxic elements. Ti-10Mo-XZr system (x= 5, 10, 15, 20, 25 and 35 wt%) were melted using an arc-melting furnace with a non-consumable tungsten electrode and water-cooled copper crucible, in an argon-controlled atmosphere and, hot-rolled in order to obtain the samples for modulus test. The samples were submitted to x ray diffraction (XRD), energy–dispersive x ray spectroscopy (EDX), scanning electron microscope (SEM) in order to characterize the samples structures. The Young modulus measurements were performed in 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. The EDX results remained near theoretical density indicating that the composition of the alloy is close to the nominal values.The Young Modulus of the alloys decreases in the presence of Zr for both systems.The MEV images for 25 and 35 wt samples showed grain boundaries, indicating beta phase predominance in this systems. However, when taking successive measurements in the samples it was observed that the Young's modulus was increased, since there is an increase of the beta phase after the heating imposed in the DMA measurements.