# Structural and Microstructural Characterization of Ti-10Mo-40Zr Alloy

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Titanium is one of the most used elements for biomedicals applications, due its higher corrosion resistance and low specific mass, having particular application in hip replacement. Titanium has a crystalline structure called compact hexagonal (α phase), around 882°C it goes through a transformation, its structure changes from compact hexagonal to body centered cubic (β phase). Molybdenum is a β stabilizer element, in other words, it helps to lower the temperature of transition to β phase. Zirconium is a neutral element, however, it has a higher corrosion resistance. Ingot was obtained through an arc melting furnace, chemically the ingot was characterized through density measurements through Archimedes principle and energy dispersive X-ray spectroscopy (EDS). Ti-10Mo-40Zr sample was submitted to structural characterization through X-ray diffraction (XRD) and microstructural through Scanning electron microscope (SEM). Mechanical properties were obtained by elasticity modulus, before heat treatment and after heat treatment.After melting, the ingot presented silver coloring, it shows that the ingot was not contaminated with impurities. Alloy density is 5,71g/cm$^3$, higher than the pure titanium, this is due to the addition of denser elements like zirconium and molybdenum. Regarding to the X-ray diffraction, it shows that the crystalline structure is β phase. Results of Young's modulus were 90.67 ± 0.11GPa before heat treatment and 66.25 ± 0.08GPa after heat treatment, showing that the heat treatment promotes a relief of internal stresses [1] and also a lowering of the Young's modulus that is evidenced by the presence of β phase, the modulus of elasticity of the alloy is small when compared to that of the Ti-Cp of 116Gpa, which is preferable as there is a decrease in the effect of stress shielding[2].Given the data discussed andpresented, it is possible to conclude that the alloy is a candidate for future biological analysis,aiming at biomedical applications.

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