

Investigation of the tensile properties of heat treated Ti-Mo alloys

Raganya, Mampai L; Moshokoa, Nthabiseng; Obadele, BA; Olubambi, PA; Machaka, Ronald

Abstract:

Extensive efforts have been undertaken to develop Ti alloys consisting of single β phase in order to substitute the $\alpha + \beta$ phase in Ti-6Al-4V used as biomaterials. This study was aimed at investigating the tensile properties of solution treated Ti-10Mo and Ti-12Mo alloys as a function of their deformation mechanisms. The optical microscope (OM) was used to perform microstructural analysis, while the phase identification was conducted using the X-ray diffractometer (XRD). Tensile tests were also conducted at room temperature. Results obtained show that Ti-10Mo alloy possesses higher yield strength probably as a result of stress-induced transformation and larger elongation due to twinning deformation than Ti-12Mo alloy. On the other hand, Ti-12Mo alloy showed moderate yield strength and large elongation due to the dominant twinning deformation mode. Both Ti-10Mo and Ti-12Mo alloys showed substantial and conspicuous equiaxed dimples, tearing ridges and few cleavage facets, which confirmed the occurrence of quasi-cleavage fracture.