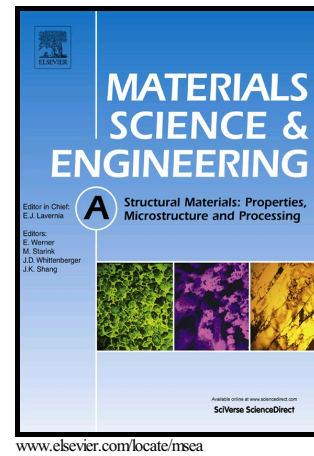


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Effect of alloying elements on microstructural evolution in oxygen content controlled Ti-29Nb-13Ta-4.6Zr (wt. %) alloys for biomedical applications during aging

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Abstract

The effects of alloying elements in Ti-29Nb-13Ta-4.6Zr (wt. %) (TNTZ) alloys with low Young's modulus for biomedical applications on microstructural evolution during aging, in particular, at an aging temperature of 400 °C have been determined. The peak hardness is obtained by co-precipitation of α and ω phases. O addition stabilizes ω phases; as a result, formation of ω is enhanced with increasing the O content as an alloying element, resulting in prevention of the growth of the α phases due to soft impingement. Because of the stress caused by the ω to α transformation, the α phase often contains defects within its internal structure. Although Zr is known to be a neutral element within Ti, here we show that Zr acts as weak β stabilizer. At the β/α interface, Zr enrichment appears to be due to a solute drag mechanism. In addition, a slight increase in Zr composition in the β/ω interface has also been

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