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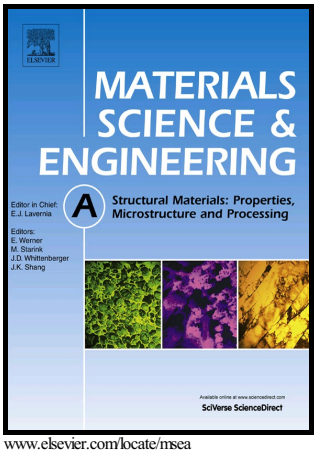

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PII: S0921-5093(17)31333-3
DOI: https://doi.org/10.1016/j.msea.2017.10.018
Reference: MSA35621

To appear in: *Materials Science & Engineering A*

Received date: 3 July 2017
Revised date: 3 October 2017
Accepted date: 4 October 2017

Cite this article as: T. Homma, A. Arafah, D. Haley, M. Nakai, M. Niinomi and M.P. Moody, Effect of alloying elements on microstructural evolution in oxygen content controlled Ti-29Nb-13Ta-4.6Zr (wt. %) alloys for biomedical applications during aging, *Materials Science & Engineering A,* https://doi.org/10.1016/j.msea.2017.10.018

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 ºC 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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