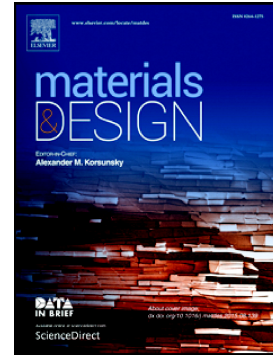


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Development of a novel TiNbTa material potentially suitable for bone replacement implants

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Abstract

A novel ($\beta+\gamma$)-TiNbTa alloy has been developed by a combined low energy mechanical alloying (LEMA) and pulsed electric current sintering process (PECS). Microstructurally, this material presents interesting characteristics, such as a submicrometric range of particle size, a body-centered phase (β -TiNbTa) and, mainly, a novel face-centered cubic Ti-based alloy (γ -TiNbTa) not previously reported. Related to mechanical performance, the novel ($\beta+\gamma$)-TiNbTa shows a lower E (49 ± 3 GPa) and an outstanding yield strength ($\sigma_y > 1860$ MPa). This combination of original microstructure and properties makes to the ($\beta+\gamma$)-TiNbTa a novel material potentially suitable as biomaterial to fabricate bone replacement implants, avoiding the undesirable and

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