

Ti-13Nb-13Zr alloy processed by severe plastic deformation

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ABSTRACT

The biomedical devices currently in use (prostheses, implants) have satisfactory performance in many cases, however, sometimes the body reacts to device insertion may lead to its rapid replacement [1]. Some of these disadvantages can be solved with the use of titanium and its alloys, due to their excellent combination of corrosion resistance, wear resistance and biocompatibility compared with other competing biomaterials [2]. In this paper, we showed the possibility of obtaining beta titanium alloy with ultrafine grain induced by severe plastic deformation. For this, we used the high pressure torsion processing method for Ti-13Nb-13Zr. The samples were processed with different loads and number of turns. After characterization, it was observed that applying three turns, 1GPa loads produce more Ti-beta than applies to 5 GPa. However, refining is higher for larger loads.

[1] R. Z. Valiev, "Paradoxes of Severe Plastic Deformation," *Adv. Eng. Mater.*, vol. 5, no. 5(2003), pp. 296–300.

[2] D. F. Williams, "On the mechanisms of biocompatibility," *Biomaterials*, vol. 29, no. 20(2008), pp. 2941–2953.