

New TiZrNbTaFe High Entropy Alloy used for Medical Applications in *Proceedings of ModTech2018 International Conference*

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Abstract. The paper considers a new concept of alloy with high entropy (HEA) for biomedical applications. HEAs are different from the conventional metallic materials by more than five alloying elements, in proportions between 5% and 35% at., which may form simple solid solutions with BCC and/or FCC phases instead of complicated intermetallic ones. These specific features provides HEA with excellent mechanical properties (hardness, strength, malleability), oxidation and corrosion resistance, with potential applications in diverse industrial areas. The present tendency in the newest titanium alloys generation is the decrease of elasticity modulus, with the maintaining of high mechanical characteristics. Thus, the paper considers the system TiZrNbTaFe for biomedical applications obtained by powder metallurgy (PM) route, because HEAs prepared by this method show a greater homogeneity in their microstructure compared to the segregated microstructure of melted and cast HEAs. The influence of milling time, compaction and sintering on the microstructure and mechanical and corrosion properties of the new TiZrNbTaFe alloy were investigated. The obtained properties have shown a better mechanical biocompatibility in order to use this high entropy alloy as orthopedic or dental implants. The mechanical properties of the obtained alloys are better than those of biomaterials that are used in present.

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