

Medium-Entropy Ti-Zr-Nb Thin Films Prepared by Magnetron Sputtering: Structural TEM Study

Anna Benediktová ^{a)}, Lucie Nedvědová, and Ján Minár

New Technologies – Research Centre, University of West Bohemia, 30100 Plzeň, Czech Republic

^{a)} Corresponding author: amalinov@ntc.zcu.cz

Abstract. High-entropy alloys (HEAs) and medium-entropy alloys (MEAs) represent an intensively studied group of metallic materials. Due to their unique properties such as their potential to be very stable, wear-resistant, and hard, in addition to the possibility of tailoring some of their properties, HEAs and MEAs also become a subject of study as biomaterials. Commonly used metal biomaterials for implants still have many drawbacks, such as low wear and corrosion resistance or lack of antibacterial properties, which can even lead to implant loss. To improve the surface properties of common implants, MEAs thin films based on Ti-Zr-Nb were prepared by magnetron sputtering, and their structure was determined using transmission electron microscopy. The films were deposited on carbon and silicon substrates and different degrees of crystallinity were revealed depending on the film thickness and the type of the substrate. It was revealed that the crystalline region has tetragonal body-centered structure, with the crystal lattice elongated in the direction of growth.

ACKNOWLEDGMENT

This publication was supported by the project "Mechanical Engineering of Biological and Bio-inspired Systems", funded as project No. CZ.02.01.01/00/22_008/0004634 by Programme Johannes Amos Comenius, call Excellent Research.