
Morphologies of RF-sputtered Zinc Coatings and Cell Proliferation on PEO-treated Ti-6Al-4V Alloy

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In this study, morphologies of RF-sputtered zinc coatings and cell proliferation on PEO-treated Ti-6Al-4V alloy were researched using various experimental instruments. The plasma electrolytic oxidation (PEO) for Ti-6Al-4V was carried out in electrolytes, after that, RF-magnetron sputtering Zn coatings on PEO-treated Ti-6Al-4V. The effects of biological changes on other conditions were investigated using MC3T3-E1 cells. The morphology and structure were examined by field-emission scanning electron microscopy (FE-SEM), elemental analysis was performed using energy-dispersive X-ray spectroscopy (EDS) and thin film X-ray diffractometer (TF-XRD).

The surface of oxide films after PEO coatings showed formation of many micro-pores with uniform distributions. RF-sputtered surface showed the small particles covered with droplet shape on the pore inside and surface parts. As the sputtering time increased, [Ca+Zn]/P ratio for the Zn coating on the PEO-treated Ti-6Al-4V alloys increased. Also, the amorphous phase was increased, whereas crystal phase was decreased, as the sputtering time increased. The results of MC3T3 cell culture, filopodium was well attached to the inside of pores in Zn coating sample with micro/nano-shape than Ca/P. As a result of MTT analysis using MC3T3-E1 cell, Zn coating sample showed higher cell proliferation rate than PEO-treated Ti-6Al-4V alloy. (Supported by NRF: 17GJ1006; *hcchoe@chosun.ac.kr).

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