Enhancing the corrosion resistance of a novel bio-compatible Mg-1Zn-0.45Ca alloy in simulated body fluid by a phosphate treated PEO coating

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Abstract The purpose of this work was to investigate the effect of Plasma electrolytic oxidation (PEO) coatings and sealed PEO coatings on the corrosion resistance and cytocompatibility of a novel Mg-1Zn-0.45Ca alloy in simulated body fluid (SBF). The microstructure, corrosion resistance and cytocompatibility of PEO coatings and phosphate conversion treated PEO coatings were investigated, and was compared with the bare Mg alloy. The hot-extruded Mg-Zn-Ca alloy exhibit inhomogeneous microstructure and suffered from localized corrosion in the SBF. The PEO coating after phosphate conversion treatment offers enhanced protectiveness to the Mg alloy within an immersion period of up to 60 days, which is significantly improved compared with the performance of the PEO coated Mg alloy, but the cytocompatibility was slightly decreased.This work offers new perspective in balancing the protectiveness and cytocompatibility of bio-materials.

Keywords bio-material; Mg-Zn-Ca alloy; Plasma electrolytic oxidation; Cytocompatibility; Corrosion performance;

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