

Effect of Zn Content on the Corrosion Behavior of Ti-6Al-4V Alloy after Plasma Electrolytic Oxidation

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초 록: Ti-6Al-4V alloy have been used for dental implant because of its excellent biocompatibility, corrosion resistance, and mechanical properties. However, the integration of such implant in bone was not in good condition to achieve improved osseointegration. For solving this problem, calcium phosphate (CaP) has been applied as coating materials on Ti alloy implants for hard tissue applications because its chemical similarity to the inorganic component of human bone, capability of conducting bone formation and strong affinity to the surrounding bone tissue. Various metallic elements are known to play an important role in the bone formation and also affect bone mineral characteristics. Especially, Zn is essential for the growth of the human and Zn coating has a major impact on the improvement of corrosion resistance. Plasma electrolytic oxidation (PEO) is a promising technology to produce porous and firmly adherent inorganic Zn containing TiO₂(Zn-TiO₂) coatings on Ti surface, and the amount of Zn introduced in to the coatings can be optimized by altering the electrolyte composition. In this study, effect of Zn content on the corrosion behavior of Ti-6Al-4V alloy after plasma electrolytic oxidation were studied by SEM, EDS, XRD, AC impedance, and potentiodynamic polarization test. The potentiodynamic polarization and AC impedance tests for corrosion behaviors were carried out in 0.9% NaCl solution at similar body temperature using a potentiostat with a scan rate of 1.67 mV/s and potential range from -1500 mV to +2000 mV. Also, AC impedance was performed at frequencies ranging from 10 MHz to 100 kHz for corrosion resistance (This work was supported by NRF: 2015H1C1A1035241 & NRF: No.2008-0062283 ; hcchoe@chosun.ac.kr).