

## Electrochemical Behaviors of PEO-treated Ti-6Al-4V Alloy in Solution Containing Zn and Si Ions

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**초 록:** Commercially pure titanium (Cp-Ti) and Ti alloys (typically Ti-6Al-4V) display excellent corrosion resistance and biocompatibility. Although the chemical composition and topography are considered important, the mechanical properties of the material and the loading conditions in the host have, conventionally. Ti and its alloys are not bioactive. Therefore, they do not chemically bond to the bone, whereas they physically bond with bone tissue. The electrochemical deposition process provides an effective surface for biocompatibility because large surface area can be served to cell proliferation.

Plasma electrolyte oxidation (PEO) enables control in the chemical composition, porous structure, and thickness of the TiO<sub>2</sub> layer on Ti surface. Silicon (Si) in particular has been found to be essential for normal bone and cartilage growth and development. Zinc (Zn) plays very important roles in bone formation and immune system regulation, and is also the most abundant trace element in bone. The objective of this work was to study on electrochemical behaviors of PEO-treated Ti-6Al-4V Alloy in solution containing Zn and Si ions. The morphology, the chemical composition, and the microstructure analysis of the sample were examined using FE-SEM, EDS, and XRD. 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. The promising results successfully demonstrated the immense potential of Si/Zn-TiO<sub>2</sub> coatings in dental and biomaterials applications. (This work was supported by 2015H1C1A1035241 & NRF: No.2008-0062283;hcchoe@chosun.ac.kr).