

Analysis of Biocompatible TiO₂ Oxide Multilayer by the XPS Depth Profiling

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초 록: In this work, analysis of biocompatible TiO₂ oxide multilayer by the XPS depth profiling was researched. the manufacture of the TiO₂ barrier-type multilayer was accurately performed in a mixed electrolyte containing HAp, Pd, and Ag nanoparticles. The temperature of the solution was kept at approximately 32°C and was regularly rotated by a magnetic stirring rod in order to increase the ionic diffusion rate. The manufactured specimens were carefully analyzed by XPS depth profile to investigate the result of chemical bonding behaviors. From the analysis of chemical states of the TiO₂ oxide multilayer using XPS, the peaks are showed with the typical signal of Ti oxide at 459.1 eV and 464.8 eV, due to Ti 2p(3/2) and Ti 2p(1/2), respectively. The Pd-3d peak was split into Pd-3d(5/2) and Pd-3d(3/2) peaks, and shows two bands at 334.7 and 339.9 eV for Pd-3d₃ and Pd-3d₅, respectively. Also, the peaks of Ag-3d have been investigated. The chemical states consisted of the O-1s, P-2p, and Ti-2p were identified in the forms of PO₄²⁻ and PO₄³⁻. Based on the results of the chemical states, the chemical elements into the TiO₂ oxide multilayer were also inferred to be penetrated from the electrolyte during anodic process. The structure characterization of the modified surface were performed by using FE-SEM, and from the result of biological evaluation in simulated body fluid(SBF), the biocompatibility of TiO₂ oxide multilayer was effective for bioactive property (This work was supported by 2015H1C1A1035241 & NRF: No.2008-0062283;hcchoe@chosun.ac.kr).