Short Communication

Surface Modification of Titanium by Hydroxyapatite/CaSiO₃/Chitosan Porous Bioceramic Coating

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In this study, hydroxyapatite(HA)-CaSiO₃-chitosan(CS) composite bioceramic coating was applied to the surfaces of pure titanium by using the electrophoretic deposition (EPD) method. The mechanism of EPD of HA/CaSiO₃/CS composites is discussed. The composite bioceramic coating was followed by heat treatments in a controlled atmosphere to make coatings porous and enhance their mechanical properties due to CS and CaSiO₃ particles. The composition, structure, and surface morphology of these coatings are characterized through fourier transform infrared spectroscopy(FTIR), X-ray diffraction(XRD), field emission scanning electron microscopy(SEM) and transmission electron microscope(TEM). Our results confirmed that this approach is especially attractive for the fabrication of porous bioceramic coatings. The adhesive force between the HA/CaSiO₃ porous coatings and pure titanium is approximately 26.6 MPa. The porous HA/CaSiO₃ coatings provide improved bioactivity and biocompatibility of pure titanium in the simulated body fluid solution.

Keywords: Electrophoretic deposition, hydroxyapatite, chitosan, CaSiO₃, porous coatings, surface modification.

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