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## Characterization of hydroxyapatite coatings deposited by hydrothermal

## electrochemical method on NaOH immersed Ti6Al4V

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**Abstract:** The hydrothermal electrochemical method was used to deposit hydroxyapatite coating on Ti6Al4V. In order to improve the bonding strength between the coating and substrate, the substrates were modified by 8 M NaOH solution before the deposition. The effects of immersing time on the substrate, on the hydroxyapatite coating, and on the bonding strength were studied. X-Ray Diffraction, Scanning Electron Microscope, Fourier Transform Infrared Spectroscopy and Drop Shape Analysis Method were applied. And the crystallinity of hydroxyapatite coating was calculated. The results show that immersing treatment effects the phase compositions, the microstructure and the wettability of the substrate surface. A porous, three-dimensional network structure is formed on the Ti6Al4V surface through the NaOH immersion. The pore size and depth increase with the increase of immersing time from 12 to 48 h. The surface microstructure of Ti6Al4V with 60 h' immersion time was different from the others. The modification treatment can improve the bonding strength between hydroxyapatite coating and the substrate obviously. The value of the bonding strength with the substrate immersed for 48 h is larger than those of the others. A bone-like apatite layer forms on the coating after 3 days of soaking in SBF, implying with good bioactivity of the hydroxyapatite coatings deposited by the method. The surface characteristics of the sample immersed with 48 h are more conducive to the deposition of hydroxyapatite and to the improvement of the bonding strength. The formation mechanism of hydroxyapatite coating deposited by hydrothermal electrochemical method was discussed.

**Keywords:** hydrothermal electrochemical method; hydroxyapatite coating; NaOH solution; immersing time; Ti6Al4V

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