

Effects of Alkaline Pretreatment Parameters on the Corrosion Resistance and Wettability of Magnesium Implant

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Abstract : Corrosion behaviour and surface roughness of magnesium substrate were investigated after NaOH pretreatment in different concentrations (1, 5, and 10 molar) and duration of (10 min, 30 min, 1 h, 3 h, 6 h and 24 h). Creation of $Mg(OH)_2$ barrier layer after pretreatment enhanced corrosion resistance as well as wettability of substrate surface. Characterization including Fourier transform infrared spectroscopy (FTIR) and X-ray diffraction (XRD) was conducted to detect the existence of this barrier layer. Surface roughness and wettability of substrate was evaluated using atomic force microscopy (AFM) and contact angle measurement respectively. It is found that magnesium treated by 1M NaOH for 30 min reveals higher corrosion resistance and lower water contact angle of substrate surface. In addition, this investigation indicates that pH value of SBF solution is strongly influenced by different time and concentration of alkaline pretreatment.

Keywords : magnesium, NaOH pretreatment, corrosion resistance, wettability

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