Corrosion and Electrochemical Impedance Properties of Ti Alloys as Orthopaedic Trauma Implant Materials

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In this study, Ti–24Nb–4Zr–8Sn, a titanium alloy used in orthopaedic trauma implants, was studied for its electrochemical corrosion performance (in weight percent) in a phosphate buffered saline (PBS) solution at 37 °C using electrochemical impedance spectroscopy (EIS), open-circuit potential (OCP) and potentiodynamic polarization strategies. A Ti–6Al–4V sample was compared with commercially pure titanium. The experimental data indicated that the spontaneous passivation of the specimens occurred as soon as they were immersed in the electrolyte. The passive region of the Ti–24Nb–4Zr–8Sn sample was wider than those of the Ti–6Al–4V and pure titanium samples. Additionally, the corrosion current density of the Ti–24Nb–4Zr–8Sn sample was as low as that of pure titanium.

Keywords: Ti based alloy; Orthopaedic trauma implant; Electrochemical impedance; Corrosion behaviour; Open circuit potential

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