

Micro-Arc Oxidation Titanium and Post Treatment by Cold Plasma and Graft Polymerization of Acrylic Acid for Biomedical Application

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Abstract : Titanium and its alloy are widely used in many fields such as dentistry or orthopaedics. Due to their high strength low elastic modulus that chemical inertness and bio inert. The micro-arc oxidation used to formation a micro porous ceramic oxide layer film on Titanium surface and also to improve the resistance corrosion. For improving the biocompatibility, micro-arc oxidation surfaces bio-inert need to introduce reactive group. We introduced boundary layer by used plasma enhanced chemical vapor deposition of hexamethyldisilazane (HMDS) and organic active layer by UV light graft reactive monomer acrylic acid (AAc) therefore we can immobilize Chondroitin sulphate on surface easily by crosslinking EDC/NHS. The surface properties and composition of the modified layer were measured by scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS) and X-ray diffraction (XRD) and water contact angle. Water contact angle of the plasma-treated Ti surface decreases from 60° to 38°, which is an indication of hydrophilicity. The results of electrochemical polarization analysis showed that the sample plasma treated at micro-arc oxidation after plasma treatment has the best corrosion resistance. The result showed that we can immobilize chondroitin sulfate successful by a series of modification and MTT assay indicated the biocompatibility has been improved in this study.

Keywords : MAO, plasma, graft polymerization, biomedical application

Conference Title : ICBBE 2016 : International Conference on Bioinformatics and Biochemical Engineering

Conference Location : Tokyo, Japan

Conference Dates : May 26-27, 2016