

Laser Rapid Prototyping Techniques for Fabrication of Custom-Designed Implants and Scaffolds for Tissue Engineering

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ABSTRACT

Advanced Laser Stereolithography (LS) and new Surface Selective Laser Sintering (SSLS) techniques have been proposed, developed and used for preparation both biostable and biodegradable composite custom-designed implants and scaffolds for tissue engineering. We incorporated bioactive enzyme and osteoinductive calcium hydroxyapatite (HA) into the polymer samples of specific shapes and structures. Supercritical carbon dioxide treatment enabled us to introduce microporosity and to remove toxic additives improving biocompatibility of the materials. The results of mechanical testing, *in vitro* and *in vivo* studies hold great promise for use of produced samples and techniques for their fabrication in biomedical applications.

Keywords: Rapid prototyping, scaffolds for tissue engineering, implants and supercritical fluids