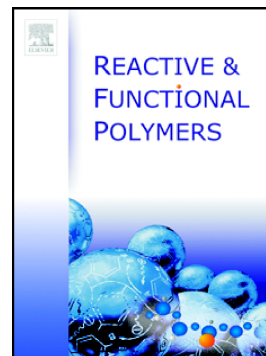


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Surface instability on polyethersulfone induced by dual laser treatment for husk nanostructure construction

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Abstract

Multilevel structured polymers can be useful materials for applications in highly specialized industries, i.e. tissue engineering. This paper deals with multilevel lamellar structures production on polyethersulfone (PES) by dual excimer laser treatment. The modification was carried out by polarized KrF laser beam. The first step was laser modification of sample, subsequently the sample was rotated about 90° and modified again with laser beam. The best results according to a structure were received by modification with polarized beam of laser fluence of 8 mJ cm⁻² and 6000 pulses, and after sample rotation 90°, followed by a secondary modification at the same laser parameters. The surface morphology of treated samples was studied with atomic force microscopy and scanning electron microscopy with focused ion beam. The X-ray photoelectron spectroscopy and infrared spectroscopy were used to determine the chemical changes of the atomic composition of the surface area. Our research was aimed on roughness, zeta potential and wettability determination. Prepared structures on PES seem to be unique according to multilevel lamellar morphology, which may be highly suitable material for cell cultivation.

Keywords: surface instability; laser treatment; LIPSS; polyethersulphone; nanostructuring; surface modification; husk structure

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1. Introduction

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