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(54) **CHEMICAL MODIFICATION OF SUBSTRATES BY PHOTO-ABLATION UNDER DIFFERENT LOCAL ATMOSPHERES AND CHEMICAL ENVIRONMENTS FOR THE FABRICATION OF MICROSTRUCTURES**

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(58) **Field of Search** 430/322–269, 430/945, 394; 219/121.68–121.69

(56) **References Cited**

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(57) **ABSTRACT**

A method for simultaneously forming microstructures in substrates and altering their chemical character. The method involves exposing a surface portion of a substrate to light source, which is strong enough and of the appropriate wavelength to cause ablation of the substrate. The ablation of the substrate is controlled to form microstructures therein, such as channels. The ablation is conducted under a chemical atmosphere, which causes a change in the chemical functionality of the microstructures. The chemical atmosphere can be a gas, liquid or solid that is provided on the substrate surface. The method can be used to fabricate or modify microfluidic systems.

22 Claims, 4 Drawing Sheets