

Study on 3-Dimensional Micromachining of PTFE Using Synchrotron Radiation Light

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Abstract

In order to fabricate highly functional microdevices for MEMS, three-dimensional (3D) micromachining that can form certain round or curved structures is required. Recently, a high aspect ratio micromachining process using synchrotron radiation (SR) direct photo-etching of polymers without any process gases, the so called TIEGA (Teflon included etching galvanicforming), has been developed. The etching rate is of the order of 10-100 $\mu\text{m} / \text{min}$. Moreover, SR etching is free from problems of sticking because it is a completely dry process. By utilizing a high processing speed and smoothness of the etched surfaces, SR etching might have a potential for 3D micromachining by combining a scanning stage with a high degree of freedom. In this paper, we proposed 3D micromachining technology by SR beam direct writing and fabricated a corn shape PTFE microstructure.

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