# Three-Dimensional Micromachining of PTFE Using Synchrotron Radiation Light

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**Abstract**

In this paper, we propose SR etching as a new approach to fabricate 3D microstructures of PTFE. SR etching is a process of TIEGA that fabricates microstructures using polymers like PTFE by etching directly in a vacuum using SR light. The etching rate is of the order of 6-100 μm/min. Direct writing using a SR beam through a pinhole was possible to fabricate 3D microstructures of PTFE combining a scanning stage with a high degree of freedom. 3D micromachining of PTFE by SR beam direct writing with atmospheric pressure as an exposure condition is thought to be desirable from the practical point of view. Therefore, we approached SR etching under 2 conditions; in a vacuum and under He at 1 atm. As a result, corn-shaped PTFE microstructure was fabricated with a turning radius of 300 μm and achieved the depth of 1 mm.

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