

# Multiple Moving Mask Deep X-Ray Lithography(M<sup>3</sup>DEXL) Process for 3-Dimensional Microstructure Fabrication

Osamu Tabata, Kouichi Terasoma, Norihiro Agawa\* and Kouji Yamamoto\*

## ABSTRACT

An advanced technology using a multiple moving X-ray mask deep X-ray lithography (M<sup>3</sup>DEXL) to realize various microstructures with inclined or free shape side wall, namely real 3-dimensional microstructures, was proposed. The side wall shape of a PMMA microstructure fabricated by deep X-ray lithography has been controlled by moving X-ray masks in parallel with the PMMA substrate during X-ray exposure. In order to demonstrate the feasibility of this M<sup>3</sup>DEXL technology, various microstructures were successfully fabricated; (1) conical shape and truncated conical shape microstructures with height of 100 - 300  $\mu\text{m}$  and a diameter of 0 - 310  $\mu\text{m}$  and (2) grooves with saw shape cross section with depth of about 30  $\mu\text{m}$  and width of 100 - 150  $\mu\text{m}$ .

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*Department of Mechanical Engineering, Faculty of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga-ken, 525-8577 Japan*

*\*Image Information Lab., Takatsuki Labs., Minolta Co., Ltd., Takatsuki, Osaka-fu, 569-8503 Japan*