Fabrication of High Aspect Ratio Sub-Micron Structures Using LIGA Process

Hiroshi Ueno, Nobuyoshi Nishi and Susumu Sugiyama*

Abstract

In this paper, we present the fabrication of sub-micron structures with high aspect ratio for practical and high performance microelectromechanical systems (MEMS) using deep X-ray lithography. It is necessary for practical and high performance MEMS to be fabricated microstructures with sub-micron widths and gaps (lines and spaces). In order to fabricate the sub-micron microstructures, sub-micron deep X-ray lithography has been investigated. As a result, a sub-micron PMMA structure with 0.2 μm minimum width and 17 μm height was fabricated by deep X-ray lithography using an X-ray mask with thick X-ray absorbers having sub-micron width. Sub-micron Ni structures with 0.2 μm minimum width and 15 μm height were fabricated by electroforming using sub-micron PMMA structures as molds.

Graduate School of Science and Engineering, Ritsumeikan University, Kusatsu, Shiga 525-8577, Japan

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