A Study on the Sub-Micron LIGA Process

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Abstract

Microstructures with sub-micron widths and gaps (lines and spaces) can be applied to practical and high performance MEMS devices. In the sub-micron LIGA process, one of the most crucial considerations is the fabrication of an X-ray mask with thick X-ray absorbers having sub-micron width. An X-ray mask, which is composed of 1 μm-thick Au with a 0.6 μm line width and a 0.2 μm space as absorbers, 2 μm-thick SiC with 240 MPa of tensile stress as a membrane and 625 μm-thick Si as a frame, was fabricated. As a result of the sub-micron LIGA process, a sub-micron PMMA structure with a maximum aspect ratio of 85, corresponding to 0.2 μm minimum width, 6 μm length and 17 μm height, and sub-micron Ni structures with a maximum aspect ratio of 75, corresponding to 0.2 μm minimum width and 15 μm height, were fabricated.

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