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Methods of manufacturing self-supporting X-ray templates

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The design and methods of manufacturing self-supporting high-contrast in the X-ray spectral wavelength range (λ ≈ 0.6÷14 Å) X-ray masks are described, which are a tool for the formation of high-aspect resistive topologies with a thickness of up to 1 mm or more, both of positive and negative X-ray resists. Two manufacturing methods are described in detail, namely: on the ba-sis of plasma chemical etching and on the basis of laser micro-processing (laser cutting). Sam-ples were made by both of these methods and their comparison was carried out. The work car-ried out shows that these methods can be used to produce self-supporting high-contrast X-ray

masks and LIGA-masks from industrially produced heavy metal foils, such as tantalum and other with minimum topological dimensions up to 15 microns. The method of laser cutting using a powerful femtosecond laser is more efficient and requires significantly less technologi-cal preparation and fewer operations for its implementation.

Keywords: X-ray mask, LIGA-mask, plasma chemical etching, laser micro-processing, laser cut-ting, LIGA technology, contrast of the X-ray mask, resist mask, aspect ratio.

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