

Creation of lithographic masks using a scanning probe microscope

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Abstract

© 2015, Pleiades Publishing, Ltd. The experimental results on scanning probe lithography (SPL)—the formation of lithographic masks using scanning probe microscope—are presented. Polymethylmethacrylate (PMMA)-based masks prepared by the SPL method are used to form metal nanoparticles of the specified sizes and shape, as well as the metallic nanowires connecting the contact areas. The analysis of various SPL modes showed that the procedure of point indentation with the switched-on microscope feedback is optimal for the formation of round nanoparticles. When forming the rectangular particles, the procedure of multiple scanning of one region in the contact mode is optimal. The quality of lithographic masks can be substantially increased by the additional use of chemical etching to remove excess PMMA after the mask is formed. The topography and magnetization structure of the formed structures were monitored by atomic force microscopy and magnetic force microscopy.

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