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New Directions in 3-D Multiphoton Lithography. JOHN FOURKAS, CHRISTOPHER LAFRATTA, University of Maryland, RICHARD FARRER, Pine Manor College, LINJIE LI, University of Maryland, MICHAEL NAUGHTON, Boston College — Multiphoton absorption polymerization (MAP) is a promising technique for the lithographic fabrication of 3-D microdevices. However, this technique also has two major shortcomings that have so far precluded its use in the mass production of devices. First, MAP is an inherently serial technique, and structures must be created on a voxel-by-voxel basis. Second, the fabrication of many desirable 3-D devices requires incorporation of materials other than polymers. We will discuss our recent progress in attacking both of these problems. We have developed soft-lithographic techniques that allow for the creation of complex 3-D structures that can include closed loops based on master structures created using MAP. We have also developed a technique that allows for the selective deposition of materials that include metals, metal oxides, and biomolecules on desired regions of 3-D structures fabricated with MAP. We demonstrate the use of the latter technique in the creation of functional microinductors.

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