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Desktop Micromachining Printer for Micro Analytical Systems

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We have developed a novel micron scaled resolution maskless photoimaging/patterning tool that permits the creation of small, arbitrary features. This microdevice printer is useful for constructing devices, structures and packages, in any photoimageable material that can be applied towards fabrication of microanalytical systems. The fabrication technology can provide features down to 10 microns simultaneously over a field of view of 2 cm height and 2 cm width but with manual stitching can yield unlimited field of view. The instrument relies on the use of microoptics and spatial light modulation to create the required 2D pattern aerial image for photoimprinting,. We have demonstrated the utility of the printer/direct writer for creating mechanical, optical, fluidic and electronic components that would form the basis of microanalytical systems and micrototal analysis systems (uTAS). The printer also can be applied to creating patterned, structured layers for controlling chemical, biochemical and physical properties of surfaces. The writer can create mask free designs on planar and curved surfaces and has been applied to metals, ceramics, organic polymers and semiconductors. The technology has widespread application in the MEMS, bioMEMS, uTAS and sensor markets. Results and output from the noncontact desktop printer will be presented.