Intelligent Micro Patterning, LLC in the News
Micromachine Devices

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From the Editors of R&D Magazine

Maskless photolithography process commercialized by Intelligent Micro Patterning

A silicon etching device, that creates patterns by means of computer-controlled light passing through air rather than an unmodified beam striking a lithographic mask in a vacuum, is now commercially available from Intelligent Micro Patterning (IMP at www.intelligentmp. com) of St. Petersburg, Fla. The price of the innovative device, called the SF-100, is just under US$100,000, says Jay N. Sasserath, the new company's chief executive officer.

While the device's smallest claimed resolution—20 µm—is not likely to make Intel go faint with desire, the tool might significantly reduce development costs for high-density packaging applications, multichip modules, microfluidic devices, and thin-film applications. "One of our key development programs is to reduce the footprint of the tool," says Sasserath.

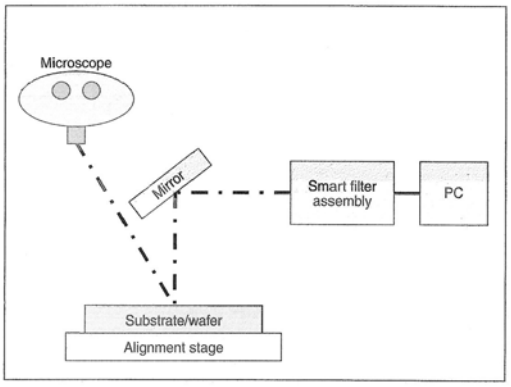

Fig. 1. Silicon etching device that creates patterns by means of computer-controlled light passing through air. **Source: Intelligent Micro Patterning, St. Petersburg, Fla.**

David P. Fries, chief technical officer for IMP, invented the method, called "Smart Filter Technology." The pattern-applied-for technology was developed at the Univ. of South Florida, Tampa, and is exclusively licensed to IMP.

How does it work? Spatial light modulation techniques and advanced micro-optics project images directly onto electronic substrates without the use of photomasks. The patented sub-system uses a broadband spectrum from a high-intensity white light source for the exposure energy of the process. The light, filtered and optimized through use of a variety of integrated optical components, then strikes a computer-generated image imposed in its path. The resultant pattern is then transferred to the substrate surface and used to expose the photosensitive material. A schematic of this system is shown in Fig. 1 (above).

The microscope is needed for pattern alignment to the substrate. Alignment is controlled through a coarse and fine alignment stage. Once alignment is complete, wafer exposure occurs. Through use of a step-and-repeat method, the entire substrate surface is exposed.

Sasserath declined to release more details but claims very minimal maintenance and minimum moving parts for the relatively small machine.

"For universities, this is a great tool," Sasserath says. "Instead of an electron beam, vacuum system, and overall mask making tool 6 ft. by 6 ft. by 8 ft. high, we use atmosphere and a tool that is 2 ft. by 2 ft. by 5 ft. and sits on a table."

Sasserath says that work using the new tool is already ongoing at the Univ. of Florida, at Gainesville, in MEMS and microfluidics, and at a large corporation interested in pressure-control applications, microactuators, and plating applications.

Since users do not need to wait for new photomasks to be manufactured, prototype devices can be fabricated very quickly, reducing time to market. The new devices also reduce operating costs.

Intelligent Micro Patterning has dedicated manufacturing facilities at which all systems are assembled and tested prior to shipment. Additionally, support facilities at the Univ. of South Florida are available for process demonstration.

For further information, call Jay Sasserath at 727-522-0334 or e-mail him at jays@intelligentmp.com.

Coming events

Oct. 11-13 Intl. Sensor Conference, Seoul, Korea. www.sensors.or.kr/ISC2001.

Oct. 15-18 Intl. Congress on Applications of Lasers and Electro-Optics, Jacksonville, Fla. www.icaleo.org.

Oct. 21-24 Polytronic 2001: 1st Intl. IEEE Conference on Polymers and Adhesives in Microelectronics and Photonics, Potsdam, Germany. www.polytronic.org/index.html.

Oct. 21-25 Micromachining and Microfabrication, San Francisco. www.spie.org/confereces/calls/01/mf.

Oct. 21-25 µTAS 2001: 5th Intl. Conference on Miniaturized Chemical and Biochemical Analysis Systems, Monterey, Calif. www.casss.org/tas2001.

Oct. 22-25 Reliability, Testing, and Characterization MEMS, part of SPIE's Intl. Symposium on Micromachining and Microfabrication, San Francisco. http://nepp.nasa.gov/pubs/call_for_papers/spie_1022-25.pdf.

Oct. 28-30 IEEE-NANO 2001, Maui, Hawaii. www.mein.nagoya-u.ac.jp/IEEE-NANO.

Oct. 28-Nov. 2 Photonics Boston, Newton, Mass. www.spie.org/conferences/calls/01/pb.

Oct. 29-Nov 1 Chips to Hits, San Diego. www.chipstohits.com/section.asp?view=welcome.

Oct. 31-Nov. 2 MNC 2001: Intl. Microprocesses and Nanotechnology Conference, Matsue-shi, Shimane, Japan. http://vip.nano.ee.es.Osaka-u.ac.jp/mnc.

Nov. 5-7 Sicon 01: First Sensors for Industry Conference, Rosemont, Ill. www.siconference.org.

Nov. 7-10 Optoelectronics and Microelectronics, Nanjing, China. www.spie.org/conferences/calls/01/om.

Nov. 9-11 9th Foresight Conference on Molecular Nanotechnology, Santa Clara, Silicon Valley, Calif. www.foresight.org/Conferences/MNT9/index.html.