News Release

Nano-Imprint Lithography System, Funded by $700,000 Grant, To Be Established at UMass

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AMHERST, Mass. – The University of Massachusetts Amherst is establishing a Nano-Imprint Lithography (NIL) laboratory to further its research capabilities in nanoscale device manufacturing. The university has received a $700,000 grant from the National Science Foundation to acquire two advanced instruments that together will allow scientists to engineer and build materials 1,000 times smaller than the diameter of a human hair.

The laboratory will aid in the study of nanotechnology and the development of new technologies such as chemical sensors, faster and more stable computer chips, and power management devices for electric vehicles.

Delivery and installation of the new equipment is expected by spring 2006. Nano-imprint lithography is based on the ancient craft of embossing adapted to modern semiconductor needs to fabricate features as small as 20 nanometers. In combination with plasma etch techniques, the system will transfer polymer patterns to inorganic materials that can be used in devices. Orders have been placed for an Imprio™ 55 Step and Flash nano-imprint lithography instrument from Molecular Imprints, Inc. and a Phantom II Reactive Ion Etch (RIE) plasma etching system from Trion Technology, Inc.

According to Alfred Crosby, a polymer scientist affiliated with the university's MassNanoTech Institute, the new equipment provides an important research asset for one of UMass Amherst's priorities: creating manufacturable nanoscale devices for diverse product applications. "Adding nano-imprint and plasma etch tools at UMass makes a lot of sense at this time, when our nanotechnology research community has a number of research projects that need to carry out prototyping studies on new devices," Crosby says. "We're also very interested in integrating these techniques with some of our other processes such as polymer-based nanopatterning." Currently, UMass is one of the few universities in the Northeast using a step-and-flash nano-imprint lithographic system for research.

Kenneth Carter, another faculty member who worked with nano-imprint lithography during his 13 years at IBM prior to coming to UMass in 2004, says the new lab will help train students on state-of-the-art industrial tools. Other faculty members involved in the NIL laboratory are Seshu Desu, Byung Kim, and James Watkins. The university will integrate the NIL system into its existing Keck Nanostructures Laboratory. The new laboratory will be available to UMass faculty, for shared use with local colleges and for projects with industry through the MassNanoTech Institute.

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