Precision Overlay in UV Nanoimprint Lithography

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Abstract:

Nanoimprint lithography techniques are known to possess remarkable replication capability down to sub-5nm resolution. Translating this nano-scale resolution to a commercially viable manufacturing processes requires carefully designed precision systems that can achieve a variety of process performance, cost and reliability targets.

This talk will discuss a specific form of UV imprint lithography known as Jet and Flash Imprint Lithography (J-FIL). J-FIL technology has been implemented in a stepper format with sub-10nm overlay to complement photolithography at sub-20nm half-pitch nodes for semiconductor ICs. It has also been applied to large area patterning on whole substrates for terabit density magnetic storage, as well as on a roll-to-roll basis with applications in display photonics, flexible nanoelectronics, and nanomedicine.

This talk will emphasize key precision sub-systems that have enabled the evolution of overlay in UV nanoimprint technology. The discussion will include state-of-the-art overlay in steppers for CMOS IC application, and in roll-to-roll systems for fabrication of integrated nanoscale devices on flexible substrates.

Biographical Summary:

Dr. S.V. Sreenivasan specializes in the area of nano-patterning as applied to advanced memory, display devices, magnetic data storage, biomedicine and clean energy. He is a Professor of Mechanical Engineering and Electrical and Computer Engineering at UT-Austin and the Co-Director of the NASCENT NSF Engineering Research Center. He has published over 100 technical articles and holds over 100 U.S. patents in the area of nanomanufacturing. He has received several awards for his work including the Technology Pioneer Award from the World Economic Forum (2005), the ASME Leonardo da Vinci Award (2009), the ASME William T. Ennor Manufacturing Technology Award (2011), and UT-Austin Inventor of the Year Award (2012).

Dr. Sreenivasan also serves as the Chief Technologist of Canon Nanotechnologies, Inc., a company formed as a result of the acquisition of the semiconductor business of Molecular Imprints by Canon in April 2014. Dr. Sreenivasan founded Molecular Imprints Inc., a nanopatterning technology spin out from UT-Austin. Molecular Imprints, Inc. is continuing to commercialize nanopatterning applications outside the semiconductor area in displays, data storage and biotechnology.