

Symposium Nanostructuring Beyond Conventional Lithography (SYNS)

jointly organized by
 the Microprobes Division (MI),
 with the Thin Films Division (DS),
 the Dielectric Solids Division (DF),
 the Semiconductor Physics Division (HL),
 the Metal and Material Physics Division (MM),
 and the Vacuum Science and Technology Division (VA)

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Since a long time, the development of silicon microelectronics is the main driving force of the progress in high-resolution lithography. Currently, industry is approaching the 14 nm node, and technology for the 10 nm node is under development. In parallel, the increasing storage density in hard disk drives has initiated additional needs for very regular but ultra-high resolution lithography processes for patterned media. At the moment, silicon integration still favors optical lithography processes enhancing the resolution by double patterning techniques and aims at introducing extreme UV technology. This strategy still works, however, the increasing costs have led to several attempts to introduce electron beam lithography into production. The requirements for patterned media, however, might allow the introduction of nanoimprint lithography or self-organization processes using the demixing of blockcopolymers. In addition, academic research on quantum effects, spintronics, plasmonics metamaterials or molecular electronics has given rise to the development of other lithography methods, based for example on scanning probe methods which are also able to reach the sub 10 nm regime. This symposium aims at showing the current state of the art of ultra-high resolution lithography. On one hand the state-of-the-art of ultra high resolution electron beam lithography will be discussed. On the other hand other methods will be presented which are less common, but which are able to achieve the same resolution and precision as electron beam methods. These methods include scanning probe methods, selforganization on prepatterned surfaces and direct patterning by ion beams. The symposium should demonstrate that substantial progress in recent years, not only with regards to size resolution, but also in the portfolio of reliable structuring methods has been achieved. Limitations, such as high costs, resolution, and poor compatibility with materials other than silicon (e. g. soft matter, ceramics) have been addressed. Interesting is as well the coupling of advanced structuring techniques with new concepts of in-situ analysis. The symposium aims at a broad interdisciplinary field with major contributions as well from basic research as well from industry application.

Overview of Invited Talks and Sessions

(Lecture room HSZ 02)

Invited Talks

SYNS 1.1	Wed	15:00–15:30	HSZ 02	The Limits to Lithography: How Electron-Beams Interact with Materials at the Smallest Length Scales — ●KARL K. BERGGREN
SYNS 1.2	Wed	15:30–16:00	HSZ 02	High precision fabrication for light management at nanoscale — ●SAULIUS JUODKAZIS, ARMANDAS BALCYTIS
SYNS 1.3	Wed	16:00–16:30	HSZ 02	Directed self-assembly of performance materials — ●PAUL NEALEY
SYNS 1.4	Wed	16:45–17:15	HSZ 02	Nanometer accurate topography patterning using thermal Scanning Probe Lithography — ●ARMIN W. KNOLL
SYNS 1.5	Wed	17:15–17:45	HSZ 02	High resolution 3D nanoimprint lithography — ●HARTMUT HILLMER

Sessions

SYNS 1.1–1.5	Wed	15:00–17:45	HSZ 02	Symposium Nanostructuring Beyond Conventional Lithography (MI with DS, DF, HL, MM and VA)
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