Nanopatterning—From Ultralarge-Scale Integration to Biotechnology
Nanopatterning—From Ultralarge-Scale Integration to Biotechnology

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EDITORS:

Lhadi Merhari
CERAMEC
Limoges, France

Kenneth E. Gonsalves
University of North Carolina
Charlotte, North Carolina, U.S.A.

Elizabeth A. Dobisz
IBM Almaden Research Center
San Jose, California, U.S.A.

Marie Angelopoulos
IBM T.J. Watson Research Center
Yorktown Heights, New York, U.S.A.

Daniel Herr
SRC, Materials and Process Sciences
Research Triangle Park, North Carolina, U.S.A.
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*Invited Paper
Nanotechnology is regarded as the key technology of the 21st century and is expected to bring a solution to problems in areas ranging from information technology to biotechnology. Whether via lithographic or non-lithographic methods, nanopatterning is a major issue to address as it is the enabling technique for the fabrication of nanostructures. A high level of creativity is clearly needed to engineer new resists and masks, to optimize nanomaterials synthesis and processing...etc....in other words to make the transition from micro- to nanoscale possible while keeping the costs of future nanofabrication compatible with the market requirements.

This volume is a snapshot of the state-of-the-art of nanofabrication applied to circuit integration and cell engineering, and provides the reader with indication of the future trends and remaining challenges in this technologically important field. It contains a representative part of the papers that were presented during Symposium Y, "Nanopatterning—From Ultralarge-Scale Integration to Biotechnology," held November 25–29 at the 2001 MRS Fall Meeting in Boston, Massachusetts.

The large attendance at the tutorial and at the 4-day long symposium again demonstrated intense interest in the topic of nanofabrication by the materials science community. The challenge to gather, in a single forum, researchers working in apparently non-related fields such as cell engineering, microelectronics, magnetism, surface science and new materials synthesis was successfully taken up.

In the field of advanced materials and processes for nanolithography, it was shown, for instance, that hybrid nanocomposite resists offer a promising route to sub-100nm resolution structures while CO2-processing of resist systems solves the serious problem of nanostructures collapse. Performance of ion projection lithography and progress of EUV and near-field optical lithographies for sub-100nm resolution circuits were critically assessed.

Nanofabrication for biological applications was particularly well addressed by outstanding contributions from key players, indicating a fast evolving field where nanopatterning of substrates, for example, plays a major role in cell engineering.

Fabrication of ordered nanostructures is an emerging field that already showed great promises in photonics and data storage. Here, the topic of high density magnetic data storage focuses on original fabrication methods by lithography and self-assembly of periodic structures on surfaces whose sizes are compatible with industrial applications.

Lhadi Merhari
Kenneth E. Gonsalves
Elizabeth A. Dobisz
Marie Angelopoulos
Daniel Herr

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Lhadi Merhari would like to dedicate this book to the memory of his beloved mother Eleonora who died shortly before the MRS Meeting.
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