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Symposium Proceedings: Volume 872

Editors: Cengiz S. Ozkan, David A. LaVan, Mark McNie and Somuri Prasad

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**MATERIALS RESEARCH SOCIETY
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PREFACE

Symposium J, "Micro- and Nanosystems—Materials and Devices," held March 28–April 1 at the 2005 MRS Spring Meeting in San Francisco, California, provided an active forum in the areas of (a) microsystems, including micromachines and micro-electro-mechanical systems (MEMS) as well as micro-optical-electro-mechanical systems (MOEMS), and (b) nanosystems, also referred to as nano-electro-mechanical systems (NEMS) or molecular machines, including devices that incorporate nanotubes, nanocantilevers, and molecular or atomic manipulators. A wide range of physical and chemical sensor applications have been addressed with these technologies, such as inertial, magnetic, environmental, chemical, and biological detection. In addition, the symposium gave an overall perspective about the technology requirements for taking a leap from conventional micro- and nano- systems towards bio-nano systems for realizing functional materials and systems for applications such as drug delivery.

The symposium was initiated with a tutorial titled BioMEMS—Materials, Fabrication and Devices, and taught by Rashid Bashir (Purdue University), Kevin Turner (MIT) and David A. LaVan (Yale University). Besides overviews of surface and bulk microfabrication techniques, they placed a special emphasis on methods of fabricating polymer micro- and nano-systems and applications in drug delivery and single molecule detection. The symposium provided an exciting environment to discuss some of the latest progress in fabrication and characterization of related technologies. We would like to list the following highlights from our symposium: Joseph Michael from Sandia National Laboratories discussed the application of focused ion beam milling in characterizing MEMS devices, which is becoming a conventional tool for this purpose. James Kelly from Sandia National Laboratories discussed the electrodeposition of structures through high aspect ratio features in thick resists, which is a new and powerful trend in MEMS fabrication. Xuan Zhang from UCR discussed the use of nanostructured substrates and demonstrated neurite guidance and growth using vertical carbon nanotube arrays. Roya Maboudian from UCB talked about surface and materials issues for reliability of MEMS devices and provided an insight into how characterization schemes for evaluating MEMS reliability can be developed. Ali Gokirmak from Cornell University demonstrated a CMOS compatible integrated fluidic channel system for the analysis of oligonucleotides. Cedric Meier from UCSB discussed the fabrication of GaN photonic crystal membrane cavities.

The organizers express their gratitude to all the invited and contributed speakers and poster presenters for their participation. It is expected that further developments in the field will provide additional stimulating symposia in the future.

Cengiz S. Ozkan
David A. LaVan
Mark McNie
Somuri Prasad

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