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Ion-Beam-Based Nanofabrication

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PREFACE

Symposium GG, "Ion-Beam-Based Nanofabrication," was held April 10–12 at the 2007 MRS Spring Meeting, in San Francisco, California.

Ion beam technologies now evidently offer a robust and highly versatile approach, both for commercial fabrication, and for nanometer-scale manipulation in research. The presentations during this two and a half day symposium emphasized applications of ion beams in nanoscale fabrication for custom tailoring of surface properties and features, and structures in 1-D, 2-D or 3-D, at resolution down to a few nanometers. Applications discussed included quantum dot arrays, nanopore membranes for DNA sequencing, bio-sensors and lab-on-chip devices, growth of nanowires, 3-D device integration, and high-density non-volatile memory. The presentations reported customized ion beam processing such as locally patterned surface functionalization to promote selective adhesion of cells in chosen arrays, or for biomedical implant materials; surface layer ultra-smoothing, by cluster ion bombardment; shallow implantation of dopants by ion clusters; induction of self-assembled surface ripples (a phenomenon of complex instability, whose full description is still eluding our best models); nanopore sculpting for electrophoretic DNA sequencing; growth of epitaxial nanowires on silicon; sculpting of intricate 3-D objects and arrays, including 'towers' with high aspect ratio; FIB-controlled growth of carbon nanotube devices; and ion implantation controlled development of silicon nanocrystals for photonic device applications.

The proceedings volume is divided according to the original sections of Symposium GG.

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