

Abstract Submitted
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3-D matrix template-assisted growth of oriented oxide nanowire arrays using glancing angle pulsed laser deposition N WRIGHT, Univ of Connecticut - Storrs, D MATEO-FELICIANO, A OSTOSKI, P MUKHERJEE, S WITANACHCHI, Univ of South Florida — Nanosphere lithography is a combination of different methods to nanofabrication. In this work nanosphere lithography is used to study the growth of Zinc Oxide Nano-columns (ZnO NCs) on different diameter Silica Nanosphere (SNS) self-assembled templates. ZnO NCs are promising building blocks for many existing and emerging optical, electrical, and piezoelectric devices, specifically, the seeded growth of other oxide materials. Recently, reports have shown a ferroelectric phase of zinc stannate (ZnSnO_3) and while lead zirconium titanate oxide (PZT) has been the main material of interest in ferroelectric and piezoelectric applications, the toxicity of lead has been of great concern. The possibility of developing lead free piezoelectric materials is of great interest in the ferroelectric community. Langmuir-Blodgett method was used to construct a self-assembled monolayer of SNSs on silicon substrates. Oriented ZnO NCs were grown on top of the spheres using the glancing angle pulsed laser deposition technique. Columns were formed in a spatially ordered closed-packed hexagonal configuration. Growth of ZnO NCs was studied as function of ambient Oxygen pressure with SNS size ranging from 250-1000 nm. Cross-sectional Scanning Electron Microscopy and X-ray diffraction (XRD) were used to study the template structure. Relative aspect ratios were studied and showed tunability of column dimensions with sphere size. XRD revealed ZnO NC arrays were c-axis oriented with hexagonal wurtzite structure.

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