Abstract Submitted
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Controlled fabrication and selective CVD growth of ZnO Nanowires and Nanoribbons enabled by Direct Write parallel patterning technique[1] DHEYAA ALAMERI , ROBERT SCHURZ, Saint Louis University, LEONIDAS E OCOLA , YUZI LIU, Argonne National Laboratory, CNM , IRMA KULJANISHVILI, Saint Louis University — We present a new approach for controllable synthesis of ZnO nanowires and nanoribbons by employing a 'direct write' patterning and subsequent Chemical Vapor Deposition (CVD) methods. In this work we implemented our developed precursor 'ink' as catalyst, and demonstrated the growth of high quality ZnO nanostructures prepared in various geometric architectures; nanoflowers, nanoribbons, and more complex shapes. We employ multi-pen AFM cantilevers for parallel writing of the precursor ink to create arrays of patterns (dots, lines) over the large areas on the substrates. We show that the diameter and the length of the grown nanowires can be controlled by the 'ink' composition, geometry of the patterns written on the substrate and the growth conditions during the synthesis. Here we show that the individual nanowires can range from (100- 250) nm in diameter , and 1μm to 3μm in length. We also demonstrate that various design patterns can be easily created on different substrates such as Si/SiO2 or graphene, and directly on prefabricated devices. Arrays of ZnO nanowires and nanoribbons were characterized by Raman , X-ray photoelectron and Photoluminescence spectroscopies. I/V characteristics of devices will also be discussed.

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