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Synthesis and Growth Polarity of ZnO Nanostructures JENNY PARRA, California State University, Fresno, JACEK JASINSKI, VALERIE LEPPERT, University of California, Merced, VANVILAI KATKANANT, DAQING ZHANG, California State University, Fresno — The semiconductor ZnO nanostructures are attracting increased attention in the nano-community due to their wide range potential applications. We present in this paper the synthesis of ZnO nanostructures including nanowires, nanobelts, and nanopillars using chemical vapor deposition method via vapor-liquid-solid growth mechanism. The as-grown ZnO nanostructures were examined in transmission electron microscope (TEM). Electron energy loss spectroscopy (EELS) and chemical mapping were used to verify their chemical composition. Furthermore, our interest particularly focused on ZnO nanopillars due to their properties are strongly polarity dependence. It was studied with convergent beam electron diffraction (CBED) and channeling-enhanced EELS methods. It indicates that the nanopillars are narrow hexagonal columns, grown along the c-direction, with their $\{1\bar{1}00\}$-type side-walls in the width range of 65-70 nm. Their tips had the form of a truncated hexagonal pyramid, with top surface terminated at the (0001) plane and the side-walls at the $\{1\bar{1}01\}$-type planes. Nanoplliars were found to grow along the (0001), Zn-polarity. Further studies on ZnO nanopillars mechanical properties and bio-senor applications are undergoing.

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