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Atomic Force Microscopy and Low Energy Electron Diffraction of Epitaxial Zinc Oxide Films MARK LEARNER[1], Y. ZHANG, ANDREAS SANDIN, DONG WU, J.E. (JACK) ROWE, NC State University — The purpose of the current thin-film Zinc Oxide (ZnO) research is to characterize OMCVD- grown heteroepitaxial thin films of ZnO, which are thought to be single crystal. These ZnO films have many interesting technological applications, including LCD screens and solar cells. We use We also use Atomic Force Microscopy (AFM) and Low Energy Electron Diffraction (LEED) to measure the topography and investigate the periodicity of the ZnO samples produced. The topography data shows nanoscale domains that appear to range in length from 300-700nm, width from 180-270nm, and height from 20-50 nm depending on growth conditions. Optical microscopy has been used to gain additional qualitative understanding of surface topography features on different areas of the samples. We observe single crystal patterns with LEED and thus confirm the expected epitaxial nature of the growth process. Analysis of the energy dependent LEED data has shown that the diffraction patterns are always single crystal orientation in good registry with the substrate orientation. However, we have also found that there are sample charging effects (which shift the apparent energy by 26 to 43 eV) occur during LEED measurements due to the high resistance of the samples on insulating substrates and Al_2O_3.

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