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**Growth and Characterization of ZnO Nanowires for Biological Sensing Applications** JOSHUA M. CARLSON, Department of Physics, West Chester University, KEVIN MACK-FISHER, Department of Chemistry, West Chester University, BENJAMIN ROE, Department of Physics, West Chester University, TYLOR J. PECA, KURT W. KOLASINSKI, Department of Chemistry, West Chester University, SHAWN H. PFEIL, Department of Physics, West Chester University — We present data on the growth of ZnO nanowires, which are under development as a less toxic alternative to quantum dots. Nanowires, grown via thermal oxidation of seed particles deposited by laser ablation, were characterized by scanning electron microscopy (SEM), energy dispersive spectroscopy (EDS) and atomic force microscopy (AFM). AFM studies focused on the details of the growth processes that occur on sub-100 nm seed particles. There appear to be three main archetypes of wire decorated nanoparticles, they follow a general trend in the sizes of "seed" particles from which wires originate, as well as the width, length, and variety of their nanowires. We bin the seed particles into three classes by diameter, small (˜1 nm), medium (˜2.5-5 nm), and large (˜7-10 nm). Small seeds give rise to short nanowire spikes, ˜0.5 nm in length, medium seeds give rise to intermediate length wires, 4-12 nm in length, and large seeds give rise to longer wires, 20-40 nm in length. This suggests that the size of the particle is qualitatively related to the "upper ceiling" on potential nanowire length. SEM studies focused on the details of growth processes that occur on 100 nm to 1 m seed particles. Large particles exhibits a remarkable growth regime in which nanowires completely consume the seed particle.

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