

ZnO Nanowhiskers: Transport and Optical properties

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Abstract :

ZnO is a promising material for electronic and photonic applications such as transparent field effect transistors and UV LEDs and lasers. We review our results on electron and hole carrier transport properties of ZnO bulk, ZnO epitaxial thin films and ZnO nanowhiskers grown with pulsed laser deposition and report on a pn diode and n- and p-type FETs based on nanowhiskers. Linear and nonlinear properties of ZnO nano- and microwhiskers are discussed in terms of optical modes, gain process and the correlation of optical and structural properties. The incorporation of MgZnO/ZnO/MgZnO quantum wells into ZnO nanowhiskers leads to the formation of zero-dimensional states, probably due to the formation of Zn-rich quantum-dot like structures with the MgZnO barrier.