

Abstract Submitted
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UV light emission from ZnO nanostructures in SiO₂ synthesized by ion implantation and thermal annealing BIMAL PANDEY, AKHILESH SINGH, PRAKASH POUDEL, ARUP NEOGI, DUNCAN WEATHERS, University of North Texas — Zinc Oxide (ZnO) nanostructures were synthesized by the implantation of low energy (35 keV) ZnO molecular ions into thermally grown SiO₂ at a fluence of 5×10^{16} ions/cm². Implanted samples were annealed in an oxygen environment to allow the growth of ZnO precipitates. X-ray photoelectron spectroscopy (XPS), Fourier transform spectroscopy (FTIR) and energy dispersive x-ray spectroscopy (EDS), confirm the formation of ZnO. High resolution transmission electron microscopy (HRTEM) shows the formation of nanostructures having diameters ranging from 2 nm to 5 nm in the SiO₂. Photoluminescence (PL) measurements show excitonic and band-edge emission in the ultraviolet region at temperatures ranging from 4 K - 300 K. Time-resolved PL measurements performed at 4K showed an electron-hole recombination lifetime on the order of a few hundred picoseconds.

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