

MICROWAVE GROWTH OF ZINC OXIDE SINGLE CRYSTAL MICROTUBES

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Single crystal zinc oxide (ZnO) microtubes were prepared with cross-sectional dimensions of 100 to 250 microns, lengths of 1-3 millimeters and wall thickness of 1-2 μm by using a microwave heating process at temperatures ranging from 1300-1350°C. The microwave grown ZnO microtubes have hexagonal hollow tubular texture with well faceted ends and side surfaces. Under optical excitation, a strong near band-edge emission was obtained at a peak wavelength of 377.8 nm with a full-width at half-maximum (FWHM) of 11 nm. The ZnO microtubes exhibited highly selective UV light response with a cut-off wavelength of about 370 nm, and excellent electron field emission properties with an emission current density of 11 mA/cm² at an applied field of 20.15 V/ μm . These low-cost and high-quality ZnO single crystal microtubes should find their myriad applications in optoelectronics devices including efficient field emission, UV light emission and detection.