

Abstract Submitted
for the NWS09 Meeting of
The American Physical Society

Influence of annealing on ZnO films grown by flow modulation epitaxy HEH HUANG, SIMON WATKINS, Simon Fraser University — We have previously reported the growth of the wide bandgap semiconductor ZnO by the growth technique of flow modulation epitaxy (FME), a variation of metalorganic vapor phase epitaxy, in which the wafer is alternately exposed to diethylzinc and nitrous oxide. In this work we report on the effect of annealing ZnO samples under air at temperatures up to 1100 °C. Evidence of significant mass transport following annealing is apparent in X-ray diffraction (XRD) and atomic force microscope (AFM) measurements. XRD data show that the as-grown ZnO films are highly c-axis (0001) oriented, since only ZnO (0002) and (0004) peaks can be seen. The annealing procedure has significantly improved the crystalline quality of ZnO films as evidenced by an order of magnitude increase in intensity and a significant narrowing of ω -scan linewidths. AFM scans show that the surface morphology has been significantly flattened after annealing, while the grain size increased with the annealing temperature from 0.4 μm to great than 1 μm . In addition, atomic terraces became evident at higher annealing temperatures.

Simon Watkins
Simon Fraser University

Date submitted: 13 Apr 2009

Electronic form version 1.4