

Supporting Information for

Surface-directed ZnGa_2O_4 and $\beta\text{-Ga}_2\text{O}_3$ Nanofins

Coated with Non-polar GaN Shell Based on

Kirkendall Effect

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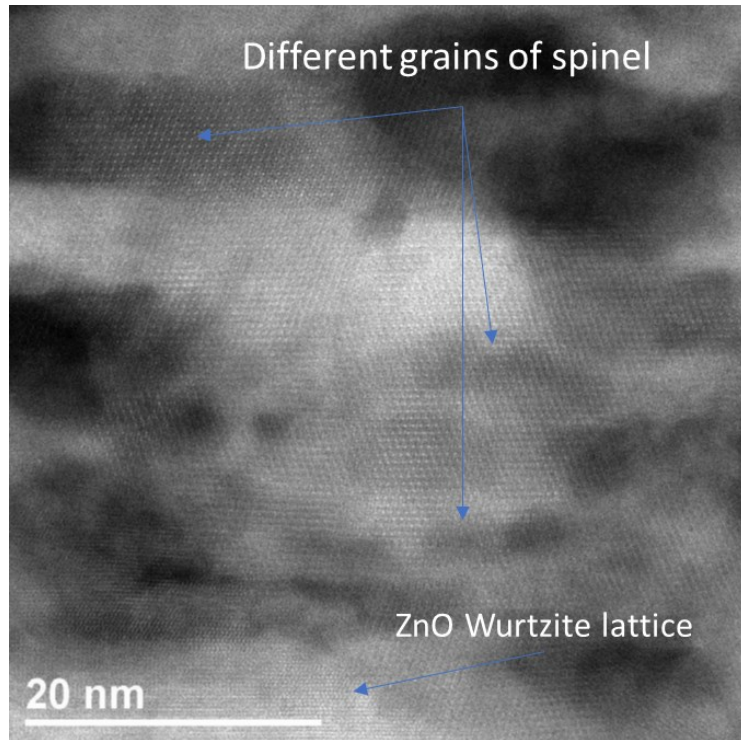


Figure S1. HRTEM section of a ZnGa₂O₄ fin at the base of the fin. Multiple grains are observed.

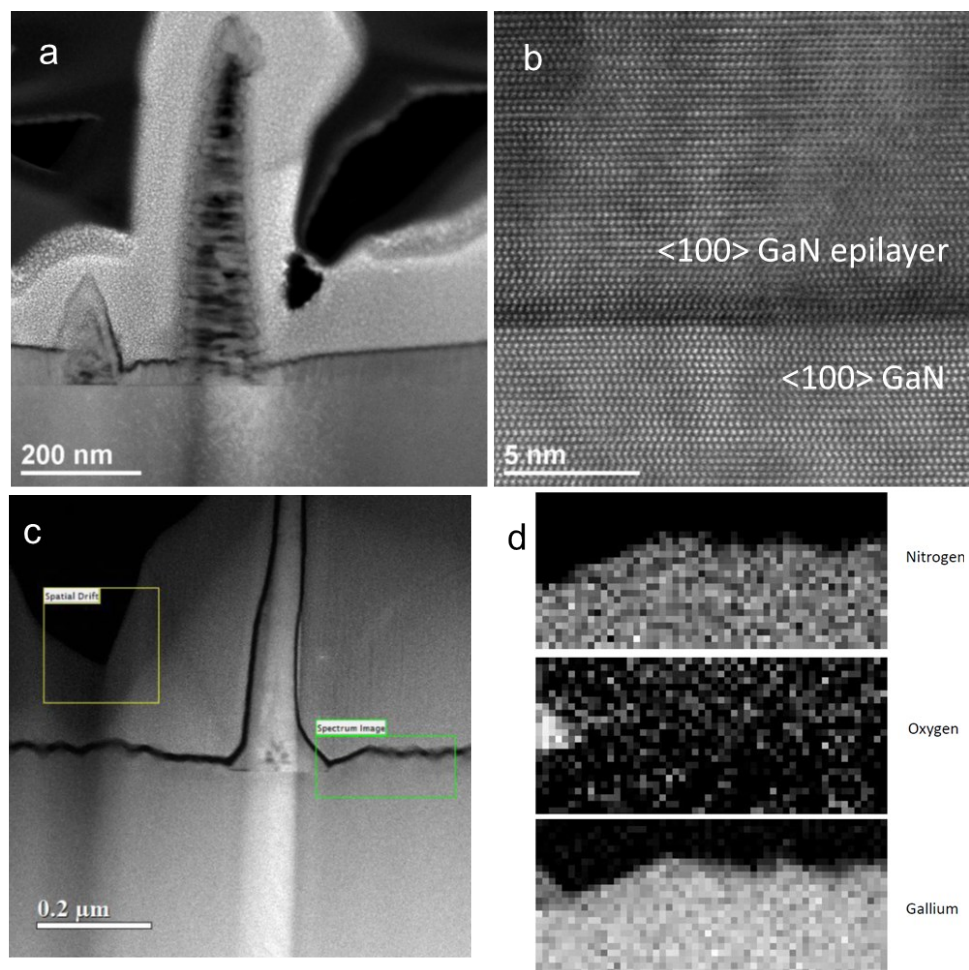


Figure S2. a) The same fin as the one shown in Figure 2, but tilted ≈ 30 degrees to an adjacent low order zone axis to better show the lattice structure and spacing in part b. c-d) Representative cross section of a fin in the nitrogen rich growth condition (2nd approach). The GaN growth on the GaN substrate (adjacent to the nanofin) results in a thicker film. EELS analysis confirms the presence of Nitrogen. Moreover, elemental analysis (d) indicates the epilayer is comprised of Ga and N. The elemental map was collected from the green frame shown in part c.

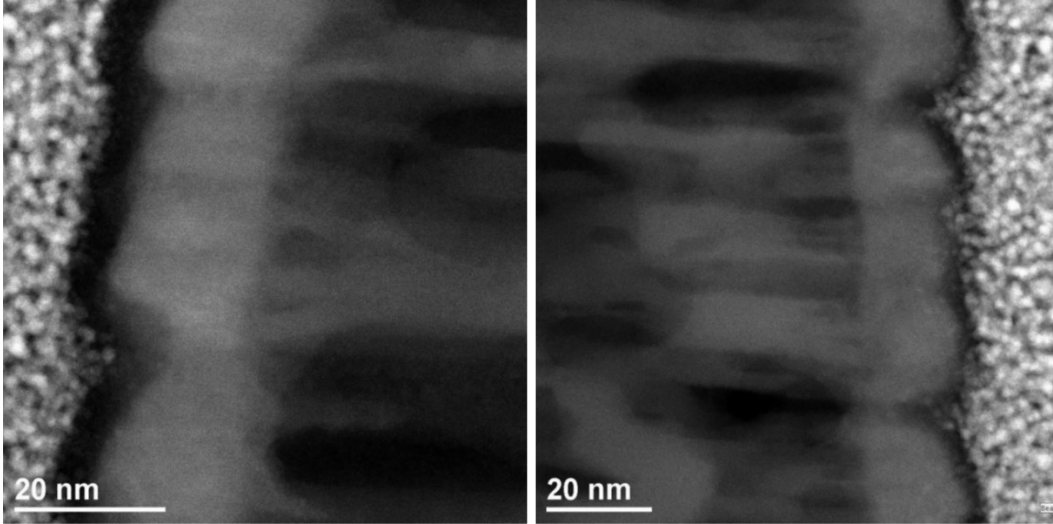


Figure. S3. In the first growth condition (Ga-rich), the GaN shell on either side of the fin has a terraced/sawtooth morphology.

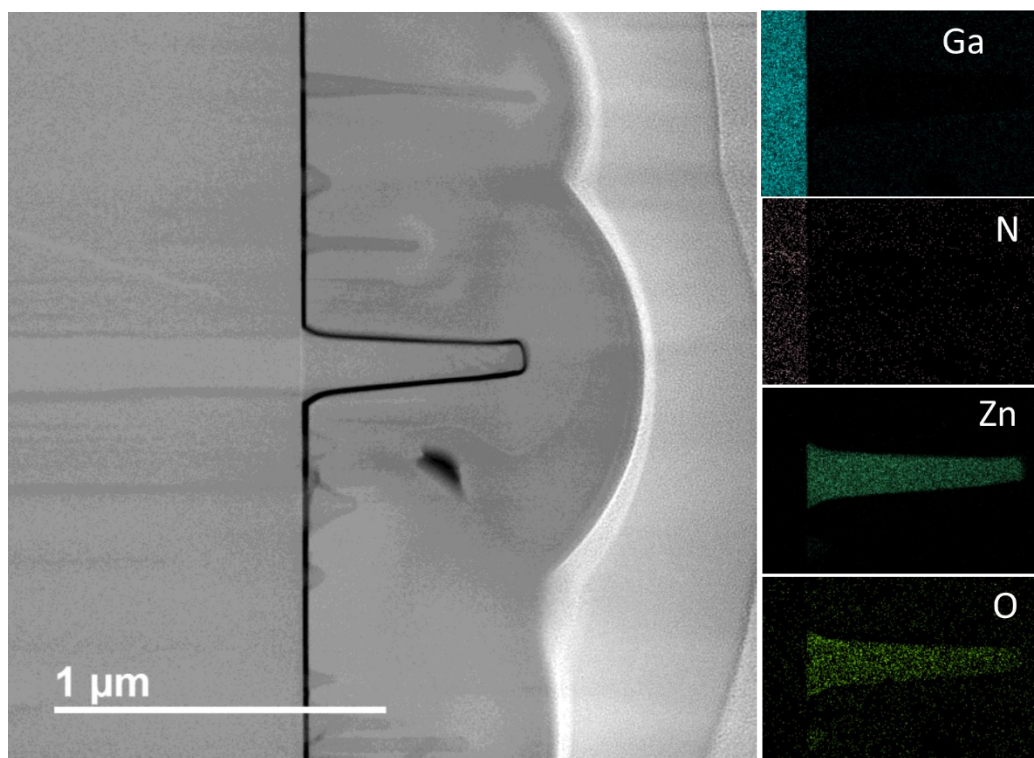


Figure. S4-a. Control study: Thermal treatment of ZnO fins for 20 min in vacuum at the GaN growth temperature. Elemental analysis are based on the k-line.

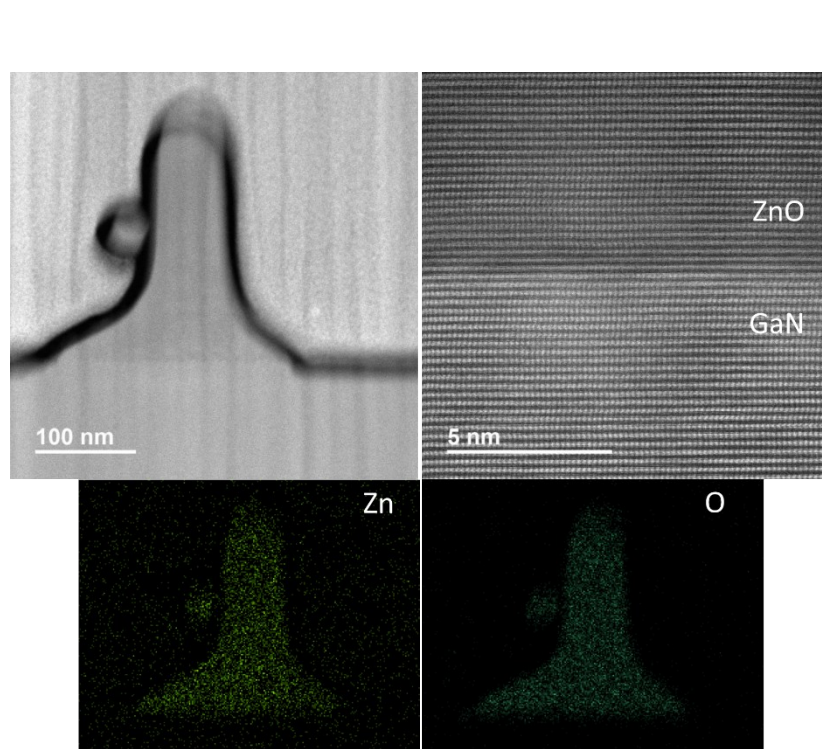


Figure. S4-b. Control study: Plasma treatment of ZnO fins for 20 min at the GaN growth temperature and nitrogen plasma condition.