

Supporting Information

Fig. S1 FESEM micrographs of GaN NWs grown with (a)-(c) a faster and (d)-(f) a relatively slow rate of temperature ramping in the CVD system. A faster temperature ramping rate randomizes the growth whereas a slow ramping rate gives a smooth and well defined geometry of NWs.

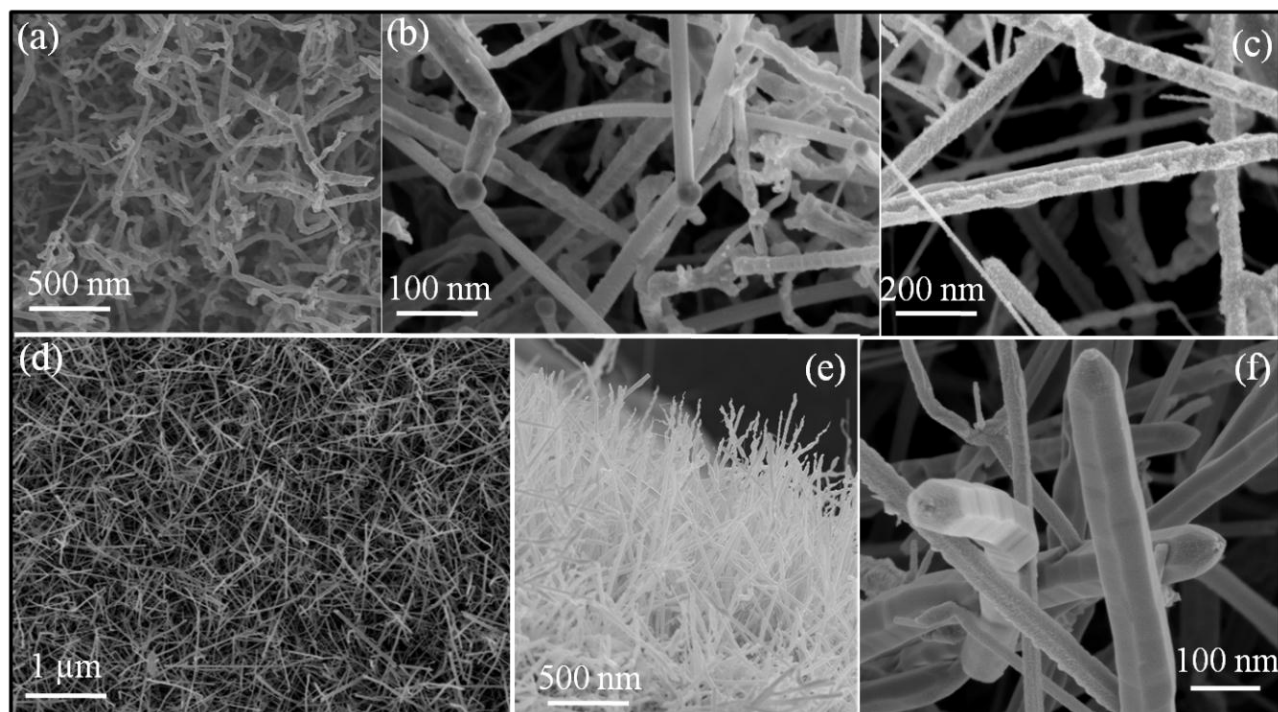


Fig. S2 Cross-sectional FESEM images of GaN NW grown over Si(100) substrate for (a) 180 min and (b) 30 min.

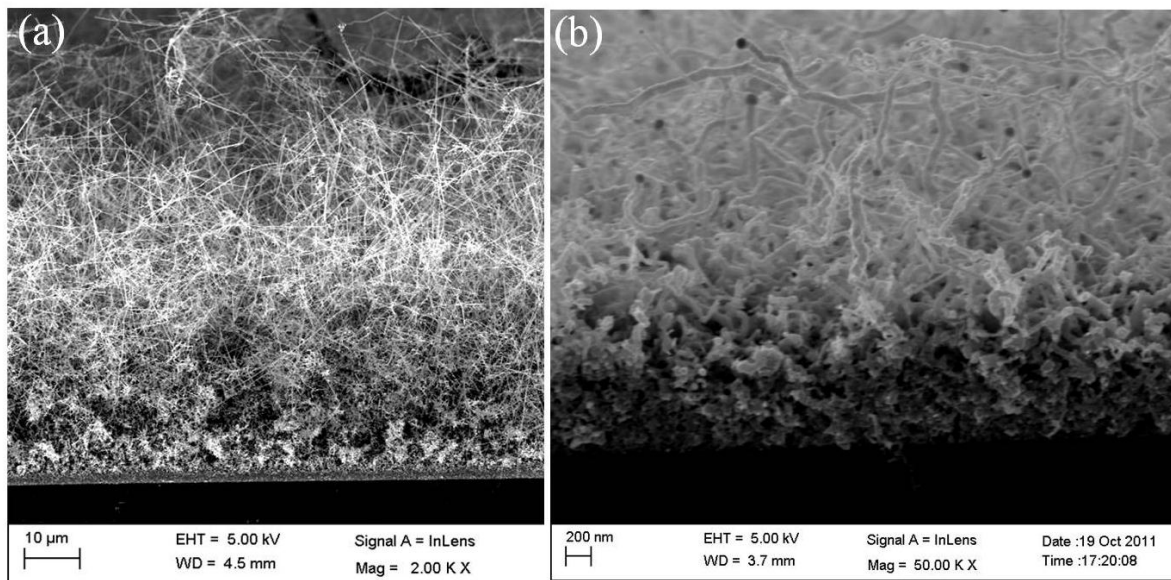


Fig. S3 FESEM images of Hexagonal Shaped GaN NWs.

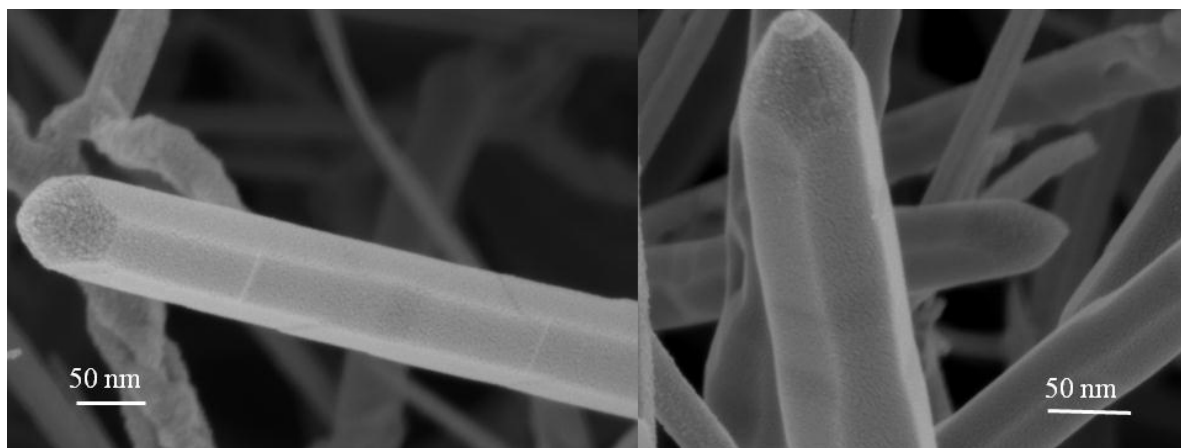


Fig. S4 (a) HRTEM image of a triangular NW grown along the $[1\bar{2}10]$ direction of the WZ-GaN phase; Inset shows the SAED pattern indexed to $[1\bar{1}00]$ zone axis; (b) a typical IFT lattice image of the transition region which clearly showing the presence of stacking faults on the surface.

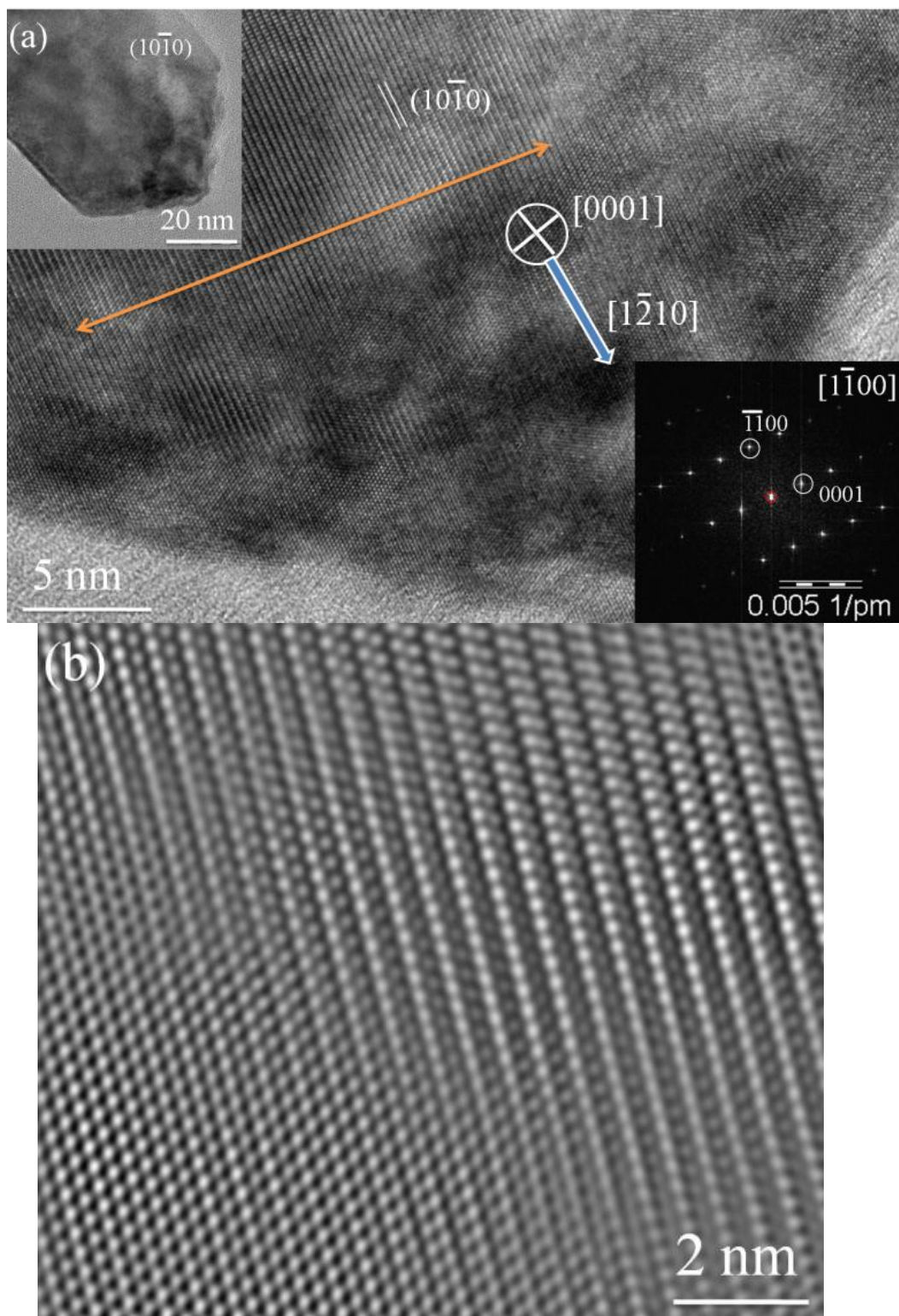


Fig. S5 FESEM images of Square Shaped Nanowires grown for (a)-(d) 30 min and (e)-(h) 180 min.

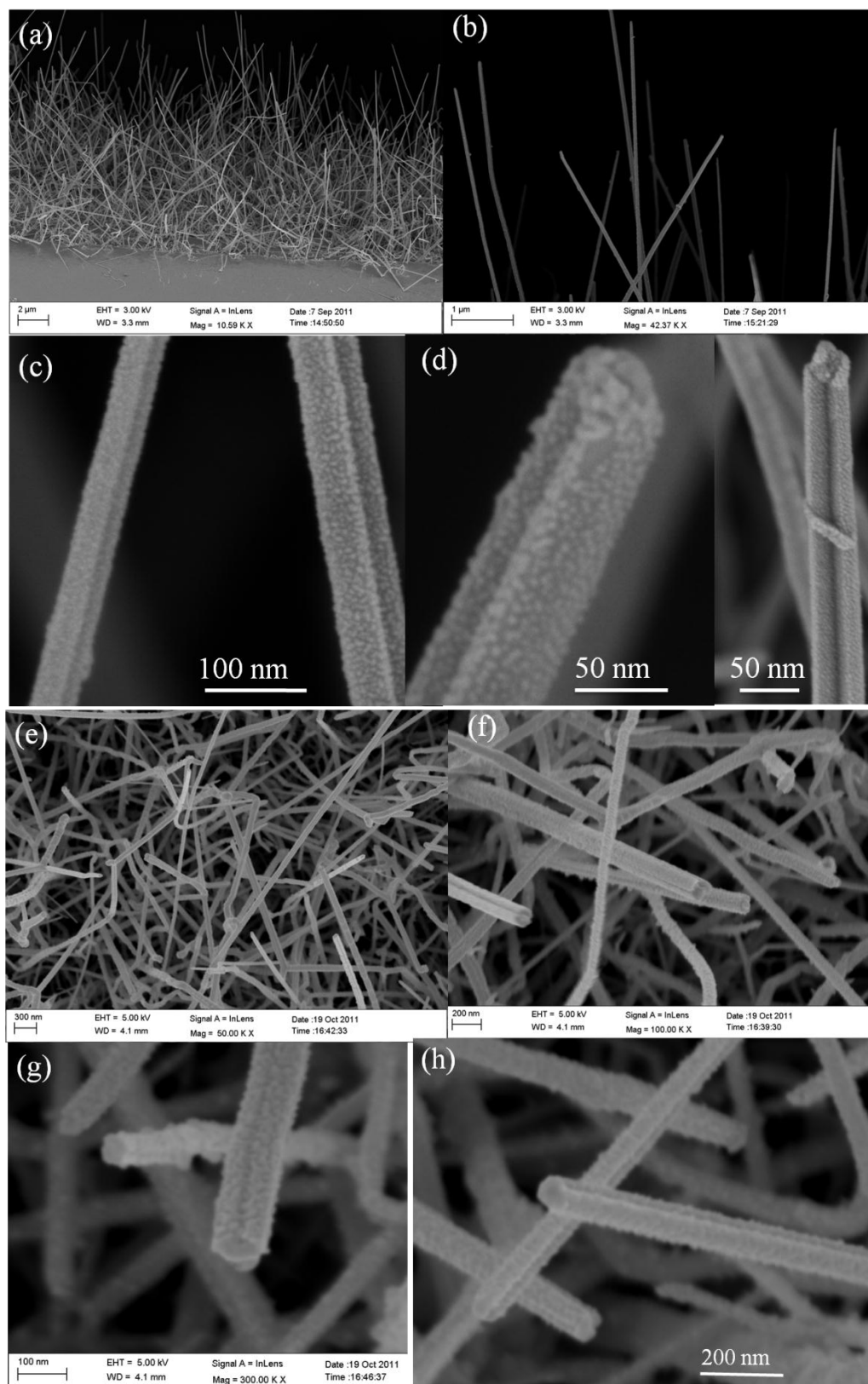


Fig. S6 (a) Atomic geometry of cleaved GaN plane constitutes of polar and non-polar surfaces; (b) Schematic diagram showing the dependence of Ga reactant surface diffusion length on the reaction condition.⁸ Under the N-rich condition, the surface diffusion lengths of Ga on polar and non-polar surface are relatively the same and result in a small length scale of a polar surface, while a Ga-rich condition favors a large length scale of a polar surface.

