Supplementary Information

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TITLE: Synthesis, photoluminescence and field emission properties of well aligned/well patterned conical shape GaN nano-rods.

Field emission measurements of poor patterned GaN nano-rods synthesized at 1000°C has also been performed in a vacuum chamber with a pressure of 1.2×10⁻⁶ Pa at room temperature. A rod-like stainless steel probe (1mm in diameter) of 0.78mm² in area has been used as an anode and the product used as cathode. The spacing between these two electrodes was 200µm. Fig. S1 depicts the exponential dependence of the emission current density (J) on the applied electric field (E).

Fig. S1: shows the field emission properties (J-E curve) of non-aligned GaN nano-rods synthesized at 1000 °C. (Inset is the SEM of poor patterned/ non-aligned GaN nanorods)
The turn-on field of $8.01 \text{ V}\mu\text{m}^{-1}$ and threshold field of $10.05 \text{ V}\mu\text{m}^{-1}$ has been obtained for poor patterned /non-aligned nano-rods synthesized at 1000 °C as shown in Fig. S1. Since the nanorods synthesized at 1000 °C are non-aligned and their tip is also not sharp, so their turn on and threshold value is greater than well-aligned GaN nanorods prepared at 1100 °C and 1200 °C.

From the high turn on values of poor patterned GaN nano-rods it can be concluded that low turn on value is related to the well aligned growth of GaN nanorods.