

Electronic Supplementary Information:

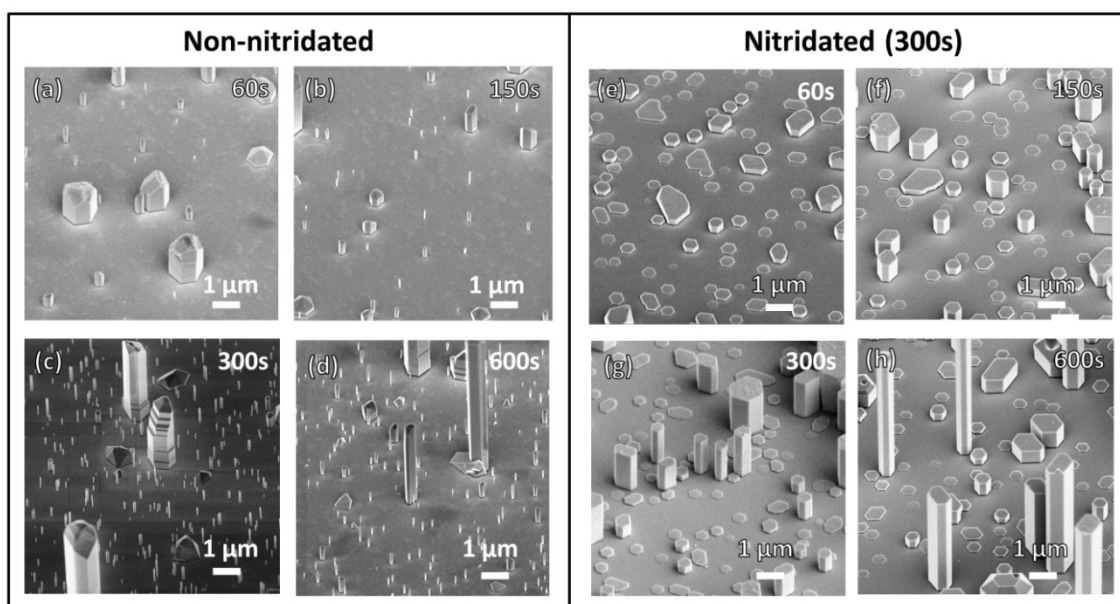


Figure S1. Time-dependent growth with growth time varying from 60 to 600 s for (a-d) non-nitridated samples and (e-h) 300 s nitridated samples.

For non-nitridated samples (fig 1 a-d), the nanorods prefer to form 'needle' shape morphology whereas for 300 s nitridated samples (fig 1 e-h) have a 'disk' like growth modes that only regular flat-tops are formed. This phenomenon starts even from the very beginning of the growth (60 s).

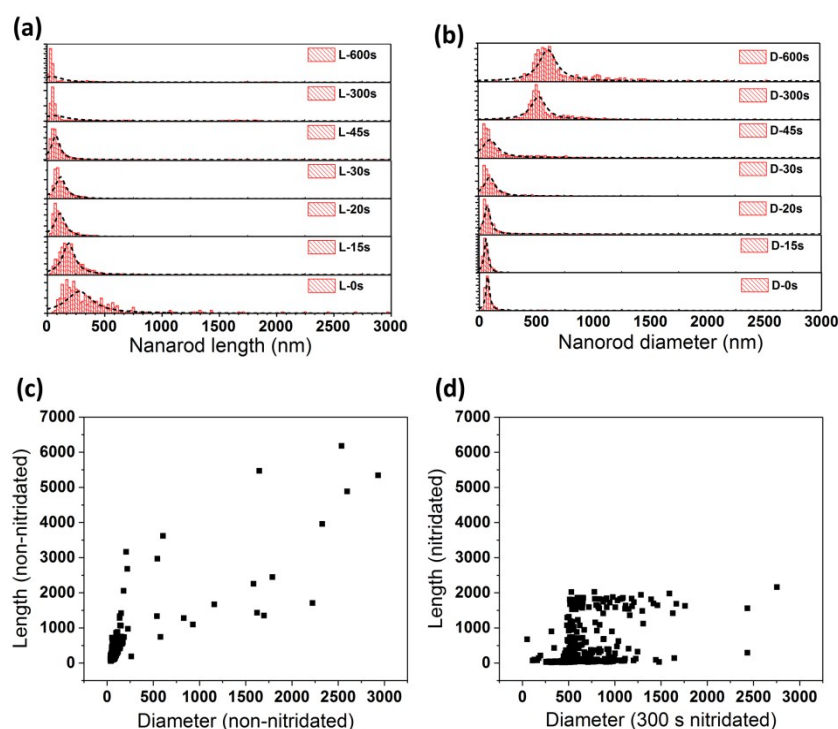


Figure S2. (a) Length distribution for samples with different nitridation times. (b) Diameter distribution for samples with different nitridation times. (c, d) Length and diameter dependence for non-nitridated and 300 s nitridated samples, respectively.

Figure 2 (a, b) shows increasing diameter with increasing nitridation duration, while the length is decreased with longer nitridation. For the non-nitridated samples, shown in figure 2 (c), rods with larger diameter are also longer in length suggesting that atom diffusion is not the limiting factor for growth. For the nitridated samples, there is no clear trend in diameter-length dependency.

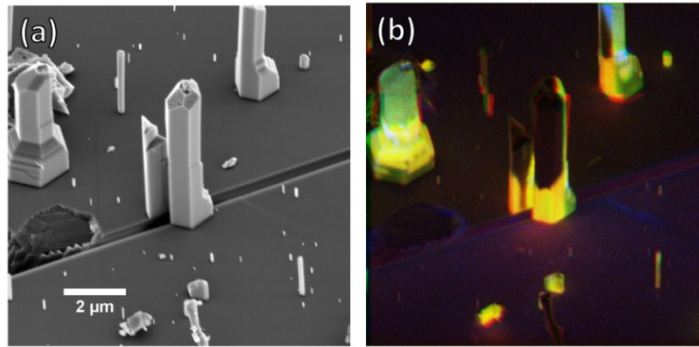


Figure S3. (a, b) SEM and corresponding intergrated CL image for a broken non-nitridated nanorod. The intergrated image was obtained using RGB filters. This rod emits mostly in the yellow wavelength region.

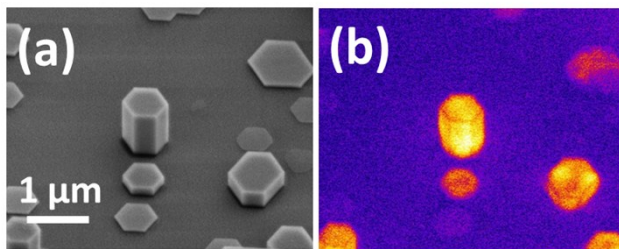


Figure S4. (a, b) SEM and corresponding intergrated CL image for 300s nitridated nanorod. This nanorod is the exactly same one as shown in figure 3 h in the manuscript.

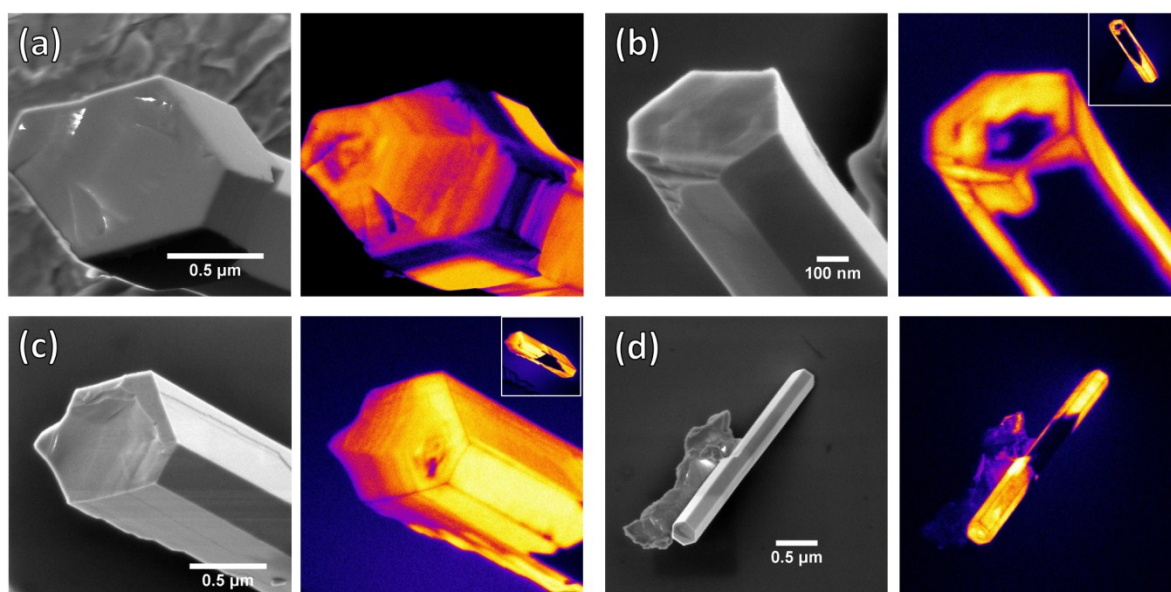


Figure S5. SEM (left) and panchromatic CL (right) from non-nitridated sample. (a-c). CL Zoomed-in at nanorod bottom showing non-uniform luminescence (right), CL image for the whole rod (inset); (d). non-uniform luminescence from a whole nanorod.