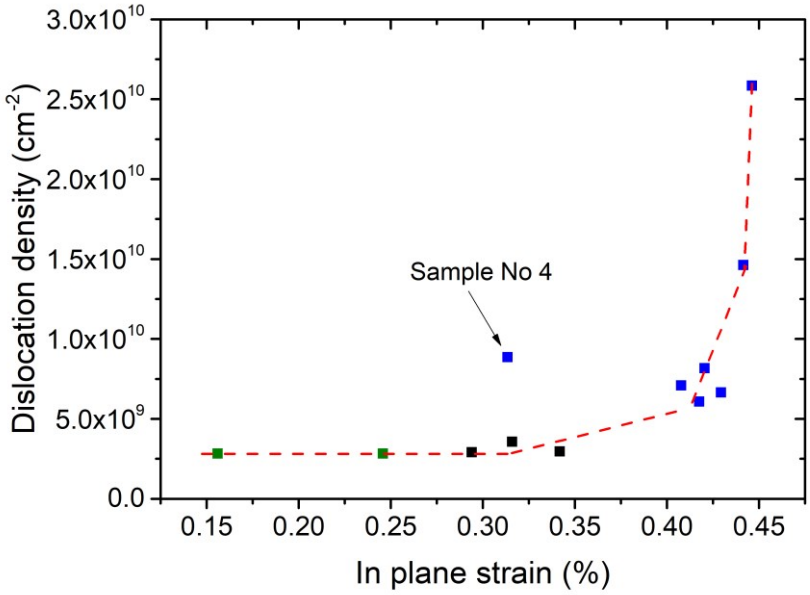
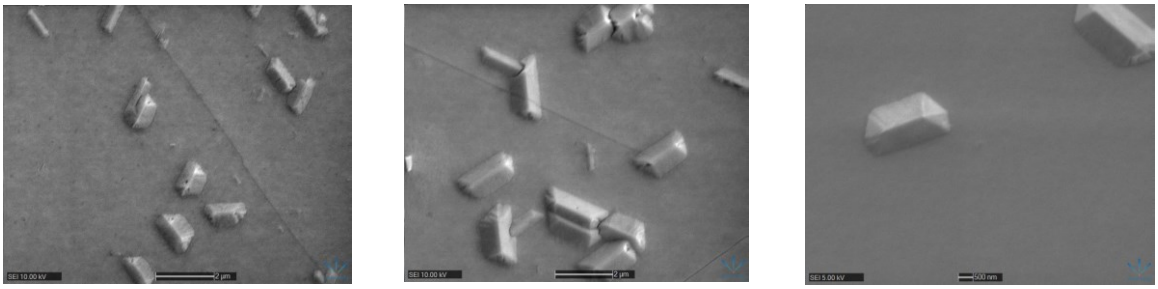


Fig. S1. Dislocation density vs. In-plane strain

Fig. S1 illustrates the relationship between dislocation density and in-plane strain in GaN layers. The results indicate that dislocation density decreases as the GaN layers undergo relaxation. However, Sample No. 4, which was grown with the longest nitridation time, deviates from this trend, suggesting a different relaxation mechanism.



Sample No 7
Optical thickness 190 nm

Sample No 6
Optical thickness 310 nm

Sample No 3
Optical thickness 460 nm

Fig. S2. GaN layers grown at the same nitridation time of 1200 s, but different growth duration times. SEM images (the same magnification).

Fig. S2 shows that stripe-type structures originate from the early stage of GaN growth. The size of stripe-type structures increases with growth time.