## Supporting materials

## Growth Behavior and Optical Properties of V-pits in GaN Grown by Na Flux Method

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## S1 Cross-sectional SEM/CL characterization of V-pit



Fig.S1 (a) Cross-sectional SEM images of m plane of V-pits. (b)CL image corresponding to (a).

(c) CL spectra obtained at the marked points in (b). (d) Cross-sectional SEM images of m plane of V-pits. (e)CL image corresponding to (d). (c) CL spectra obtained at the marked points in (c). Fig.S1(a-b) and (d-e)shows cross-sectional SEM images and corresponding CL images of multiple V-pits at different regions. The CL contrast below the V-pit defects is stronger, while the SEM results rule out topography contrast effects. Also, the black and white striations beneath the V-pits align with our analysis that V-pit growth relates to (10-11) plane growth. Fig.S1.(c) and (f) clearly show that the lateral growth regions beneath the V-pits exhibit stronger NBE compared to the c-plane growth regions. Additionally, Fig.S1.(c) shows the FWHM of the lateral growth region (15 nm) was larger than that of the c-oriented growth region (9 nm) and Fig.S1.(f) shows the FWHM of the lateral growth region (12 nm) was larger than that of the c-oriented growth region (7 nm).