

Supplementary information

High-quality crack-free GaN epitaxial films grown on Si substrates by two-step growth of AlN buffer layer

Yunhao Lin,^{1,2} Meijuan Yang,^{1,2} Wenliang Wang,^{1,2} Zhiting Lin,^{1,2} Junning Gao,^{1,2,3*} and
Guoqiang Li^{1,2,3*}

¹State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Wushan Road, Guangzhou 510640, China.

²Engineering Research Center on Solid-State Lighting and its Informationisation of Guangdong Province, South China University of Technology, Wushan Road, Guangzhou 510640, China.

³Department of Electronic Materials, School of Materials Science and Engineering, South China University of Technology, Guangzhou 510640, China.

* Correspondence and requests for materials should be addressed to msgli@scut.edu.cn or msjngao@mail.scut.edu.cn

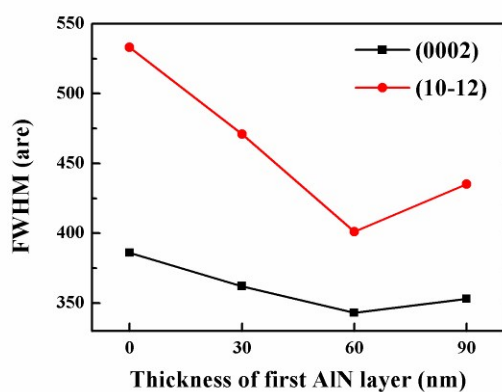


Fig. 1S The thickness dependence of the first AlN layer (AlN-1) on FWHM values of GaN (0002) and GaN (10-12) XRCs for the GaN epitaxial films grown on two-step AlN buffer layers of 140 nm-thick.

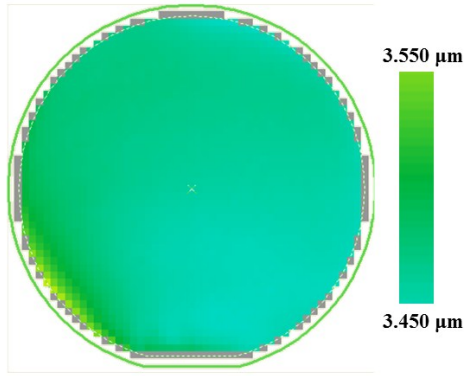


Fig. 2S The typical thickness map of as-grown GaN epitaxial films grown on 4-inch Si substrates.

Table 1S

The standard deviations of thickness (StdDev) for the as-grown GaN epitaxial films on 4-inch Si substrates with different thicknesses of AlN buffer layer.

Thickness of AlN buffer layer (nm)	60 nm	80 nm	100 nm	120 nm	140 nm
StdDev for Single-step (nm)	0.0721	0.0528	0.0612	0.0429	0.0752
StdDev for Two-step (nm)	0.0353	0.0921	0.0525	0.0711	0.0663