

Research on the critical thickness of $\text{Al}_{0.2}\text{Ga}_{0.8}\text{N}$ template grown on AlN/sapphire substrate

Yaqin Li,^{1,2,3} Jianping Liu,^{1,2,3*} Aiqin Tian,^{2,3*} Masao Ikeda,^{2,3}

Wei Zhou,^{2,3} and Hui Yang^{1,2,3}

¹School of Nano-Tech and Nano-Bionics, University of Science and Technology of China, Hefei 230026, China

²Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215123, China

³Key Laboratory of Semiconductor Display Materials and Chips, Key Laboratory of Nanodevices and Applications, Suzhou Institute of Nano-Tech and Nano-Bionics, Chinese Academy of Sciences, Suzhou 215123, China

Correspondence to: J P Liu, jpliu2010@sinano.ac.cn; A Q Tian, aqtian2012@sinano.ac.cn

Supplementary Information:

As shown in Figure S1, the HRXRD results revealed that the FWHM values for the (0002) and (10 $\bar{1}2$) planes of the regrown AlN layer were 45 arcsec and 830 arcsec, respectively. Based on these values, the threading dislocation density was calculated to be $8.2 \times 10^9 \text{ cm}^{-2}$.

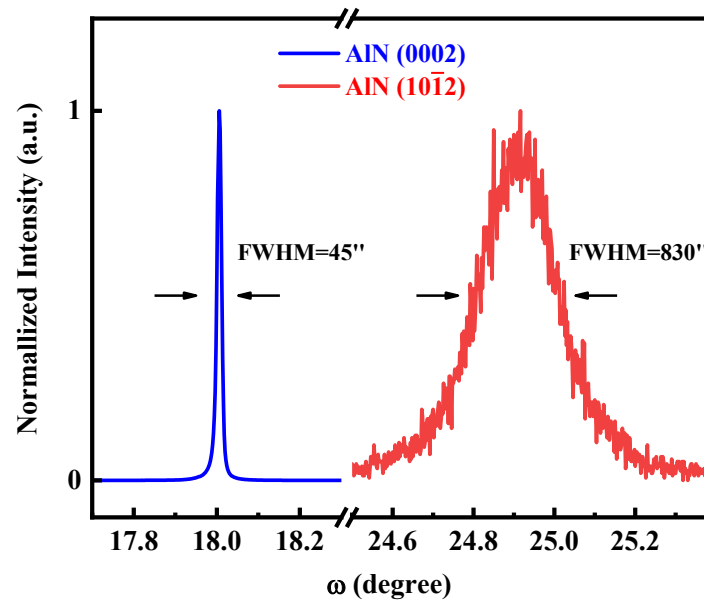


Fig. S1. (Color online) FWHM values of (0002) and (10 $\bar{1}2$) measured by x-ray rocking curves for the regrown AlN layer

Figure S2 shows an AFM image of the regrown AlN layer on the sputtered-AlN/sapphire substrate. The surface exhibits a step-terrace feature with a root mean square (RMS) roughness of 0.14 nm.

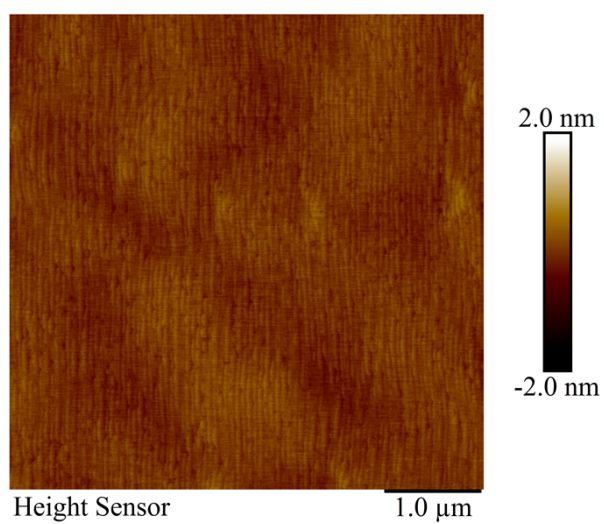


Fig. S2. (Color online) AFM image ($5 \times 5 \mu\text{m}^2$) of the surface morphology of the regrown AlN layer