

Supplementary material to the manuscript “CVD elaboration of 3C-SiC on AlN/Si heterostructures: structural trends and evolution during growth”

1) Detailed experimental conditions used for characterizations

Scanning Electron Microscopy (SEM): all the observations made at 5kV; probe current 100 pA; working distance 5mm.

Transmission Electron Microscopy (TEM): operated at 200kV; specimens are prepared for observation in cross-section using a conventional technique, involving mechanical thinning followed by ion-milling with Ar⁺ at 0.5-4.5 keV.

X-Ray Diffraction (XRD): room temperature measurements; monochromated K α copper excitation; 2D area Pixel detector; acquisition in $2\theta-\omega$ configuration : step = 0.025°, step duration = 5sec; acquisition of rocking curves of symmetric diffraction lines : step = 0.025°, step duration = 1sec; acquisition of azimuthal spectra (ϕ angle recording) : step = 0,5°, step duration = 5sec.

Fourier Transform Infrared Spectroscopy (FTIR): room temperature measurements; 50-9000cm⁻¹ Infrared source, DLATGS detector, acquisition in reflectance mode with Au mirror for reference; 16 scans; resolution 2cm⁻¹.

2) Typical AlN/Si morphologies

Here are presented some typical surface morphologies of the AlN films grown on Si(111) and Si(110) substrates, used for the study. Images are Scanning Electron Microscopy micrographs recorded on a ZEISS SUPRA40 with an accelerating voltage of 5kV and a magnification of x10⁵.

On Si(111), AlN morphologies differ according to the Si substrate orientation (on axis vs off axis). The growth of AlN on *on axis* substrates (Figure S1) leads to a very smooth AlN surface, with emerging dislocations (dark spots). For AlN grown on 4° *off axis* Si surfaces, a stepped morphology is obtained (Figure S2). Dislocations are still present as dark spots. The AlN grown on Si(110) present some larger defect on the surface, featured by a V-shaped geometry.

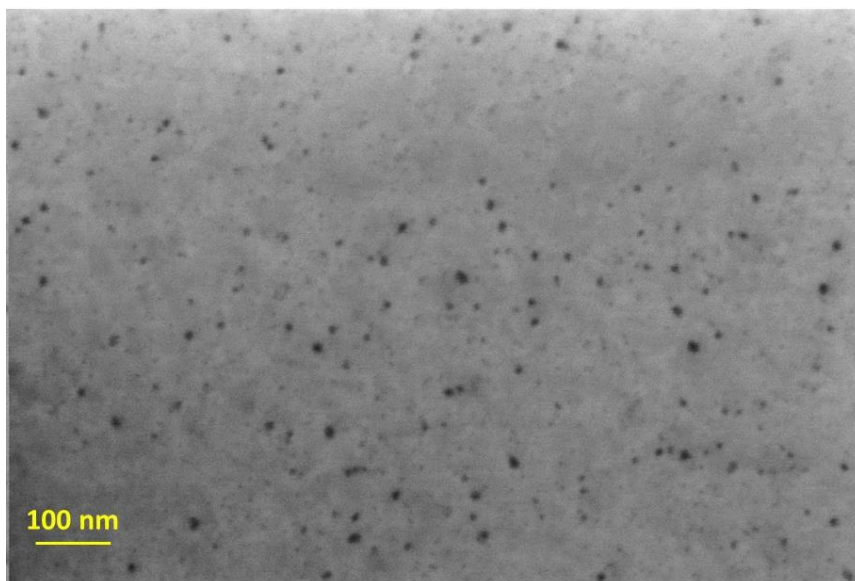


Figure S1. SEM micrograph recorded on AlN/Si(111) *on axis*.

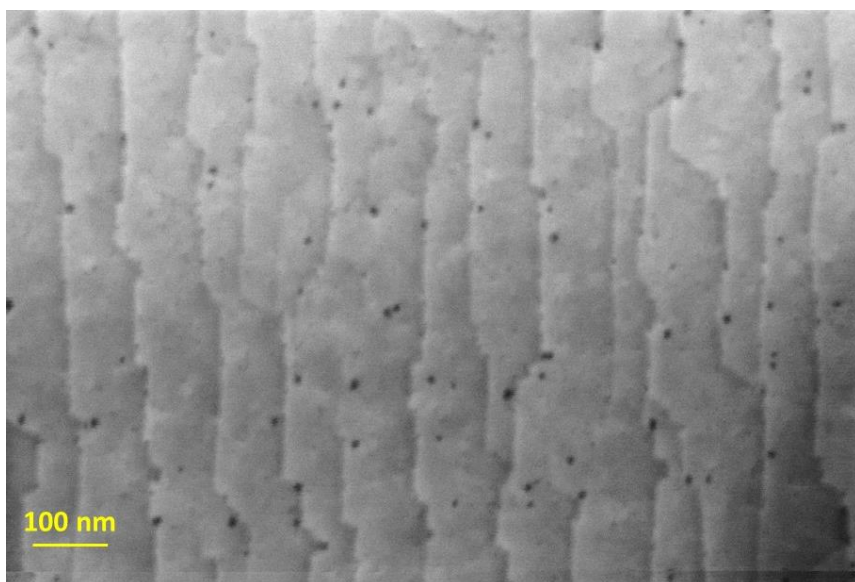


Figure S2. SEM micrograph recorded on AlN/Si(111) *4° off axis*.

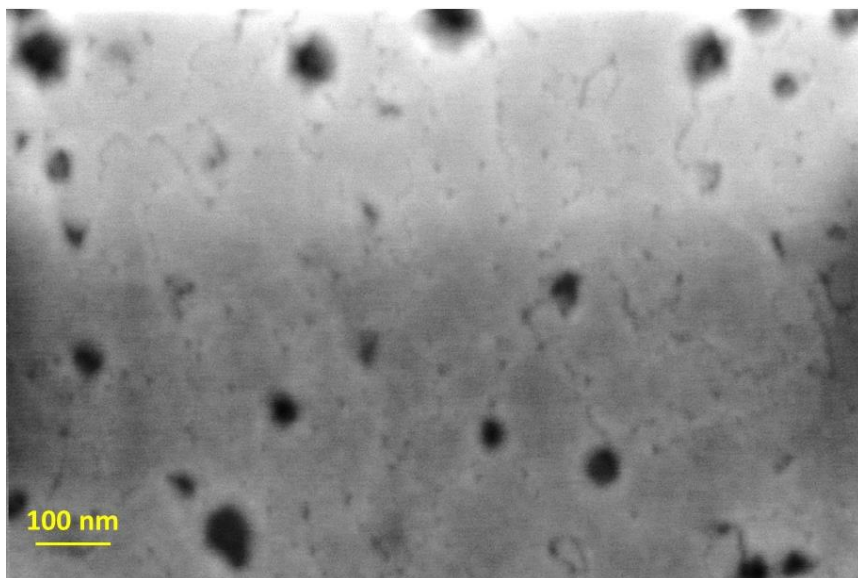


Figure S3. SEM micrograph recorded on AlN/Si(110) *on axis*.