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Electronic Supplementary Information (ESI)

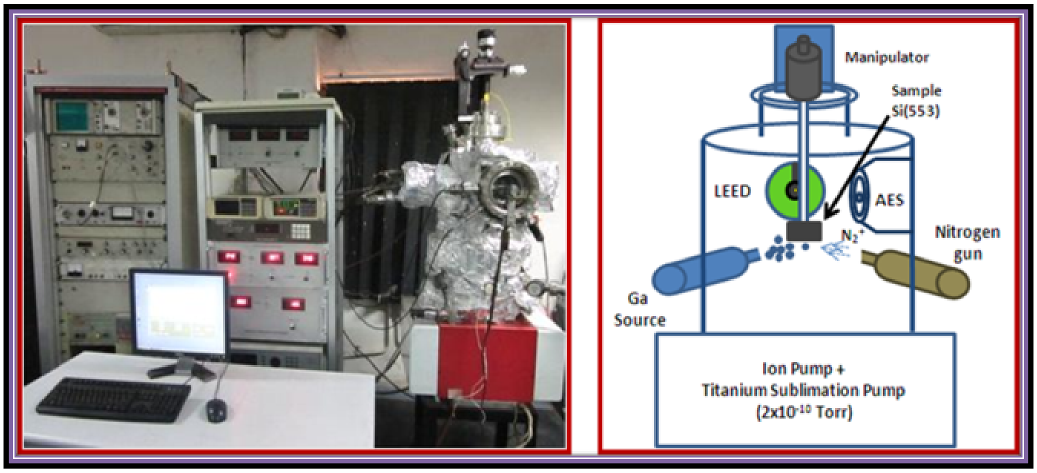

Figure S1 Actual growth system for TGNPI nanostructures which is equipped with Auger Electron Spectroscopy, Low Energy Electron Diffraction, Ga source and Low energy nitrogen gun.

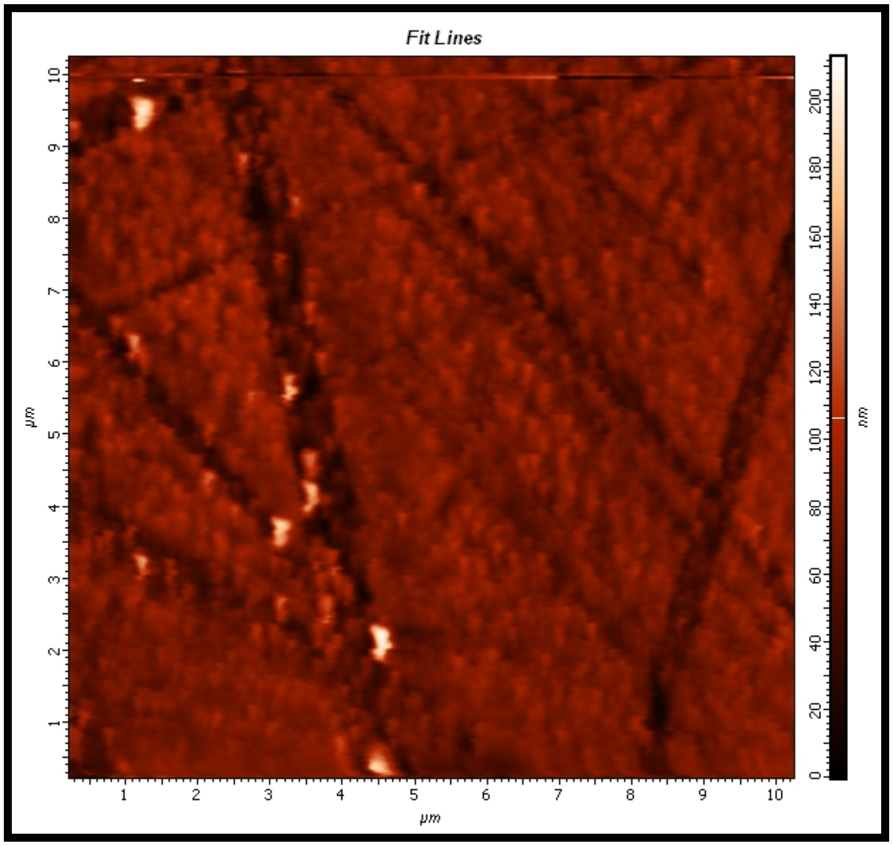

Figure S2: Low resolution AFM image of TGNPI structure grown at 600 ºC.

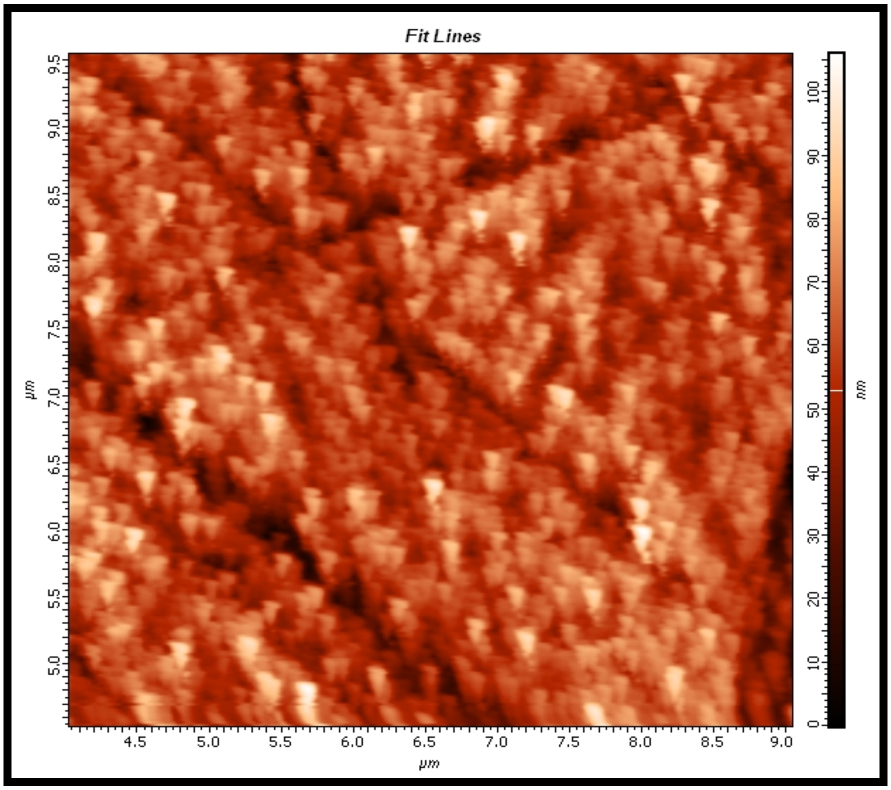

Figure S3: AFM image of TGNPI structure grown at 600 ºC.

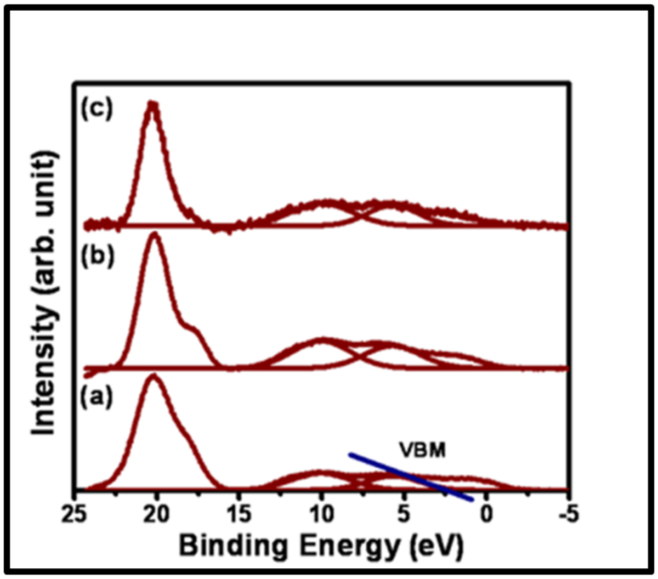

Figure S4: Deconvoluted Valence band spectra of GaN/Si(553) surface using 2keV nitrogen ions at various temperatures (with hybrid Ga and N contribution , N-p derivative) **(a)** RT (57,43), **(b)** 450ºC (56, 44), **(c)** 600ºC (52, 48).

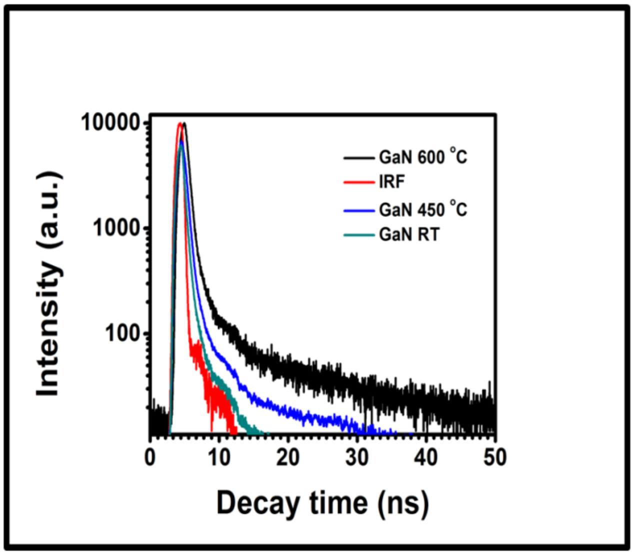

Figure S5: Represents decay profile of samples grown at RT, 450 and 600°c.