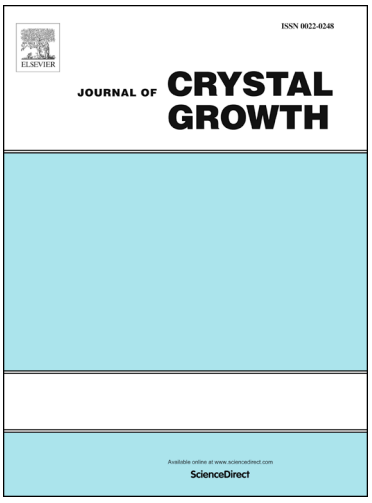

Surface morphology of AlGaN/GaN heterostructures grown on bulk GaN by MBE

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In this report the influence of the growth conditions on the surface morphology of AlGaN/GaN heterostructures grown on sapphire-based and bulk GaN substrates is nondestructively investigated with focus on the decoration of defects and the surface roughness. Under Ga-rich conditions specific types of dislocations are unintentionally decorated with shallow hillocks. In contrast, under Ga-lean conditions deep pits are inherently formed at these defect sites. The structural data show that the dislocation density of the substrate sets the limit for the density of dislocation-mediated surface structures after MBE overgrowth and no noticable amount of surface defects is introduced during the MBE procedure. Moreover, the transfer of crystallographic information, e.g. the miscut of the substrate to the overgrown structure, is confirmed. The combination of our MBE overgrowth with the employed surface morphology analysis by atomic force microscopy (AFM) provides a unique possibility for a nondestructive, retrospective analysis of the original substrate defect density prior to device processing.