



# GaN nucleation on 6H-SiC(0 0 0 1)- $(\sqrt{3}\times\sqrt{3})R30^\circ$ :Ga and c-sapphire via ion-induced nitridation of gallium: Wetting layers

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## Abstract

We present X-ray Photoemission (XPS) and low energy electron diffraction (LEED) investigations of initial stages of GaN film growth on sapphire(0 0 0 1) and SiC(0001)- $\sqrt{3}\times\sqrt{3}$ :Ga. The growth of ultrathin films is performed by successive metal deposition and ion beam induced nitridation. Epitaxial GaN films have been obtained on both substrates, but in case of sapphire, additional domains rotated by  $20^\circ$  have been observed. The experimental data demonstrate that the growth on sapphire proceeds via a reactive spreading mechanism including a metallic wetting layer on the growing GaN fed by outdiffusion of the Ga metal from 3D droplets. In case of SiC(0 0 0 1) we provide evidence for a 2ML thick Ga wetting layer on the reconstructed substrate, which forms after metal deposition. But further nitride growth also involves a Ga wetting layer on GaN.