Microstructure structure of *M*- and *A*-plane GaN on $LiGaO_2$ grown by plasma-assisted MBE

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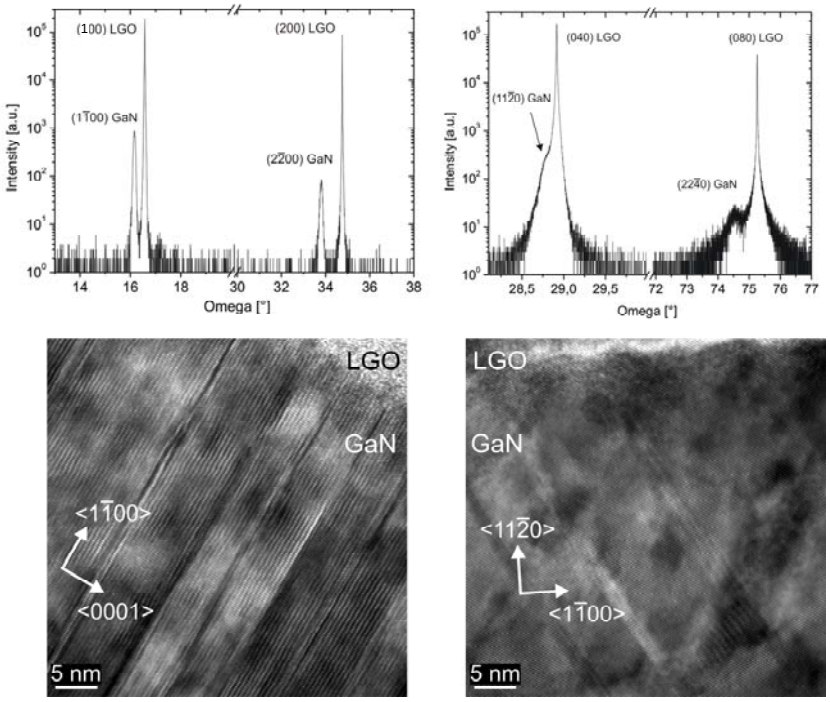
Internal electric fields in group III nitrides give rise to a strong quantum confined Stark effect when grown along the <0001> direction. As a consequence, electrons and holes are spatially separated leading to a reduced wave function overlap and the radiative transition energy is decreased.

One way to circumvent these unwanted effects is to use non-polar surfaces of the hexagonal nitride structure such as the *M*-plane {1-100} and *A*-plane {11-20} for epitaxial growth procedures. The lack of available substrates for homoepitaxy on non-polar crystal planes requires alternative substrates for heteroepitaxy. While various substrates have been considered for this purpose, $LiGaO_2$ (LGO) presents the unique opportunity for growth of *C*-, *M*- and *A*- plane oriented GaN on a very well lattice matched crystal, depending on the orientation used. *C*-plane GaN growth has been demonstrated on {001} LGO by a number of groups, e.g. [1]. Recently, *M*- and *A*-plane GaN growth has been investigated on {100} LGO [2] and {010} LGO [3], respectively.

Here we demonstrate a first analysis of the films showing strong evidence for a high phase purity of non-polar GaN on LGO. Transmission electron microscopy (TEM) studies confirm the epitaxial relationship of *M*-plane GaN on {100} LGO and *A*-plane GaN on {010} LGO. The defect structure of the epitaxial GaN films on LGO will be presented.



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