Group-III Nitrides Grown by MOVPE and MBE for Optoelectronic Applications

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Group-III nitrides are of great importance for short wavelength optoelectronic applications.

Due to a lack of lattice matched substrates growth is usually performed on sapphire or SiC using metalorganic chemical vapor phase epitaxy (MOCVD) or molecular beam epitaxy (MBE). Whereas for wide gap II-VI compounds MBE is the preferred growth method it turns out that MOVPE has certain advantages in case of nitrides. The growth start of GaN by MOVPE is studies by *in-situ* reflectometry. Depending on the conditions the grain size can vary from 150 nm to more than 4 µm. In the latter case the density of threading dislocations can be reduced to the low 10^8 cm^{-2}. A non-destructive method for determining the dislocation density by high resolution X-ray diffraction for wurzite GaN will be presented.

A comparison of quantum well structures grown by MBE on (0001) and (000-1) give clear indications that the growth on Ga-polar surfaces provides to more efficient light emitters. Nevertheless, at least for optoelectronic applications MOVPE provides to better surface morphology and structural and optical properties.

First results of light emitting structures in the violet spectral region will be discussed.