Strain engineering during MOVPE growth of GaN on Si(111)

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Growth of thick, crack–free GaN layers on Si is difficult due to the high thermal mismatch of these materials. To obtain stress reduction compressive stress can be applied during growth using AlN/GaN superlattices [1] or low–temperature (LT) AlN interlayers [2]. We present in– and ex–situ stress measurements of crack–free GaN layers in excess of 5 µm grown using LT–AlN interlayers. For in–situ measurements we use a multibeam stress–sensor. Ex situ characterisation was performed by highly resolved x–ray diffraction, cathodoluminescence, raman measurements and by transmission electron microscopy. We also discuss the strong influence of doping and in–situ deposited SiN masks on stress evolution during growth.

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