MOCVD GaN *

摘要
采用MOCVD技术在非有意掺杂的条件下，在蓝宝石衬底上制备出了高阻的GaN单晶薄膜样品。用扫描电子显微镜和原子力显微镜分析样品显示GaN外延膜的表面十分平整，表面粗糙度仅有6.6×10⁶Ω·cm²。用X射线双晶衍射摇摆曲线分析样品的(0002)面内(0002)面外(0002)面分别得到0.22°和0.27°的半峰宽，证实所生长的GaN外延层具有较好的结晶质量。使用变温85K测量发现样品的室温电阻率高达3×10⁷Ω·cm，低温下的电阻率约为3×10⁵Ω·cm。关键词：GaN；电阻率；MOCVD；掺杂；杂质；杂质补偿；氮空位；外延生长；薄膜；表面粗糙度；X射线双晶衍射；扫电子显微镜；原子力显微镜；变温电阻率；室温电阻率。
GaNPFWHM=5.22’

Fig. 2 Roughness diagram and AFM result of the sample

Fig. 3 DCXRD result of HR GaN layer
High Resitivity GaN Film Grown by MOCVD


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Abstract: High resitivity unintentionally doped GaN films are grown on (0001) sapphire by metalorganic chemical vapor deposition. The surface morphology of the layer is measured by both atomic force microscopy and scanning electron microscopy. The film shows a mirror-like surface morphology (RMS: 0.3 nm). The FWHM value of X-ray rocking curve is 5.22°, indicating that the single-crystalline GaN qualiy is well-crystallized. The resistivity at room temperature and 250°C is measured to be 6.6 × 10^6 Ω · cm and 10^6 Ω · cm by variable-temperature Hall measurement, respectively.

Key words: MOCVD; GaN; resistivity

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Fig. 4 Temperature dependence on the resistivity of the GaN layer

4 MOCVD GaN C SEM, AFM, DCXRD GaN 6.6 × 10^6 Ω · cm, 250°C 10^6 Ω · cm.