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器件制备及器件物理

ICP刻蚀工艺对LED阵列电流输运特性的影响

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摘要： 在制备串联高压LED阵列工艺中,ICP刻蚀工艺引起的漏电与断路问题是高压LED电流输运特性中的核心问题。本文着重从刻蚀深度、掩模材料以及隔离槽制备方面分析了ICP刻蚀工艺对高压LED的漏电、电极开路等电流输运问题的影响。通过随机抽取样品进行电学测试并结合SEM观测,对比了不同工艺过程,得出ICP工艺是导致串联高压LED阵列中可靠性问题的主要原因。并通过优选ICP刻蚀工艺,使高压LED电流输运特性得以改善,制备出~12 V的四串联高压LED阵列器件。

关键词： 氮化镓 高压LED 电流输运

Effect of ICP Etching on Current Transport Properties in High-voltage LED Array

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Abstract: In the manufacturing processes of high-voltage LED, one of the key problems in high-voltage LED current transport is current leakage and open circuit caused by ICP etching. This paper mainly analyzes the impact of ICP etching process on high-voltage LED in different ways, such as current leakage, open circuit and other current transport problems. We mainly discuss the depth of etching, the material of mask and isolation channel preparation in the ICP etching process. Random samples are chosen to measure electrical properties and proceeding SEM micrographs. By comparing the electrical properties and SEM micrographs with different process, we can conclude that ICP process is the main reason, which brings the problem of reliability into series-high-voltage LED array. Finally, the properties of high-voltage LED have been improved by optimizing the ICP etching process and a four series high-voltage LED with excellent current transport properties is got, whose forward voltage is about 12 V at 20 mA current.

Keywords: GaN high-vlotage LED current transport properties
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