Investigation on the characteristics of ITO/Ti/GaN contact layers

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ABSTRACT

In this experimental process, ITO films were deposited on glass substrates in RF sputtering system, and change growth parameter (including power and oxygen current capacity), research thin film Electrical and optical properties. Conventional photolithography and lift-off process were used to define the CTLM and interdigitated electrodes pattern. The metal films were deposited onto glass substrates and/or n-GaN films by RF sputter and electron-beam evaporation, and to study the thermal annealing was performed in various temperatures. We obtain the optimum sputtering conditions is power: 30 W; Ar flow rate: 110 sccm; pressure: 10 mtorr; substrate temperature: 200°C. We obtain the sheet resistance 32.5Ω/□ of the ITO thin film, the lowest sheet resistance is 28.7Ω/□ at annealed 600°C. At the same time, the thin film transmittance maintains above 80% at the visible light. The characteristics of ITO, ITO/Ti contacts to n-type GaN and GaN photoconductor have been studied. We found the contact property of ITO/n-GaN shows specific contact resistance of 4.2x10-6Ω-cm2 ,and lowest were 2.9x10-6Ω-cm2 as the sample annealed at 600°C in air. However, we also found that the photo responsivity is 325 A/W and quantum efficiency is 1.1% at 366 nm when the detector is biased at 5 V.

Keywords : GaN ; Indium-tin-oxide ; sputter

Table of Contents

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