

# The Application of Indium Tin Oxide Conductive Layer for AlGaInP LEDs

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## ABSTRACT

Indium-Tin Oxide, was introduced to enhance the current spreading and been a transparent electrode. ITO is widely used on electro optical devices due to its high conductance ( $\rho = 2.5 \times 10^{-4} \text{ cm}$ ) and superior transparency (>90%). On a conventional AlGaInP LED, it is hard to form a good ohmic contact between ITO and GaP window layer. In order to resolve this issue, we formed a Ni/ITO layer on GaP to obtain a good ohmic contact in this study. In this work, a Ni(6 nm)/ITO(230 nm) layer was deposited onto the AlGaInP LED by an electron beam evaporation system, then we measured the sheet resistance and transmittance. The transmittance of Ni/ITO layer can reach 91% at 630nm in this experiment. The Ni/ITO layer, annealed in a furnace at 450 under air ambient for 15 min, is found to achieve the lowest sheet resistance. We regard the Ni/ITO layer as a contact layer of window layer of AlGaInP LEDs for application, the drive voltage, drop of about 0.04V and 0.13V at an operation current of 20mA, as compared to the LED with GaP and GaP/ITO structure. The luminous intensity of GaP/Ni/ITO structure LED is 1.23 and 1.62 times higher than that of GaP and GaP/ITO structure LED at an operation current of 100mA. Key Words: ITO, AlGaInP, LEDs.

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