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W/InGaN Ohmic 접촉의 전기적 구조적 특성연구

Electrical and structure properties of W ohmic contacts to InGaN

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Abstract

Low resistance ohmic contacts to the Si-doped InGaN($\sim\times10^{19}cm^{3}$) were obtained using the W metallization schemes. Specific contact resistance decreased with increasing annealing temperature. The lowest resistance is obtained after a nitrogen ambient annealing at 950℃ for 90s, which results in a specific contact resistance of $2.75\times10^{-8}\Omega cm^{2}$. Interfacial reactions and surface are analyzed using x-ray diffraction, transmission electron microscopy (TEM) and scanning electron microscopy (SEM). The X-ray diffraction results show that the reactions between the W film and the InGaN produce a β-W_2N phase at the interface. TEM results also show that the β-W_2N has a rough interface, which increase contact area. It shows that the morphology of the contacts is stable up to a temperature as high as 950℃. Possible mechanisms are proposed to describe the annealing temperature dependence of the specific contact resistance.