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Effects of oxygen annealing treatment on formation of ohmic contacts to n-GaN¹ WENTING HOU, THEERADETCH DETCHPROHM, CHRISTIAN WETZEL, Rensselaer Polytechnic Institute — Low-resistance ohmic contacts are essential for the fabrication of efficient light emitting diodes (LEDs). A commonly used ohmic contact to n-type GaN is a layer sequence of Ti/Al/Ti/Au, followed by rapid thermal annealing (RTA) in nitrogen ambient at a high temperature. We present an ohmic contact on n-GaN by a surface treatment process of rapid thermal annealing (RTA) in oxygen ambient before the n-metal deposition. As deposited n-contacts are not linear. After RTA in nitrogen ambient, ohmic contact are obtained. The annealed n-contact degrades during the p-metal anneal in oxygen ambient. However, if the sample is annealed in oxygen ambient prior to the metal deposition, the as-deposited n-contact on the treated surface is ohmic, similar to or even better than processes optimized for single-type contacts. This benefit was seen for both, mesa-etched and as-grown n-GaN epi layers. Contacts improvement is also found on unintentionally doped GaN (u-GaN). Oxygen ambient is crucial in the treatment and RTA in nitrogen ambient fail to give ohmic contacts. XPS analysis of the surface shall give us more information on the mechanism of the treatment.

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