Abstract Submitted
for the SES05 Meeting of
The American Physical Society

Stable Contacts at High Temperature for GaN using Boride-Metal Scheme. ROHIT KHANNA, STEVE PEARTON, C.J. KAO, FAN REN, IVAN KRAVCHENKO, G.C. CHI, DEPARTMENT OF MATERIALS SCIENCE AND ENGINEERING, UNIVERSITY OF FLORIDA, GAINESVILLE, FL 32611 USA TEAM, DEPARTMENT OF ELECTRICAL ENGINEERING, NATIONAL CENTRAL UNIVERSITY, CHUNG-LI 32054,TAIWAN TEAM, DEPARTMENT OF CHEMICAL ENGINEERING, UNIVERSITY OF FLORIDA, GAINESVILLE, FL 32611 USA TEAM, DEPARTMENT OF PHYSICS, UNIVERSITY OF FLORIDA, GAINESVILLE, FL 32611 USA TEAM — Ohmic contact having boride interlayer (Ti/Al/X/Ti/Au) to n-GaN was studied using contact resistance, scanning electron microscopy and Auger Electron Spectroscopy measurements. X in the metallization scheme was W_2B, TiB_2 or CrB_2. A minimum contact resistance of $7\text{x}10^{-6}\Omega.\text{cm}^2$ was achieved for W_2B based scheme at an annealing temperature of 800 $^\circ$C. For TiB_2 it was of $2\text{x}10^{-6}\Omega.\text{cm}^2$ at 800^oC and 900^oC and $8\text{x}10^{-6}\Omega.\text{cm}^2$ for CrB_2 at 800^oC. Contact resistances were found to be essentially independent of measurement temperature, indicating that tunneling plays a dominant role in the current transport. The reliability measurements for the contact resistance of W_2B based contact showed excellent stability for extended periods at 200 $^\circ$C which simulates the type of device operating temperature that might be expected for operation of GaN-based power electronic devices.

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Date submitted: 04 Aug 2005 Electronic form version 1.4