

Abstract Submitted
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EPR detected defect center in bulk GaN substrates grown by high pressure nitrogen solution method¹ J. DASHDORJ, M.E. ZVANUT, Univ of Alabama - Birmingham, M.M. BOCKOWSKI, Institute of High Pressure Physics, Poland — Growth of high quality, free-standing GaN substrates is essential for further improvement of nitride device performance. Unfortunately, many bulk growth methods introduce unacceptable amounts of O donors. Samples studied in this work were grown by the high-pressure nitrogen solution method and intentionally doped with Mg to compensate O. Undoped and Mg-doped GaN samples were characterized by 4 K electron paramagnetic resonance (EPR) spectroscopy. No EPR signal is detected in the undoped samples. However, a nearly isotropic spectrum with g-value of 1.984 and a line-width of 120 G is observed in the doped sample after illumination with 2.8 eV light. Concentration of the center was estimated to be 10^{17} cm^{-3} while secondary ion mass spectroscopy revealed Mg and O levels of 10^{19} cm^{-3} ; Si, C, and Be levels of 10^{17} cm^{-3} . Time-dependent photo-EPR data were well fit by a single defect-to-band transition model with a defect level of 0.67 eV above the valence band. This value is close to that predicted for the Be acceptor. Together with the similar concentrations of the EPR center and Be, the data suggest that the signal may be due to the accidental Be; however, a review of the literature suggests additional possibilities, such as a vacancy-related defect.

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Jamiyanaa Dashdorj
Univ of Alabama - Birmingham

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