Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Defect generation and annealing of Al-implanted 6H-SiC GARY GERARDI, Dept.of Chemistry and Physics, William Paterson University of New Jersey, KEN JONES, MARK WOOD, M.A. DERENGE, Army Research Laboratory, Adelphi MD, R.D. VISPUTE, S.S. HULLLAVARAD, Physics Dept., University of Maryland, College Park, GARY GERARDI COLLABORATION, KEN JONES TEAM, R.D. VISPUTE TEAM — Aluminum implantation and high-temperature annealing of 6H-SiC was carried out to determine the thermal treatment needed to produce the shallow Al acceptor and remove intrinsic defects resulting from the implant. A p-type wafer was box implanted with Al to a depth of 0.4 μm resulting in a concentration of 6 x10^{19}cm^{-3} on both sides of a wafer originally doped to 1.3 x 10^{18} cm^{-3}. Samples were annealed at temperatures ranging from 1300 to 1600°C. Implantation resulted in a large concentration of intrinsic defects and charge trapping as evidenced by the loss of EPR signal of the shallow Al acceptor from the substrate. Optical absorption measurements indicate amorphization, which was removed by the 1300 °C anneal. Intrinsic defects are completely removed after the 1600 °C anneal. No measurable increase of the Al shallow acceptor was found as a result of the implant and annealing suggesting that the implanted Al does not behave in the same manner as Al incorporated during growth even after the implant has been electrically activated. EPR results suggest that the annealing at different temperatures produces different Al-related defects.

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Date submitted: 02 Dec 2004 Electronic form version 1.4