Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Defects Controlling the Minority Carrier Lifetime in n$^-$ 4H-SiC epitaxial layers .[1] P.B. KLEIN, B.V. SHANABROOK, Naval Research Laboratory, S.W. HUH, A.Y. POLYAKOV, M. SKOWRONSKI, Carnegie Mellon University, J.J. SUMAKERIS, M.J. O'LOUGHLIN, Cree Inc. — The relationship between the minority carrier lifetime (MCL) and the concentration of deep trapping centers in n$^-$ 4H-SiC was investigated by low-injection time-resolved photoluminescence (TRPL) and by deep level transient spectroscopy (DLTS) and minority carrier transient spectroscopy (MCTS). Layers of varying layer thicknesses were studied in order to enable the separation of bulk lifetimes from surface recombination effects. A linear dependence of the inverse bulk MCL on the concentration of the Z1/Z2 defect, and the lack of significant correlation of the MCL on the concentration of any other traps, suggests that the Z1/Z2 defect controls the MCL. The results of DLTS measurements in 4H-SiC p-i-n diodes under forward bias reinforce the idea that Z1/Z2 alone is the lifetime killer in this material.

[1]Work supprted in part by DARPA and ONR.

Paul Klein
Naval Research Laboratory

Date submitted: 29 Nov 2005 Electronic form version 1.4