Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Issues with Deep Defect Spectra in Electron Irradiated 4H SiC[1]

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— Recently, Steeds *et al.* [1] discussed deep levels induced by high fluence electron irradiation in 4H SiC. We have also observed the particular triplet assigned to di-carbon antisites using both ion implantation and electron irradiation. Here we specifically address data obtained by 170 keV electron irradiation at a fluence of $5x10^{16}cm^{-2}$. We shall discuss details of the no phonon lines of the triplet as well as two sets of vibrational modes well beyond the highest energy of the SiC lattice spectrum. Theory suggests that one should observe four no phonon lines and groups of four lines for each observed localized mode. Our high resolution spectra reveal differences in the LVM spectra with respect to those reported by Steeds *et al.* We obtain strong spectra at a fluence of $5x10^{16}cm^{-2}$ whereas Steeds *et al.* report that they do not see the triplet in the irradiated area using greater than 10^{19} cm^{-2}, but do see it beyond the periphery of the TEM beam. We can explain this in terms of the transverse straggling of the electrons in his TEM beam. Finally, we report the reappearance of this triplet due to an anneal at 1100 $^{\circ}$C after it had already been annealed out at 1400 $^{\circ}$C. [1] J. W. Steeds *et al.*, Phys. Rev. B **77**, 195203 (2008).

[1]We thank the II-VI Foundation for supporting this research.

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Date submitted: 01 Dec 2008 Electronic form version 1.4