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Time-dependent photo-induced electron paramagnetic resonance of Vc+ in semi-insulating 4H SiC: evidence of defect relaxation[1] HAIYAN WANG, MARY ZVANUT, Physics Department, University of Alabama at Birmingham — SiC is widely studied because of its superior electronic and physical properties. Many investigations focus on defect levels that act as efficient recombination centers and influence the carrier lifetime. We conducted photo-induced electron paramagnetic resonance (photo-EPR) studies of high purity semi-insulating 4H SiC by illuminating the sample with light of selected energy at 4K. Although several different defects were detected in the samples, the presentation will focus on the defect level of the carbon vacancy, V_c. Steady state photo-EPR indicates that the intensity of V_c^+ increases at 1.8 eV and reaches a peak at 2.3 eV. Time-dependent photo-EPR results for V_c^+ are consistent with those obtained from steady state measurements. The data suggest that when V_c^+ captures an electron from the valence band becoming V_c^0 the energy required is about 1.8 eV, and when V_c^0 releases an electron to the conduction band becoming V_c^+ the energy required is 2.3 eV. Initial analysis indicates that lattice relaxation accounts for the energy difference between the plus- to-neutral and neutral-to-plus states. At the talk, we will present the details of these measurements and discuss additional support for the defect relaxation model.

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Mary Zvanut
Physics Department, University of Alabama at Birmingham

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