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Charge transfer kinetics of carbon vacancy defect in 4H-SiC J. DASHDORJ, M.E. ZVANUT, J.G. HARRISON, Department of Physics, University of Alabama at Birmingham — There has been much detailed work aimed at understanding carbon vacancy related defects and their complexes in SiC, but there are no reports of charge transfer kinetics between the carbon vacancy and other defect centers. In this study, optical cross sections of the positively charged carbon vacancy, V_c^+, in high purity semi-insulating 4H-SiC were measured by time-dependent photo-electron paramagnetic resonance, EPR. The measurements were performed by a X-band EPR spectroscopy at 80 K. Selected photon energies used in this study were between 0.8 and 3.13 eV. A single defect model considering only capture and emission of electrons from V_c^+ was shown to fit well the measured data. The photon energy-dependence of the cross sections exhibit threshold value of 1.6 eV and peak value of 2.15 eV for the capture, and threshold value of 1.9 eV and peak value of 2.45 eV for the emission processes, respectively. In this talk, we will discuss the above results in terms of charge transfer mechanisms including the effects of the electronic density of states and participation of phonons.

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