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Electron Paramagnetic Resonance Studies of Multi-layer Epitaxial Graphene Formed on Semi-Insulating 4H- and 6H-SiC Substrates E.R. GLASER, N.Y. GARCES, J.C. CULBERTSON, A.L. FRIEDMAN, P.M. CAMPBELL, G.G. JERNIGAN, J.L. TEDESCO, R.L. MYERS-WARD, C.R. EDDY, JR., D.K. GASKILL, NRL, WASHINGTON, DC TEAM — Electron paramagnetic resonance (EPR) experiments were performed at 9.5 GHz on a set of multi-layer epitaxial graphene (MEG) samples. The films (∼20-30 layers) were formed via desorption of Si from the C-faces of SI 4H- and 6H-SiC substrates at ∼1350 ^{o}C under vacuum in a commercial SiC epitaxy reactor. Additional characterization included room-temperature Raman measurements and Hall effect measurements at both 77 and 300 K. EPR between 4.2 and 50 K revealed a single paramagnetic resonance line with an isotropic Zeeman splitting g-value of 2.003 and FWHM of ∼4.5 G. Most notably this feature was not observed from EPR of the parent SiC substrates alone. Electron paramagnetic resonance was also performed on a highly-oriented pyrolytic graphite (HOPG) reference sample and the usual anisotropic feature ($g_{\perp}$=2.003, g||=2.050; where || refers to the c-axis) associated with charge carriers in crystalline graphite was found. Work to determine if the EPR feature in these MEG samples is associated with charge carriers or defects within the films or at the film/substrate interfaces will also be discussed.

E.R. Glaser

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