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Mid-Infrared Magneto-Optical Kerr and Faraday Studies in Gated Monolayer and Rotated Bilayer CVD Graphene C.T. ELLIS, N. TESAROVA, ALOK MUKHERJEE, A. STABILE, SUNY Buffalo, Dept. of Physics, YUFENG HAO, R.S. RUOFF, The University of Texas at Austin, Dept. of Mechanical Engineering and the Materials Science and Engineering Program, G. SAMBANDAMURTHY, J. CERNE, SUNY Buffalo, Dept. of Physics — Previous studies of multi-layer graphene grown on C-face SiC have proven that mid-IR (111-135 meV) Polar Magneto-Optical Kerr Effect (PMOKE) measurements provide a unique and sensitive way to probe the Landau Level (LL) structure of graphene. Graphene PMOKE measurements, which are proportional to the Hall conductivity (σ_{xy}), have revealed large changes in the Kerr angle due to the chiral nature of LL transitions in mono- and multi-layer graphene, as well as the dependence of these Kerr features on the position of the Fermi level. In this work we present new results that extend these measurements to more ideal samples consisting of large area (5x5mm), epitaxial single layer CVD grown graphene that has been deposited onto a Si/SiO_2 substrate. Unlike epitaxial SiC graphene these new samples can be back-gated and also allow magneto-optical measurements to be made in transmission (Faraday geometry). The ability to tune parameters such as the Fermi energy, probing photon energy, magnetic field strength, and temperature allows us to better understand graphene through its mid-IR Hall conductivity and to test for theoretical predictions of an infrared quantum Hall effect in graphene (Morimoto, PRL, 2009). This work is supported by NSF-DMR1006078 and by the Office of Naval Research.

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