Abstract Submitted
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Transport properties of monolayer and bilayer graphene supported by hexagonal boron nitride JING LI, KE ZOU[1], DONALD SEIWELL, JUN ZHU, Department of Physics, Pennsylvania State University — We present transport studies on hexagonal boron nitride (h-BN) supported monolayer and bilayer graphene. Following the method introduced by Dean et al, we first exfoliate thin sheets of h-BN (15-20 nm) to SiO_2/Si substrate then align and transfer exfoliated graphene flakes onto the h-BN sheets. E-beam lithography is used to process the samples into Hall bar devices. We find that current annealing at low temperature can increase the mobility of as-fabricated devices but often introduces large density inhomogeneity at the same time. AFM images of annealed devices reveal the limitations of this technique. In comparison, thermal annealing is much more reliable in improving the sample quality. Bilayer devices annealed in a flow of Ar/H_2 at 450C for 5 hours show high mobility of 30,000 cm^2/Vs at low temperature. We observe high-quality Shubnikov-de Hass (SdH) oscillations and degeneracy-lifted Landau levels in these samples. We extend existing measurements of the electron and hole effective mass in bilayer graphene[1] to lower carrier density regimes and discuss the implications of the results.[1] K. Zou, X. Hong, and J. Zhu, Phys. Rev. B 84, 085408 (2011).

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