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**Electronic Properties of Large-scale Graphene Chemical Vapor Synthesized on Nickel and on Sapphire** HELIN CAO, LIYUAN ZHANG, YONG CHEN, Department of Physics and Birck Nanotechnology Center, Purdue University, QINGKAI YU, Department of Electrical and Computer Engineering, University of Houston, HAO LI, Department of Mechanical and Aerospace Engineering, University of Missouri — We have studied the electronic transport properties of *large area* few-layer graphene/graphitic films grown by two different chemical vapor based methods. The first type of samples (metal-transfer graphene) is synthesized by carbon segregation from Ni, then transferred to SiO2/Si substrates. The second type of samples is synthesized by direct chemical vapor deposition (CVD) on sapphire. We measured these samples under variable temperatures (from 2K to 300 K) and transverse magnet fields (from 0 to 7 T). For both types of samples, we found a negative magnetoresistance at low field, and carrier mobilities on the order of several hundreds of $cm^2$/V-s. For metal-transfer graphene in particular, we were able to measure a moderate field effect response, using the highly doped Si substrate as back gate. The observed magnetoresistance shows characteristic features of weak localization, from which we extract various carrier scattering lengths in the metal-transfer graphene samples. Comparison with those measured in mechanically exfoliated graphene suggests possibly different carrier scattering mechanisms for graphene materials prepared with different methods.

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