Abstract Submitted
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Improving the quality of CVD graphene-based devices: synthesis, transfer, fabrication and measurement JUNJIE WANG, Department of Physics, Penn State University, BEI WANG, Department of Physics, Penn State Univeristy, ANNA SKINNER, Department of Physics, Virginia Tech University, JUN ZHU, Department of Physics, Penn State University — Graphene synthesized by chemical vapor deposition (CVD) is potentially useful in a wide range of electronic and optoelectronic applications. In order to obtain CVD-graphene based devices with performance comparable to their exfoliated counterparts, improvement needs to be made on the synthesis and transfer of graphene, as well as device fabrication and measurement techniques. Here we report on a low-pressure growth procedure, which successfully suppresses the growth of multilayer patches, resulting in large-scale single-layer graphene production. By following the etching of the copper substrate with a HCl/H_2O_2 cleaning step similar to the RCA-2 procedure used in Silicon industry, metal particle contamination is reduced. By applying the gate voltage in pulse, we eliminate the hysteresis commonly observed in the transfer curve of graphene field effect transistors. This allows us to accurately determine the charge neutrality point and carrier mobility of the device. We are able to achieve high-quality CVD-graphene devices with average carrier mobility of 7,000 $cm^2V^{-1}s^{-1}$.

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