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Method for Transferring High-Mobility CVD-Grown Graphene with Perfluoropolymers[1] JIANAN LI, JEN-FENG HSU, University of Pittsburgh, HYUNGWOO LEE, University of Wisconsin-Madison, SHIVENDRA TRIPATHI, QING GUO, LU CHEN, MENGCHEN HUANG, SHONALI DHINGRA, University of Pittsburgh, JUNG-WOO LEE, CHANG-BEOM EOM, University of Wisconsin-Madison, PATRICK IRVIN, JEREMY LEVY, BRIAN D'URSO, University of Pittsburgh — The transfer of graphene grown by chemical vapor deposition (CVD) using amorphous polymers represents a widely implemented method for graphene-based electronic device fabrication. However, the most commonly used polymer, poly(methyl methacrylate) (PMMA), leaves a residue on the graphene that limits the mobility. Here we report a method for graphene transfer and patterning that employs a perfluoropolymer — Hyflon — as a transfer handle and to protect the graphene against contamination from photoresists or other polymers. CVD-grown graphene transferred this way onto $LaAlO_3/SrTiO_3$ heterostructures is atomically clean, with high mobility (30,000 $cm^2V^1s^1$) near the Dirac point at 2 K and clear, quantized Hall and magnetoresistance. Local control of the $LaAlO_3/SrTiO_3$ interfacial metal-insulator transition — through the graphene — is preserved with this transfer method. The use of perfluoropolymers, such as Hyflon, with CVD-grown graphene and other 2D materials can readily be implemented with other polymers or photoresists.

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