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Transport study of electrochemically decorated and intercalated graphene DMITRI K. EFETOV, KIN FAI MAK, YINSHENG GUO, TONY F. HEINZ, LOUIS BRUS, PHILIP KIM, Columbia University in the City of New York — Due to the surface-only properties of graphene, the decoration and/or intercalation of single, bi- and multi-layer graphene with foreign atoms can severely modify its electronic interactions, similar to those observed in its 3D counterpart the graphite intercalation compounds. Supported by a highly increased density of state due to a strong charge transfer above 10^{14} cm^{-2}into the graphene π-bands, certain adatoms are expected to induce strong electronic interactions to the graphenes own Dirac fermions, where theoretical predictions reach from the Kondo-effect and magnetism to as far as superconductivity in graphene. In this study we will present evidence of specific adsorption and intercalation of diverse atomic species by electrochemical means. We will present a detailed transport study, including resistivity-, Hall- and magneto-resistivity measurements of single-, bi- and multi-layer graphene devices which were subjected to electrochemical doping by a variety of electrolytes and ionic species such as Li^+, ClO_4^-, Cs^+, Ca^{2+}, etc.

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