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Electronic transport properties of tungsten-decorated monolayer graphene JAMIE ELIAS, ERIK HENRIKSEN, Washington Univ — The impact of tungsten adatoms on the electronic properties of monolayer graphene has been studied. Using a cryogenic probe capable of *in situ* deposition of sub-monolayer coatings of most metals, we have evaporated tungsten onto the surface of graphene devices. For dilute coatings up to a 2.5% coverage, the adatoms are found to donate electrons to the graphene, becoming charged impurities that reduce the carrier mobility. In addition, multiple lines of evidence point to the adatoms being isolated, point-like charge impurities, rather than clusters. Analysis of the conductivity at zero magnetic field, as well as the ratio of transport to quantum scattering times, suggests the adatoms are located approximately 1 nm above the surface. Surprisingly, this is about five times higher than predicted by density functional theory. Furthermore, we find a large discrepancy between the expected density of adatoms based on geometric changes in the evaporation source, when compared with the induced change in electron density due to charge doping. We hypothesize that both this discrepancy in evaporation densities, and the 1 nm separation, are a consequence of a remnant layer of PMMA residues from device fabrication.

Jamie Elias
Washington Univ

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