Impact of physisorbed species on transport properties of graphene. Chaun Jang, Jianhao Chen, Shudong Xiao, Department of Physics and Center for Nanophysics and Advanced Materials, University of Maryland, College Park, MD 20742, Masa Ishigami, Ellen Williams, Department of Physics and Materials Research Science and Engineering Center, University of Maryland, College Park, MD 20742, Michael Fuhrer, Department of Physics and Center for Nanophysics and Advanced Materials, University of Maryland, College Park, MD 20742 — We have measured the impact of physisorbed species, including Argon, Krypton, Nitrogen, water and Benzene, on the transport properties of mechanically-exfoliated graphene sheets on SiO$_2$/Si in an ultra-high vacuum environment at temperatures near 30 K. We controlled the gas dosage down to the sub-monolayer level and found species-specific effects on the field-effect mobility of graphene. We observed the influence of different molecular sizes, molecular dipole moment, and intermolecular interactions. We will discuss our results in the context of recent theoretical calculations within the Boltzmann transport framework.

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