

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Probing charge scattering mechanisms in suspended and supported graphene by varying dielectric environment A.K.M. NEWAZ, KIRILL I. BOLOTIN, Vanderbilt University — The electronic properties of graphene are drastically affected by its environment, such as the substrate underneath it and the impurities near it. To elucidate the effect of scattering due to the environment, we used the Hall probe technique to study the electronic transport properties and the quantum capacitance of single layer graphene devices in environments with different dielectric susceptibility κ . We have varied the susceptibility by i) using solvents of different dielectric constants, ii) mixing two miscible solvents of different dielectric strengths and iii) varying the temperature of the solvent. To eliminate the effects due to a substrate, we have also studied suspended graphene devices. We have observed enhancement in the Hall mobility and reduction in the minimal conductivity in both supported and suspended devices as the static dielectric constant is increased from $\kappa \sim 2$ to $\kappa \sim 30$. This suggests stronger screening of charge scattering in higher κ dielectric environment. Our results support the conjecture that the dominant scattering mechanism in graphene is the long range Coulomb interaction due to the charge impurities.

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Date submitted: 29 Dec 2010

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