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Effects of fluorination on graphene spin transport[1] ZHISHENG LIN, BOWEN YANG, JING SHI, UC Riverside — Although ideal graphene has extremely weak intrinsic spin-orbit coupling (SOC), by introducing adatoms, proximity effect, hydrogenation, etc., SOC in graphene can be effectively enhanced. In this work, we study the effects of fluorination on graphene nonlocal transport which can probe the spin Hall effect and inverse spin Hall effect as SOC is introduced. The nonlocal resistance is compared between the pristine and fluorinated graphene devices. Upon fluorination, the nonlocal resistance rises clearly above the ohmic contribution and increases as the dosage increases, which is interpreted as a consequence of increased SOC in fluorinated graphene. Raman spectroscopy is used to monitor the D-peak intensity as a function of the fluorination. We find that by controlling fluorination, the magnitude of the nonlocal resistance enhancement is correlated with the D-peak in Raman spectra. We will discuss the effects of the enhanced SOC on spin diffusion length in fluorinated graphene devices. This work was supported by DOE/BES and NSF/NEB.

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