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Strain variation in corrugated graphene XUANYE WANG, KHWANCHAI TANTIWANICHAPAN, Department of Electrical and Computer Engineering, Boston University, JASON CHRISTOPHER, Department of Physics, Boston University, ROBERTO PAIELLA, ANNA SWAN, Department of Electrical and Computer Engineering, Boston University — Raman spectroscopy is a powerful nondestructive technique for analyzing strain in graphene. Recently there has been interest in making corrugated graphene devices with varying spatial wavelengths Λ for plasmonic and THz applications. Transferring graphene onto corrugated substrates introduces strain, which if there was friction would cause a periodic strain variation. However, the strain variation for spatial period Λ smaller than the diffraction limit λ makes the strain distribution measurement hard. Here we present a detailed study on how strain varies in corrugated graphene with sub-diffraction limit periodicity $\Lambda<\lambda$. Mechanically exfoliated graphene was deposited onto sinusoidal shape silicon dioxide gratings with Λ=400nm period using a "pick and place" transfer technique. We observed that the graphene is not rigidly clamped, but partially slides to relieve the strain. We model the linewidth variation to extract the local strain variation as well as the sliding in the presence of charge puddling in graphene. Meanwhile, by tuning the surface salinization, the overall strain as well as its variation could also be tuned. This gives us a better understanding on slippage and strain distribution in corrugated graphene.

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