

Electronic supplemental material for “Interplay between Raman shift and thermal expansion in graphene: temperature-dependent measurements and analysis of substrate corrections”

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The temperature dependent G peak frequencies (ω_G) presented in Fig. S1 have been obtained for several measurements on two distinct but equivalent graphene/SiN/Si samples, two measurements being carried for each sample. Sample 1 was measured under argon atmosphere and ultra high vacuum (UHV) environment, whereas sample 2 was measured on supported graphene/SiN/Si and a suspended area of the graphene (holes in the SiN/Si substrate with about $1 \mu\text{m}$ in diameter). The raw frequencies ω_G of sample 1 are shifted by about $+5 \text{ cm}^{-1}$ relative to sample 2 most likely due to built-in strain or doping. Those shifts are of course washed out in $\Delta\omega_G$.

The measurements on suspended graphene show greater dispersion and were not used for the main analysis of the thermal expansion coefficient. Their similarity with the measurements on deposited graphene layers suggests that the effects of strain remain significant, likely due to the major part of the crystalline sample to be in contact with the substrate away from the hole in the substrate.

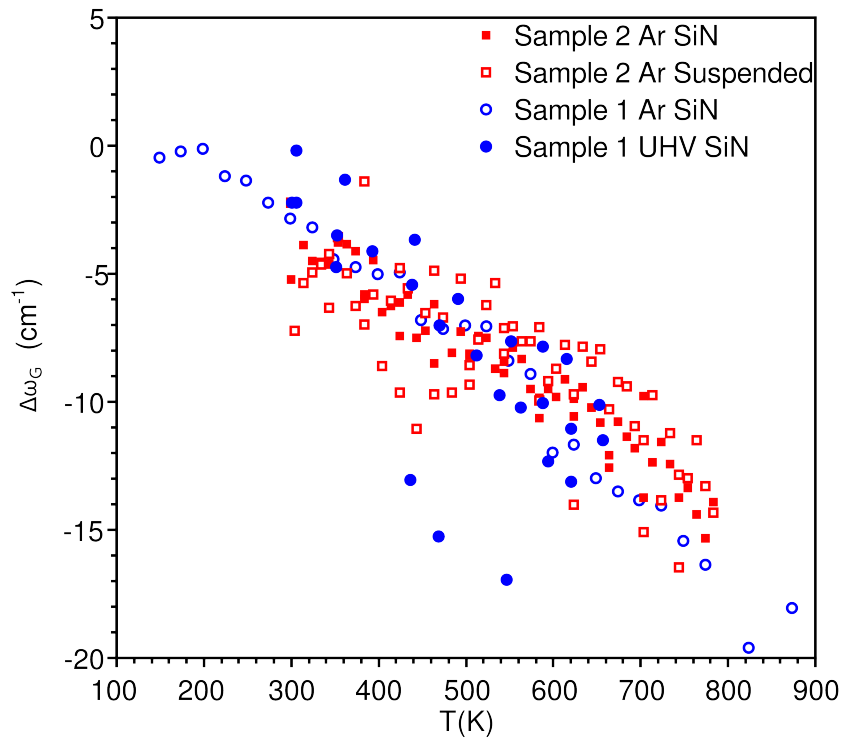


Fig. S1. Temperature variations of ω_G for single layer graphene transferred onto SiN/Si substrates. Measurements on samples 1 and 2 are depicted by blue circles and red squares, respectively.

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