Electronic Supplementary Material (ESI) for RSC Advances.

Supporting information for
"Dopant-configuration controlled carrier scattering in graphene"

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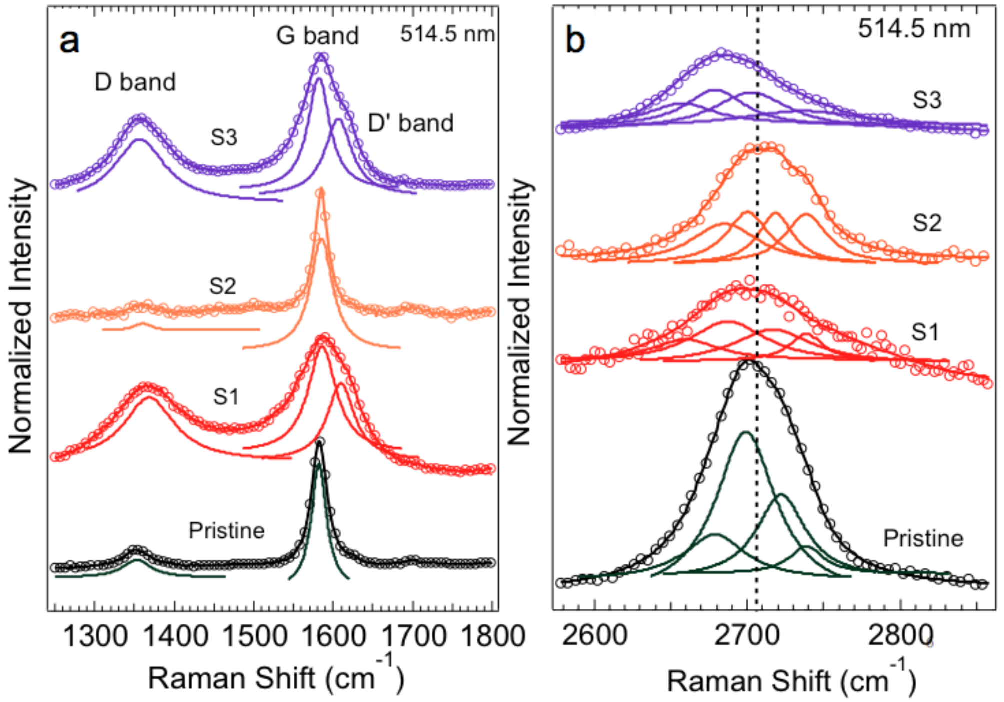

Figure S1. Raman spectra for pristine and N doped graphene (S1 – S3) obtained using 514.5 nm excitation. The *D* and *D′* bands in panel a) are intense for S1 and S3, and are attributed to N dopants present in the non-graphitic doping configuration (see text). Notably, the *D* and *G* band intensities for S2 (graphitic doping configuaration) are similar to those exhibited by pristine graphene, except for the defect-induced broadening. The electron-phonon energy renormalization upon doping results in a net downshift of the peak position of the *G′* band for S1and S3 relative to that for pristine and S2.

Figure S2: Density functional theory calculations showing the electron density of porphyrin-type defects. The formation energy was found to be 9.75 eV with a bandgap of 0.1 eV at the K-point indicating it is a energetically favorable. Nonetheless, our detailed X-ray photoemission spectroscopy studies (Ref. 9) did not show any evidence for prophyrin-like dopants in our samples. Accordingly, only graphitic, pyridinic, and pyrrolic dopants were considered based on micro-Raman and XPS studies discussed in Ref. 9.