Supplementary Information

For

Effects of Disorder on the Optical Properties of CVD grown Polycrystalline Graphene

Z-scan method:

The Z-scan is a nonlinear optical measurement, in which the light-induced change in transmittance (ΔT) of a medium due to optical nonlinearity is measured as a function of input light energy density (fluence) or intensity, yield the nonlinear absorption and refraction coefficients. In the experiment, a continuous variation of the input fluence is achieved by translating the sample under study through the focal region of a focused laser beam (the sample position is taken as z with z = 0 being the focal point for the incident laser beam; hence the name "Z-scan"). A detailed description of the Z-scan technique can be found elsewhere [1].

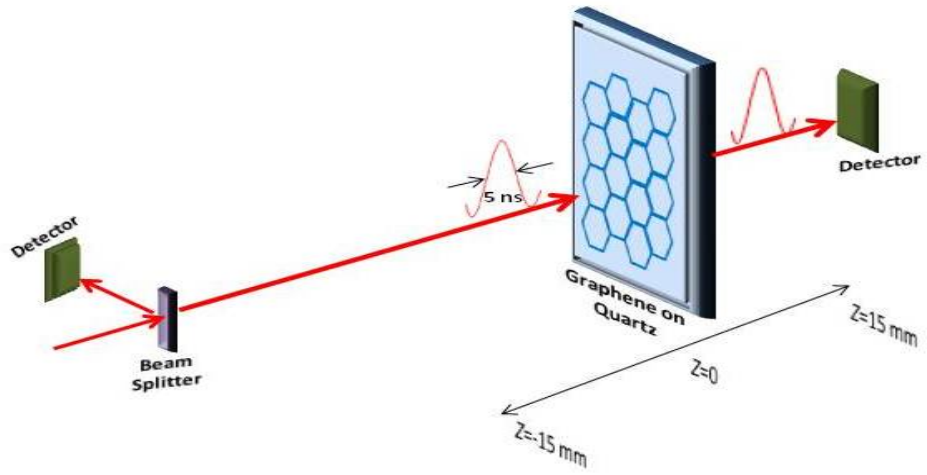

Figure S1: A schematic of the open aperture ns Z-scan technique used in this study.

1. Van Stryland, E. W.; and Sheik-Bahae, M. Z-Scan: Characterization Techniques and Tabulations for Organic Nonlinear Materials, M. G. Kuzyk and C. W. Dirk, Eds., 655-692, Marcel Dekker Inc.: **1998**.

Cu grain measurement:

Cu grain images were obtained using Olympus IC-50x microscope. ImageJ software (rsbweb.nih.gov/ij/). ImageJ is a public domain Java image processing program. It runs, either as an online applet or as a downloadable application, on any computer with a Java 1.4 or later virtual machine.

For the analysis of the Cu grain size distribution we used the following procedure: i) the 'set scale' tool in ImageJ options was used to calibrate the pixel per micron, ii) The pencil tool in the imageJ program was later used to highlight the desired grain of interest in the optical image, and iii) finally, the the total number of pixels enclosed in the highlighted grain was calculated and the corresponding area was determined using the calibration performed in step (i).

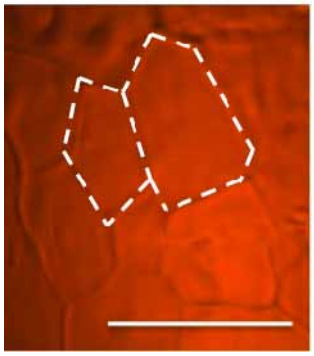

Figure S2: Typical optical microscope images of the Cu substrate. Dashed white lines serve as a guide to the eye. The scale bar in all the images is ~80μm

Atomic Force and Transmission Electron Microscopy:

Typical AFM and TEM images of our samples are shown in Figs. S3 and S4. Polycrystallinity of our graphene samples is evident in Fig S4.

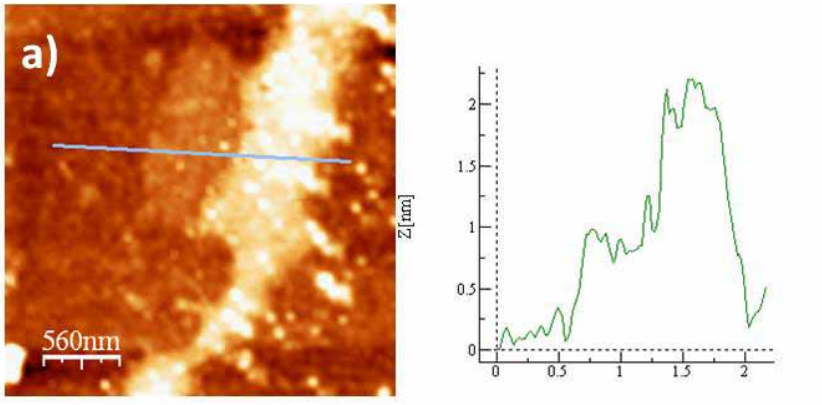

Figure S3: Typical AFM height profiles for graphene samples grown on Cu substrates.

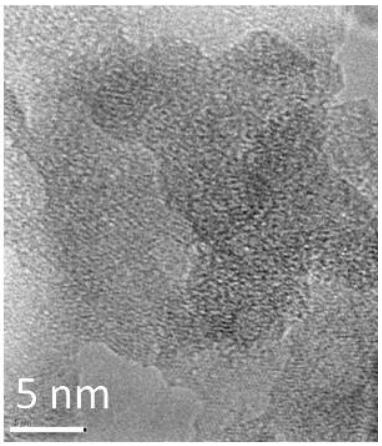

Figure S4: Typical High resolution TEM images of graphene samples showing the polycrystalline nature of our samples.

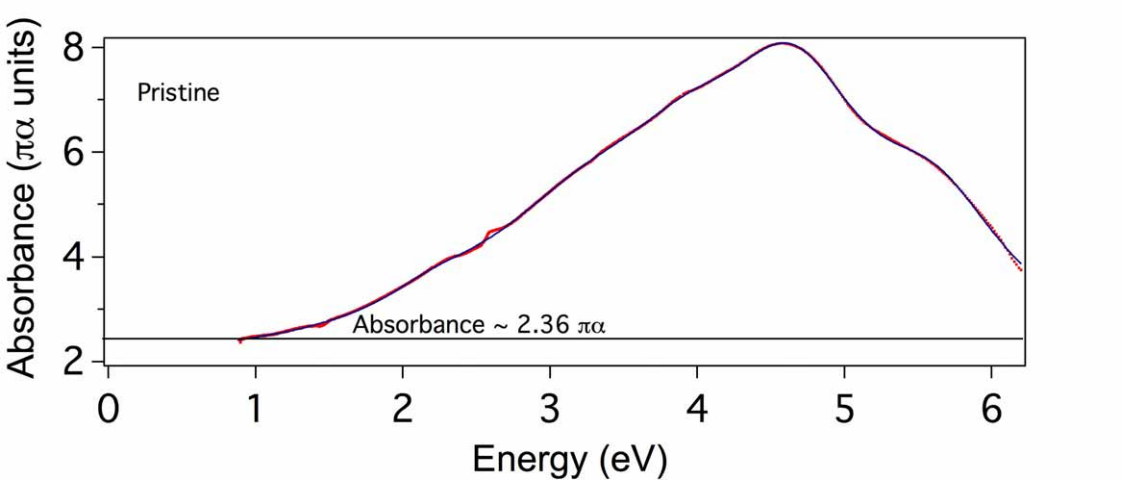

Figure S5: Optical absorption data for 1 sccm sample shows an absorbance similar to bilayer graphene.

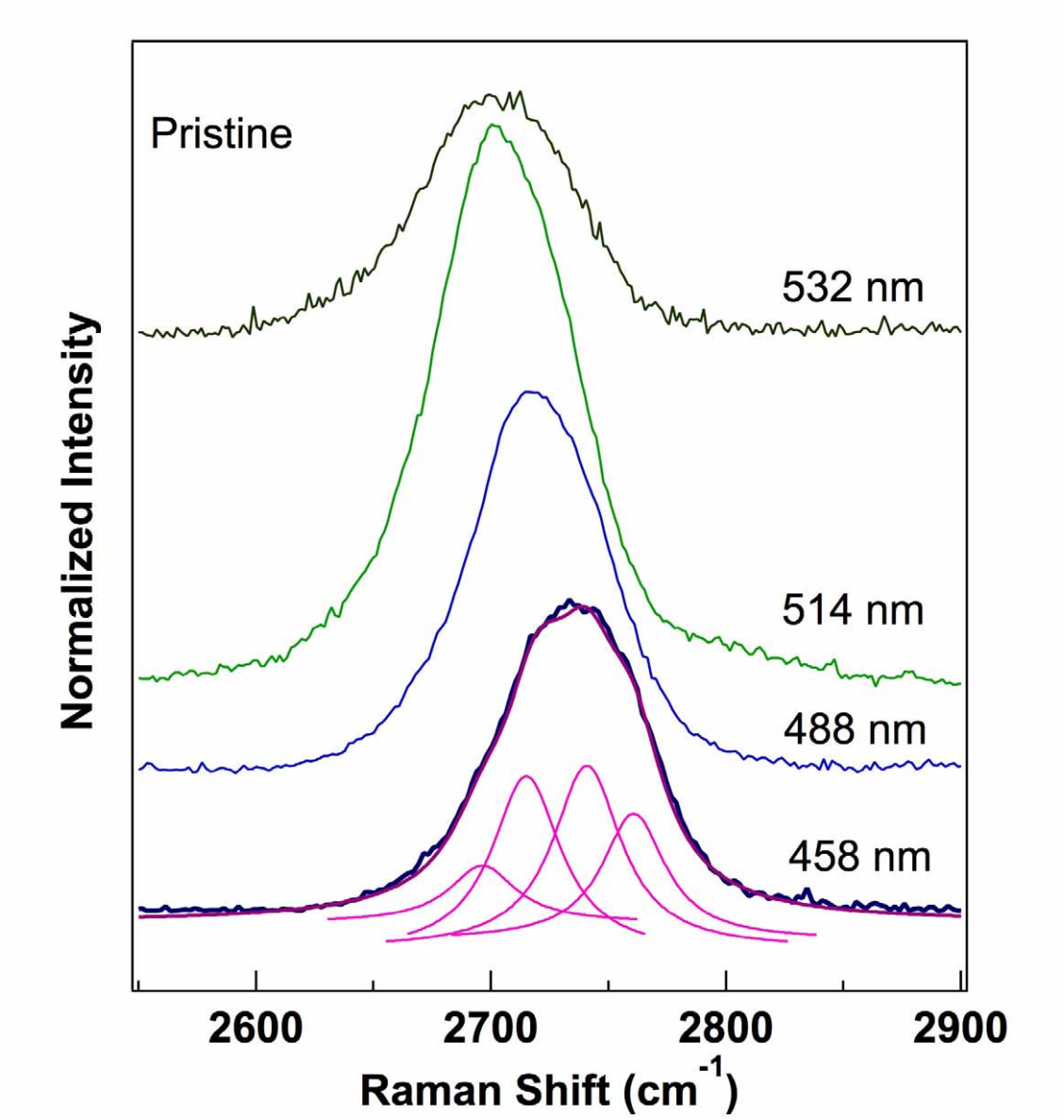

Figure S6: Raman spectra of 1 sccm sample obtained at different excitation energies confirms the bilayer like nature of our samples.