Electronic Supplementary Information for

Homogeneous Bilayer Graphene Film Based Flexible Transparent Conductor

Seunghyun Lee,[a] Kyunghoon Lee,[a] Chang-Hua Liu [a] and Zhaohui Zhong *[a]

[a] Department of Electrical Engineering and Computer Science,
University of Michigan, 1301 Beal Avenue Ann Arbor, MI 48109-2122 U.S.A.; Tel: +01-734-647-1953; E-mail: zzhong@umich.edu

Multilayer graphene (MLG) characterization and growth

25μm thick copper foil (99.8%, Alfa Aesar) was loaded into an inner quartz tube inside a 3 inch horizontal tube furnace of a commercial CVD system (First Nano EasyTube 3000). The system was purged with argon gas and evacuated to a vacuum of 0.1 Torr. The sample was then heated to 1000°C with argon (1000sccm) and hydrogen (50 sccm) flow at atmospheric pressure for annealing. When 1000°C is reached, the annealing process is maintained for 30 minute, and then 50 sccm of CH_4 is flowed for 5 minutes at atmospheric pressure. The sample is then cooled to room temperature without CH_4 gas flow. The hydrogen is cut off but the argon flow is maintained during the cooling process. The time plot of the entire growth process is shown in Fig. S1a. After the transfer process to silicon substrate with thermal oxide, Raman spectroscopy was used to verify the existence of multilayer graphene. For this typical raman spectra shown in figure S1b, I_{2D}/I_G ratio is 0.78 and the $fwhm_{2D}$ is 63. However for 10 different measurements on random areas, the value of I_{2D}/I_G varied from 0.51 to 1.11 and $fwhm_{2D}$ varied from 47.78 to 68.27.

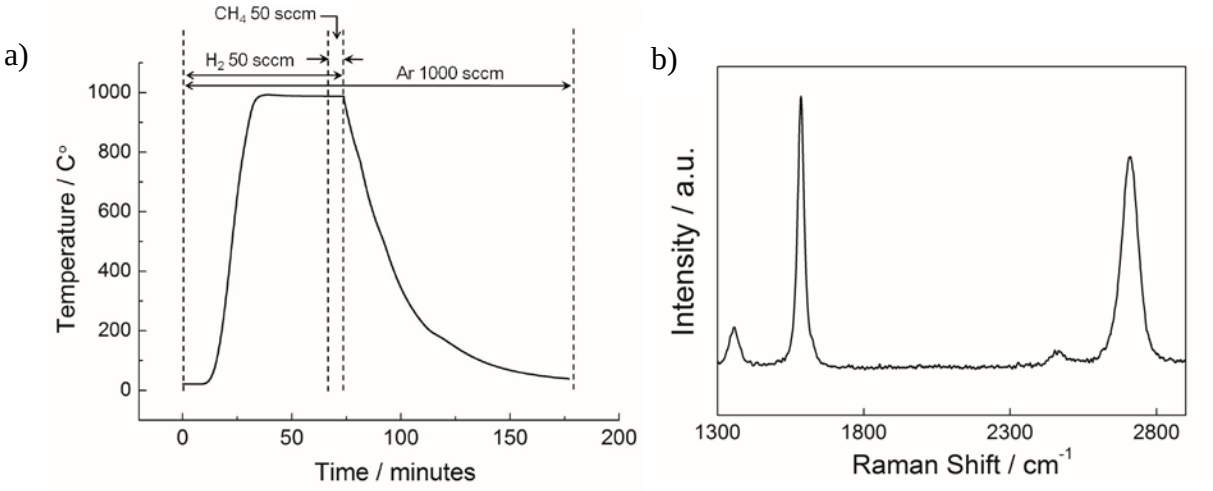

Figure S1. a) Temperature vs. time plot of multilayer graphene growth condition. Pressure is maintained to atmospheric pressure at all time except the initial purge stage. b) Raman spectroscopy result showing typical multilayer signal.