Growth of Graphene from Food, Insects and Waste—Supporting Information

*Gedeng Ruan,[1†] Zhengzong Sun,[1†] Zhiwei Peng[1] and James M. Tour[1,2,3,]**

[1]Department of Chemistry, [2]Department of Mechanical Engineering and Materials Science, [3]Richard E. Smalley Institute for Nanoscale Science and Technology, Rice University, 6100 Main Street, Houston, Texas 77005, USA.

*Address correspondence to tour@rice.edu, † These authors contributed equally to this work

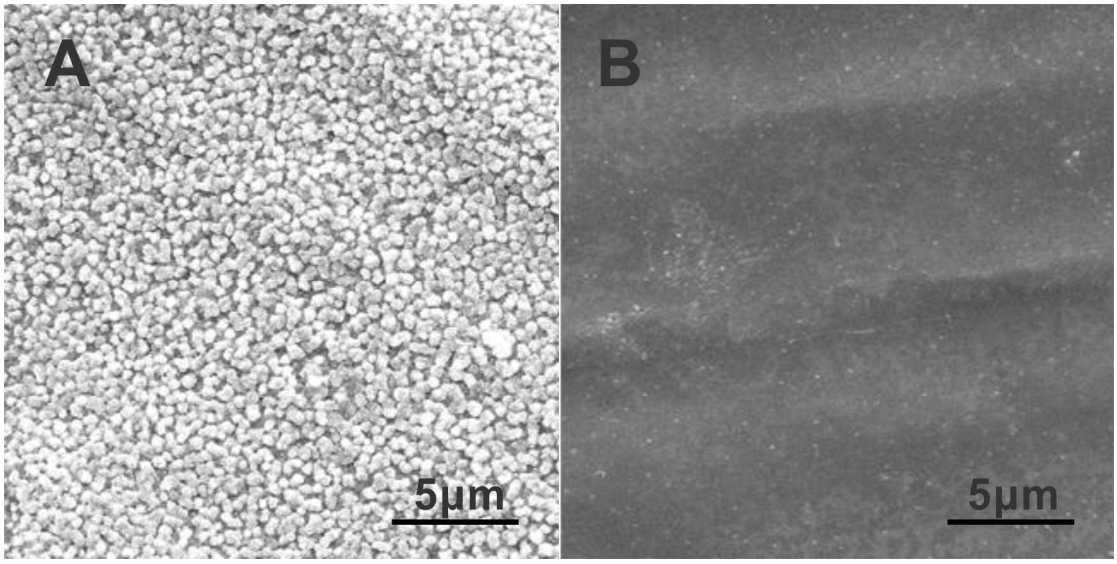

Figure S1. SEM images of the Cu foil after growth of graphene from a Girl Scout cookie. (A) The original frontside of the Cu foil; there was a large quantity of particle residue after the pyrolysis of the cookie. (B) The backside of the Cu foil.

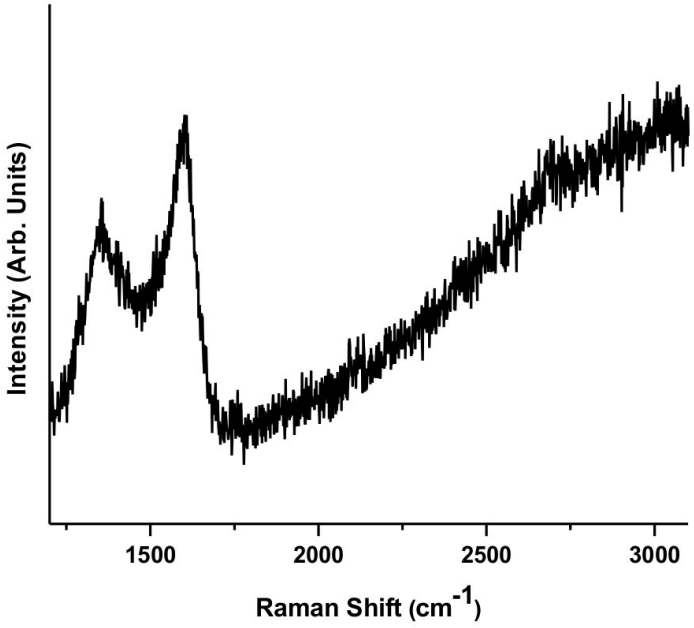

Figure S2. Representative Raman spectrum of amorphous carbon grown on the backside of Cu foil when the Girl Scout cookie fragments were placed 5 cm ahead of the Cu foil in the tube furnace.

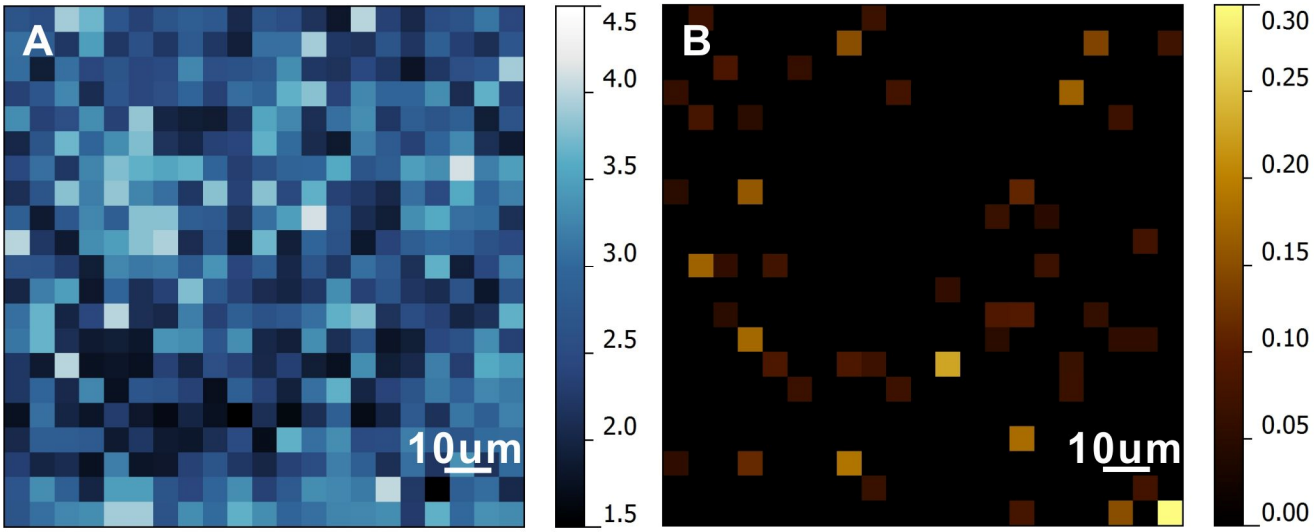

Figure S3. Raman spectra mapping of graphene from dog feces. The scanning was performed at every 5 μm over an area of 100 μm × 100 μm. (A) Raman spectral mapping of 2D/G ratio, over 95% of the scanning area has the signature of $I_{2D}/I_G > 1.8$. (B) Raman spectral mapping of D/G ratio; note that over 95% of the scanning area has the signature of $I_D/I_G < 0.1$. This is confirmation of high-quality monolayer graphene.

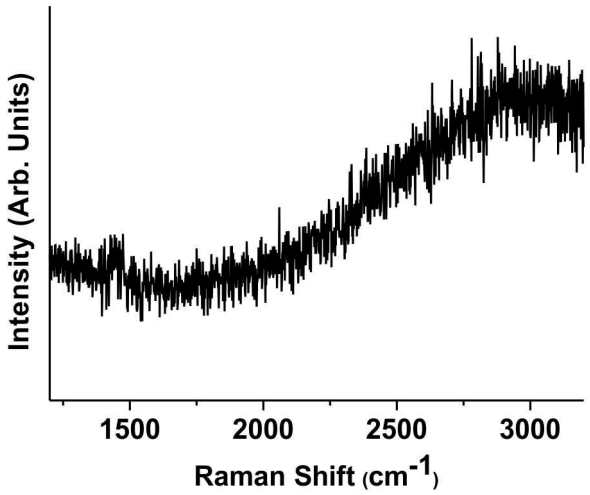

Figure S4. Raman spectrum of a control sample. The annealing conditions are the same as the growth conditions described in the methods part except there is no solid carbon source added to the growth system. As shows in the spectrum, no graphene was present on the backside of the Cu foil in the control sample.

Table S1. The wavelength number of the G and 2D peak, and their FWHM for graphene samples derived from six different carbon sources.

Carbon source	G peak (cm^{-1})	G peak FWHM (cm^{-1})	2D peak (cm^{-1})	2D peak FWHM (cm^{-1})
Cookie	1585.5	14.1	2682.6	32.0

Chocolate	1591.4	15.9	2693.9	32.6
Grass	1585.7	16.0	2692.1	33.1
Plastic	1587.7	15.8	2685.7	34.8
Dog feces	1589.6	16.3	2689.7	35.1
Roach	1588.4	14.6	2687.4	33.5

Reference

1. Wang, Y. Y.; Ni, Z. H.; Yu, T.; Shen, Z. X.; Wang, H. M.; Wu, Y. H.; Chen, W.; Wee, A. T. S. Raman Studies of Monolayer Graphene: The Substrate Effect. *J. Phys. Chem. C* **2008**, *112*, 10637-10640.