† Electronic Supplementary Information (ESI) available:

Gum arabic assisted exfoliation and fabrication of Ag–graphene-based hybrids

Jinchen Fan, Zixing Shi,* Yan Wang, Yu Ge, Jialiang Wang and Jie Yin

School of Chemistry & Chemical Technology, State Key Laboratory for Metal Matrix Composite Materials, Shanghai Jiao Tong University

Tel.: +86-21-54743268; Fax: +86-21-54747445.

Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

1. Estimation of graphene concentration with the GA-stabilized aqueous graphene dispersions

UV–vis absorption spectra of the surfactant-stabilized aqueous graphene dispersions were recorded using a double-beam Heλios α spectrophotometer, from Shimadzu. The spectra were measured in the 200–800 nm wavelength range. The concentration was estimated from the absorbance at 660 nm by using the extinction coefficient of graphene (α = 1390 mL mg^{-1} m^{-1}) previously determined in surfactant/water solutions. According to the Lambert-Beer law, the graphene concentrations of samples were calculated as follows[1]:

$$A_{660nm} = \alpha C l$$

, where A_{660nm} is the absorbance of the GA-stabilized aqueous graphene dispersions in the wavelength of 660nm, α (value: 1390 mL mg^{-1} m^{-1}) is the absorption coefficient which is related to the absorbance, C is the concentration and *l* (value: 10^{-2} m) is the path length

2. TEM and AFM images of GA-G nanosheets

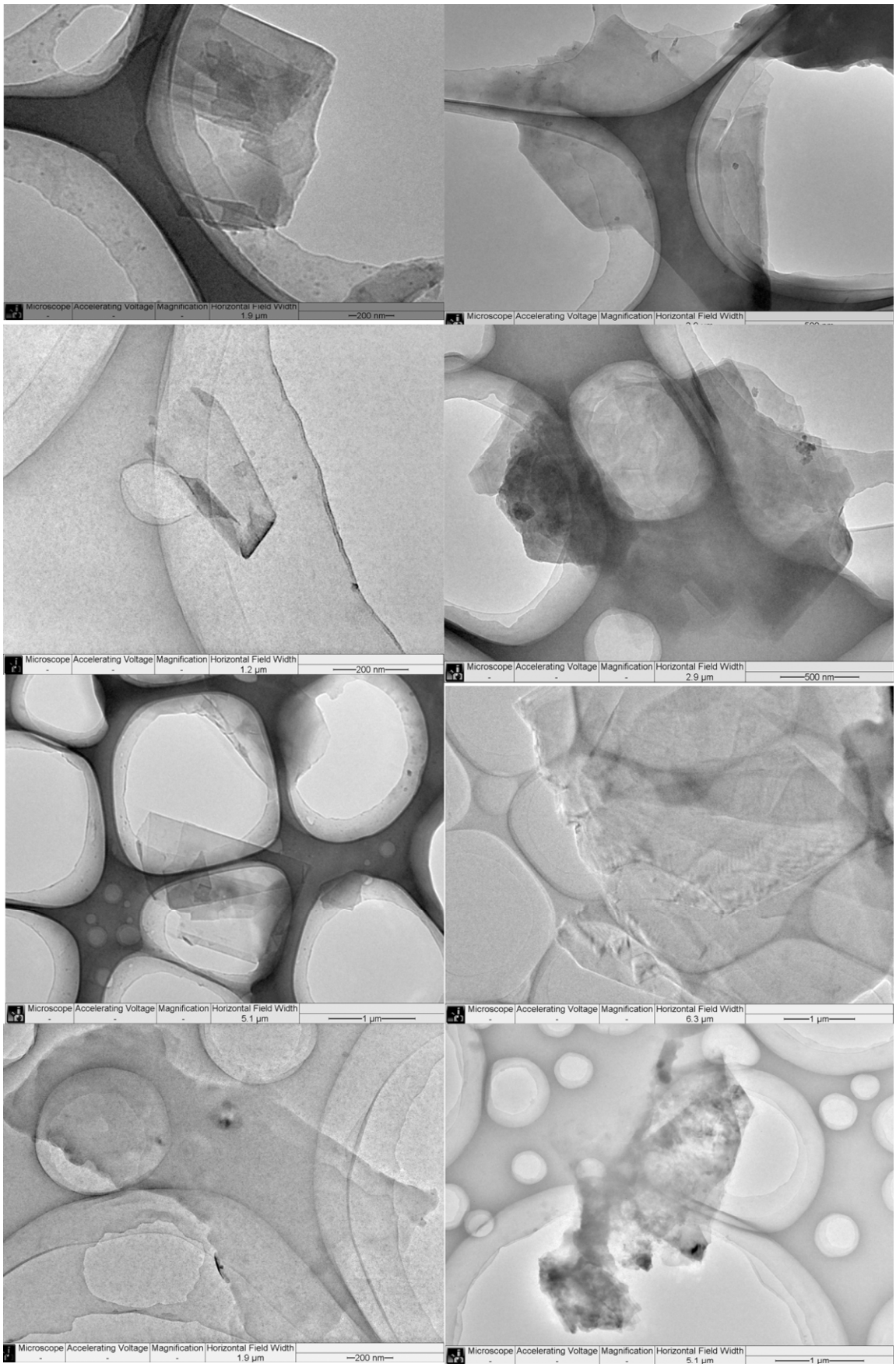

Fig.S1 Low magnification TEM images of folded and stacked GA-G nanosheets

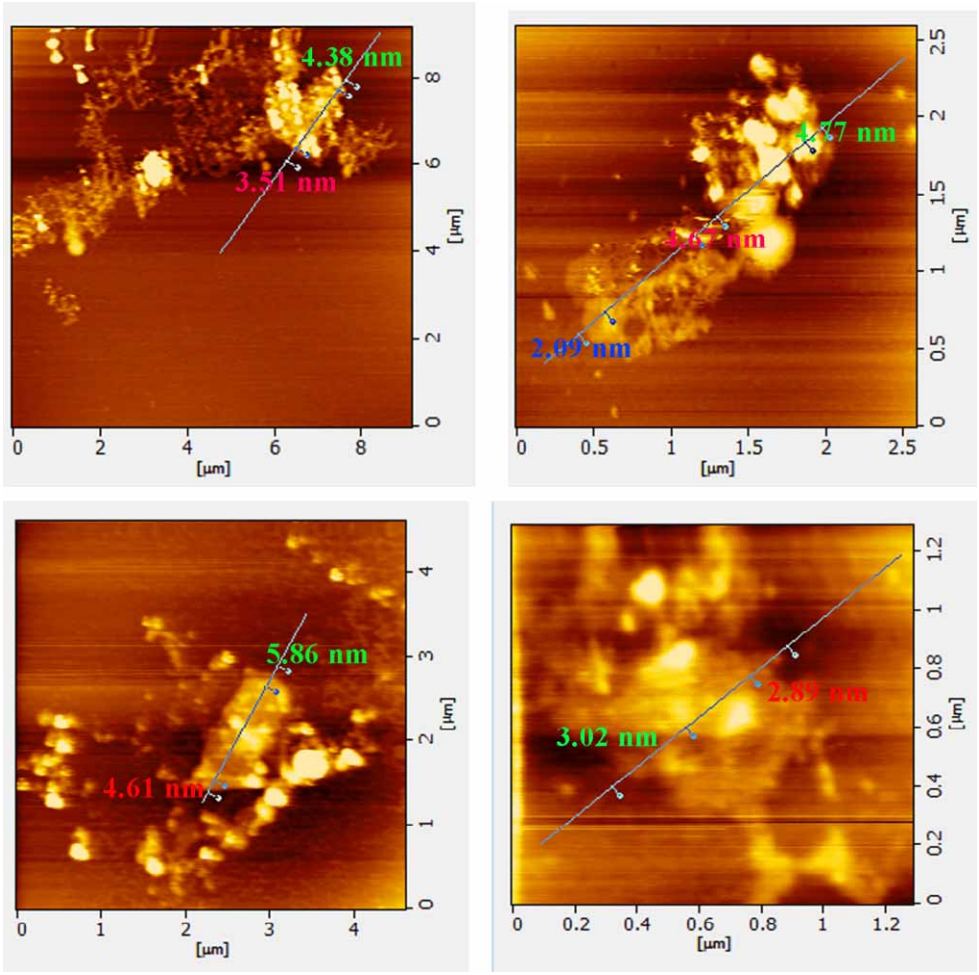

Fig.S2 AFM images of GA-G nanosheets

3. Zeta potential (ζ)

Table S1. Zeta potential (ζ) of samples (pH=5.6)

Samples (1 mg mL^{-1})	Graphite aqueous dispersion	GA water solution	GA-G water dispersion
Zeta potential (mV)	-5.42	-18.8	-26.8

4. The equilibrium contact angles of graphite and GA-G

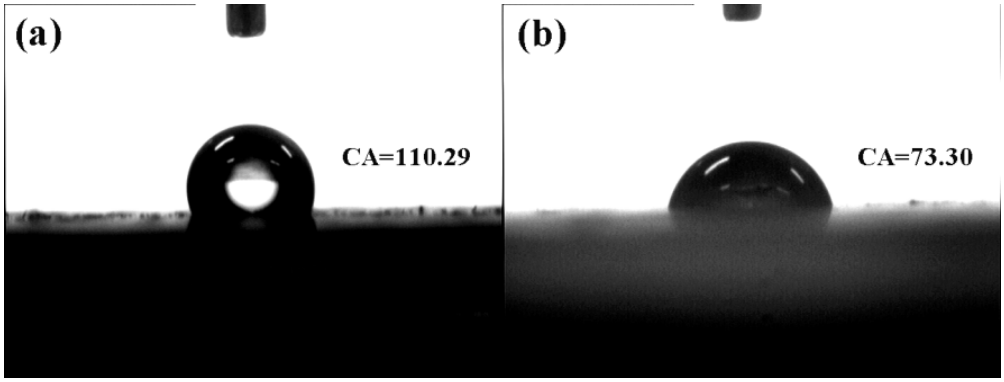

Fig.S3 The equilibrium contact angles of graphite (a) and GA-G (b)

5. Aqueous dispersibility of GA-G obtained with hot-air dry

Fig.S4 The aqueous dispersion of GA-G obtained with hot-air dry

6. Raman spectroscopy of the reduced graphene oxide

The reduced graphene oxide was prepared by hydrazine reduction of graphene oxide suspension in water[2]. The reduction was accomplished for 50 mL of graphene oxide dispersions with a concentration of 0.1 mg mL^{-1}, using 100 μL of 25% ammonia solution and 10 μL of hydrazine hydrate. The reaction was carried out in at 95 ^{o}C for 1 h. After reaction, the reduced graphene oxide was obtained by vacuum filtration followed with water washing.

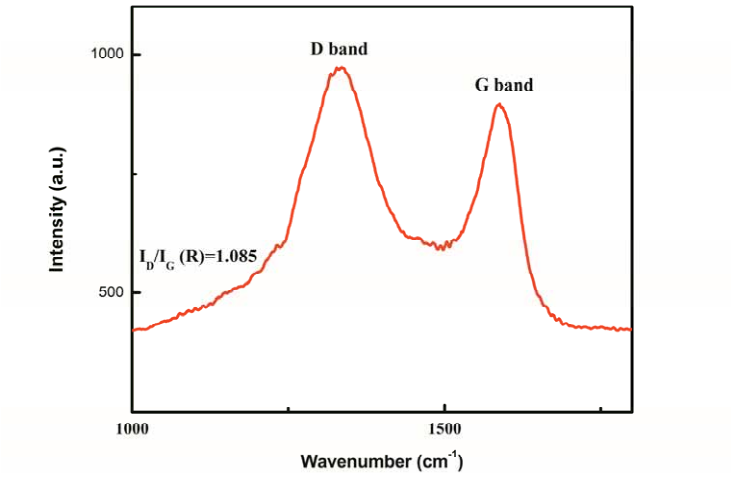

Fig.S5 Raman spectroscopy of the reduced graphene oxide

7. TGA curves of Ag/GA-G hybrids

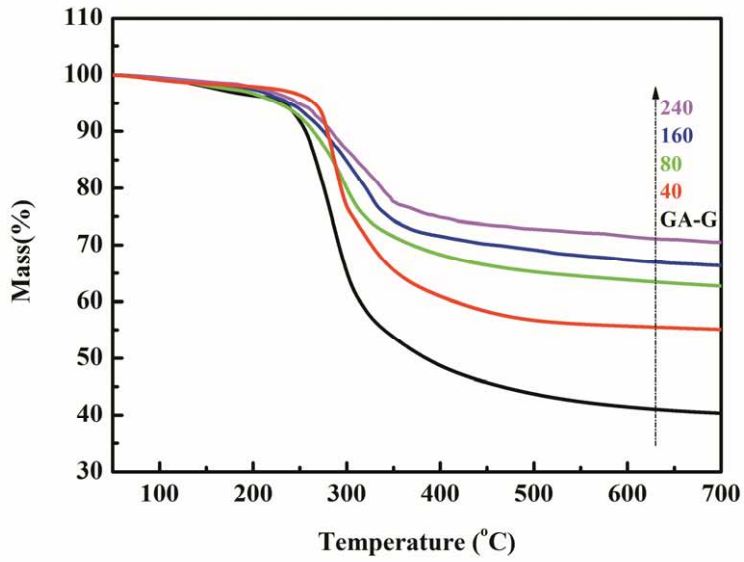

Fig.S6 The TGA curves of Ag/GA-G hybrids prepared with a different weight ratio between the $AgNO_3$ and GA-G: 40, 80, 160, and 240 (TGA was performed in the nitrogen atmosphere)

References

1. M. Lotya, Y. Hernandez, P. J. King, R. J. Smith, V. Nicolosi, L. S. Karlsson, F. M. Blighe, S. De, Z. Wang, I. T. McGovern, G. S. Duesberg and J. N. Coleman, *Journal of the American Chemical Society*, 2009, **131**, 3611-3620.

2. X. Gao, J. Jang and S. Nagase, *The Journal of Physical Chemistry C*, 2009, **114**, 832-842.