

Salt-assisted direct exfoliation of graphite into high-quality, large-size, few-layer graphene sheets

(Supporting Information)

Liyong Niu,^{1,2,‡} Mingjian Li,^{1,2,‡} Xiaoming Tao,^{1,2,*} Zhuang Xie,^{1,2} Xuechang Zhou,^{1,2} Arun P. A. Raju,³ Robert J. Young,³ Zijian Zheng^{1,2,*}

¹Nanotechnology Center, Institute of Textiles and Clothing, The Hong Kong Polytechnic University, Hong Kong SAR, China, *Fax:* +852-27731432; *Tel:* +852-27666441; *E-mail:* *tctaoxm@polyu.edu.hk; tczzheng@polyu.edu.hk*

²Advanced Research Centre for Fashion and Textiles, The Hong Kong Polytechnic University, Shenzhen Research Institute, Shenzhen, China,

³Materials Science Centre, School of Materials, The University of Manchester, Manchester, M13 9PL, UK

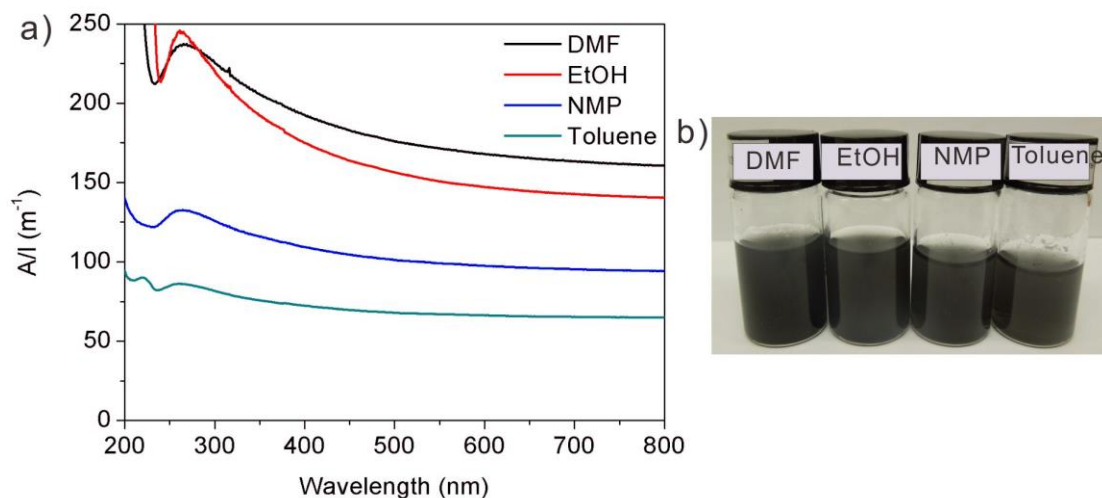


Figure S1. a) UV-Vis spectra and b) digital image of the graphene aqueous solutions prepared by NaCl-assisted direct exfoliation of graphite in various solvents. The baseline

was adjusted through using DI water. The calculated concentrations are 0.12, 0.11, 0.07 and 0.05 mg/ml for DMF, EtOH, NMP and toluene, respectively.

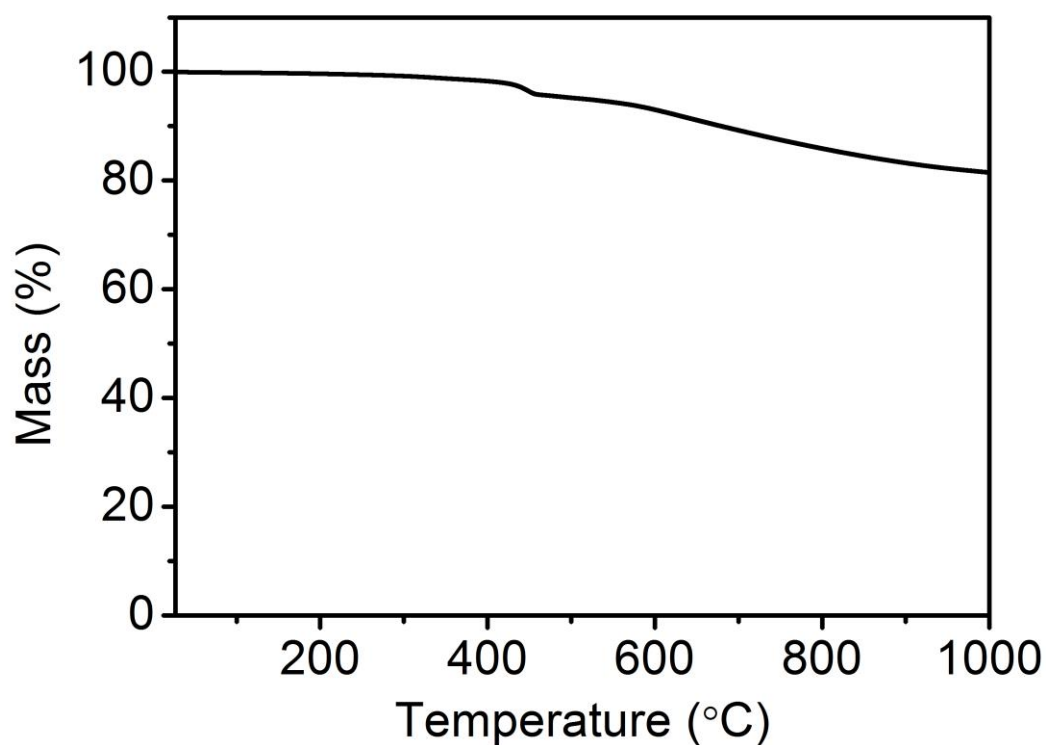


Figure S2. TGA analysis of the graphene prepared by NaCl-assisted direct exfoliation of graphite in EtOH, which was heated from room temperature to 1000°C at 5 °C / min under a nitrogen flow.

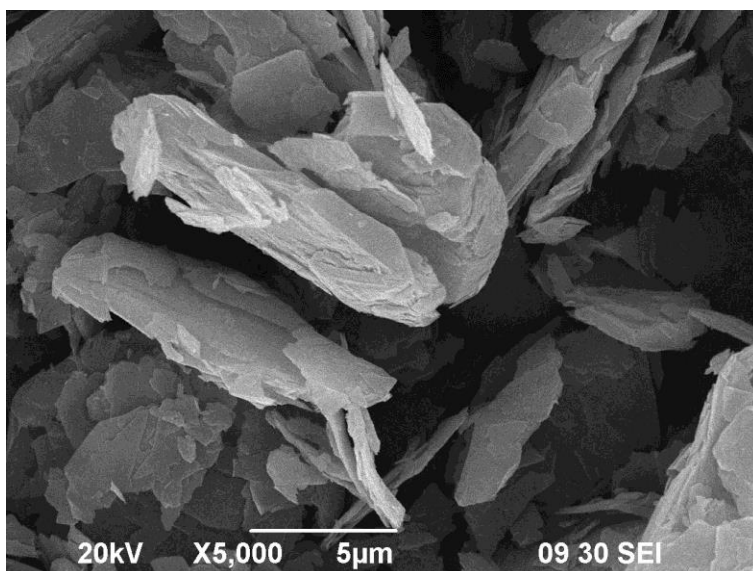


Figure S3. SEM image of the starting graphite.

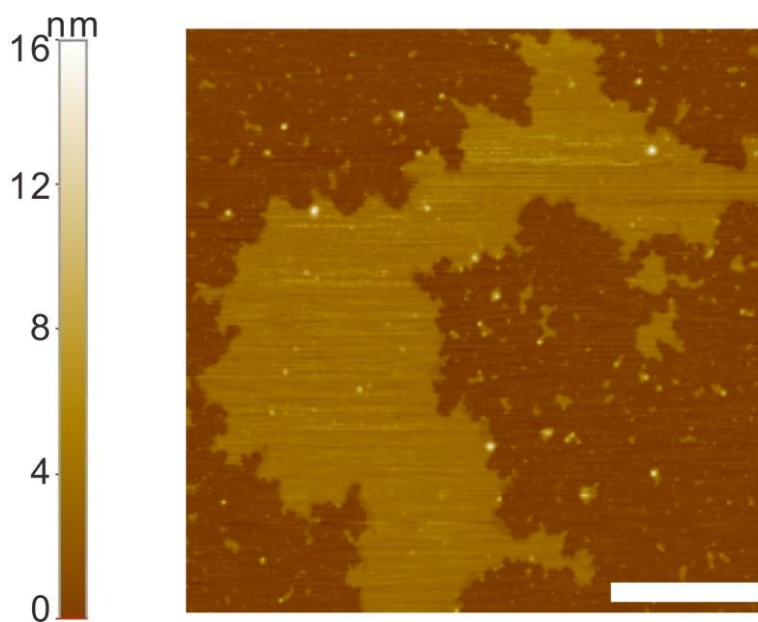


Figure S4. AFM topographic image of graphene prepared from NaCl-assisted direct exfoliation of graphite in EtOH after annealing at 500 °C in an argon atmosphere for 1 hr. After annealing, the SDBS was decomposed (460 °C), while graphene sheets can be still observed on SiO₂/Si wafer by AFM, scale bar: 2 µm.

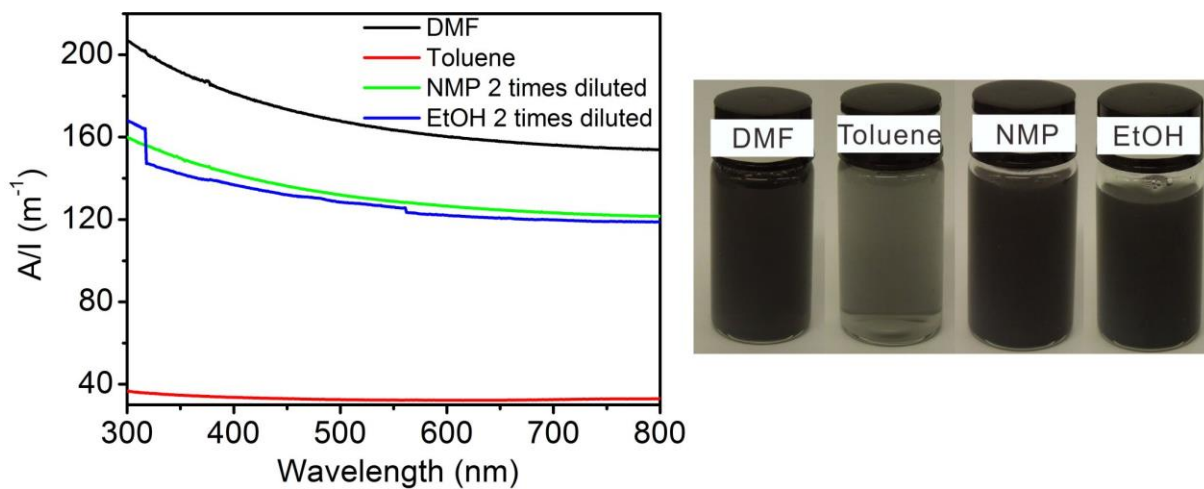


Figure S5. a) UV-Vis spectra and b) digital image of the graphene aqueous solution prepared from CuCl₂-assisted direct exfoliation of graphite in various organic solvents. The calculated concentrations are 0.11, 0.02, 0.17 and 0.17 mg/ml for DMF, toluene, NMP and EtOH, respectively.

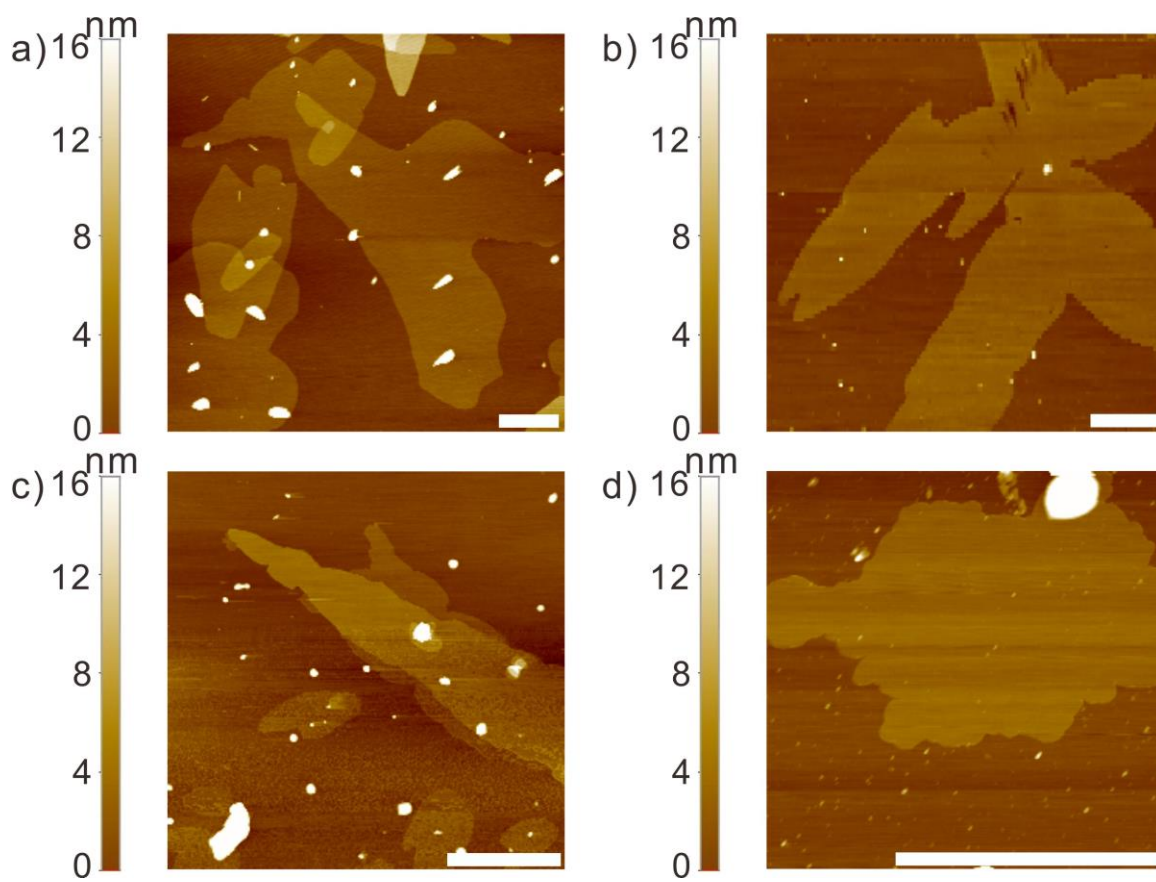


Figure S6. AFM topographic images of graphene prepared by CuCl₂-assisted direct exfoliation of graphite in various organic solvents: a) EtOH, b) DMF, c) NMP and d) Toluene. And the heights are 3.0, 3.1, 3.2, 2.6 nm, respectively. The scale bars are 5 μm.

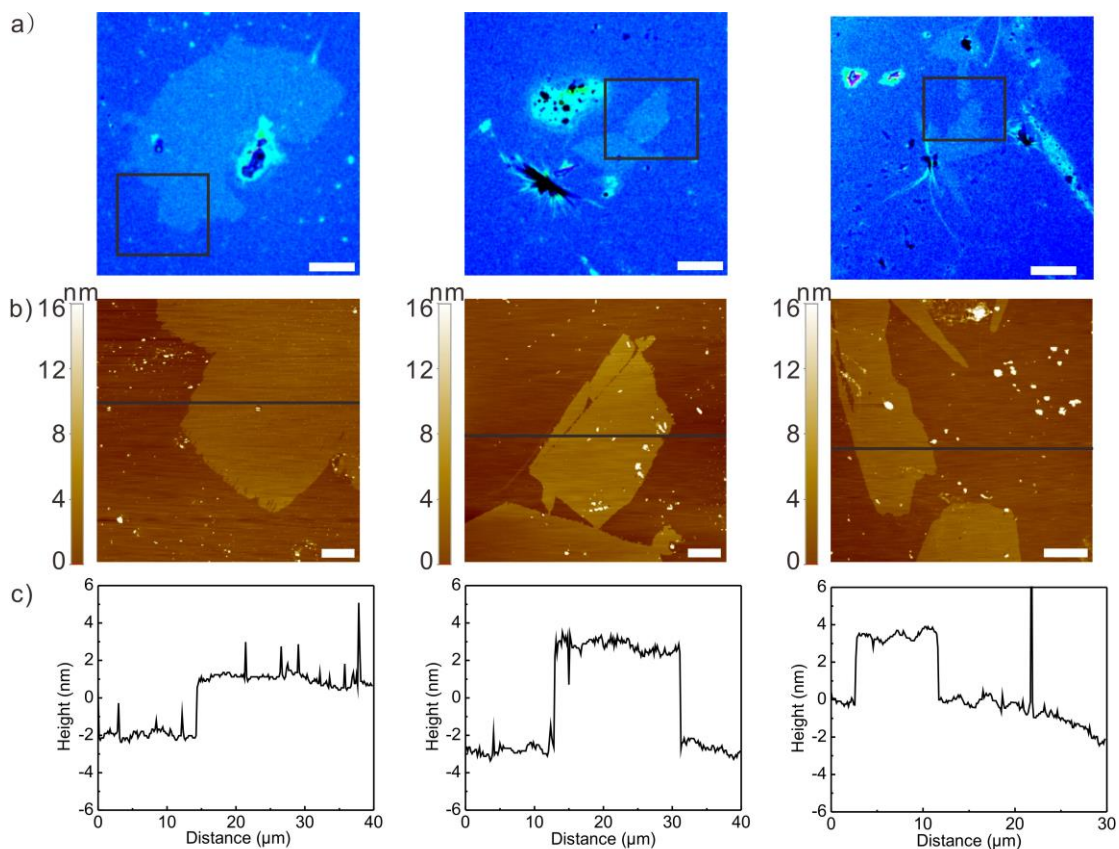


Figure S7. a) Optical micrographs, b) AFM topographic images, and c) cross-sectional profiles of the as-made graphene prepared by CuCl_2 -assisted direct exfoliation of graphite in ethanol after annealing at $500\text{ }^\circ\text{C}$ in an argon atmosphere for 1 hr. The scale bars are $20\text{ }\mu\text{m}$ and $5\text{ }\mu\text{m}$ for a) and b), respectively.

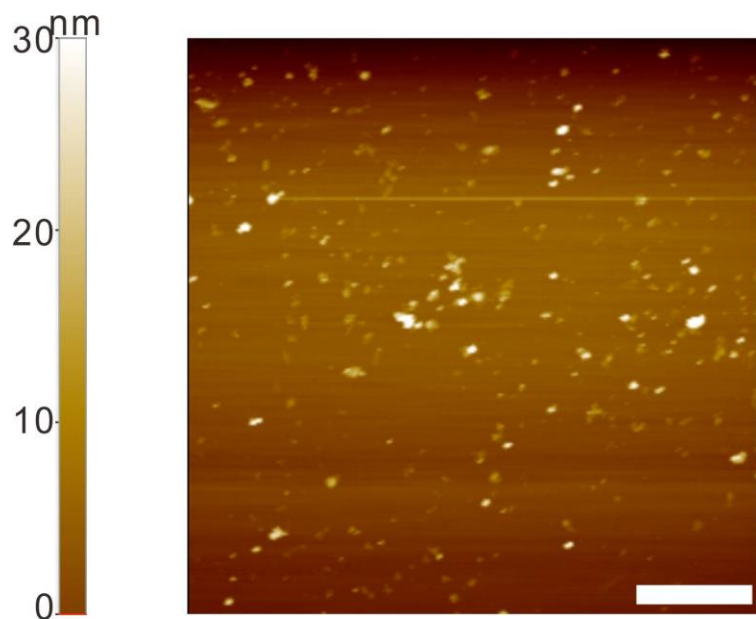


Figure S8. AFM topographic image of the graphene-like sample synthesized by sonicating raw graphite in EtOH with SDBS, scale bar: 2 μm .

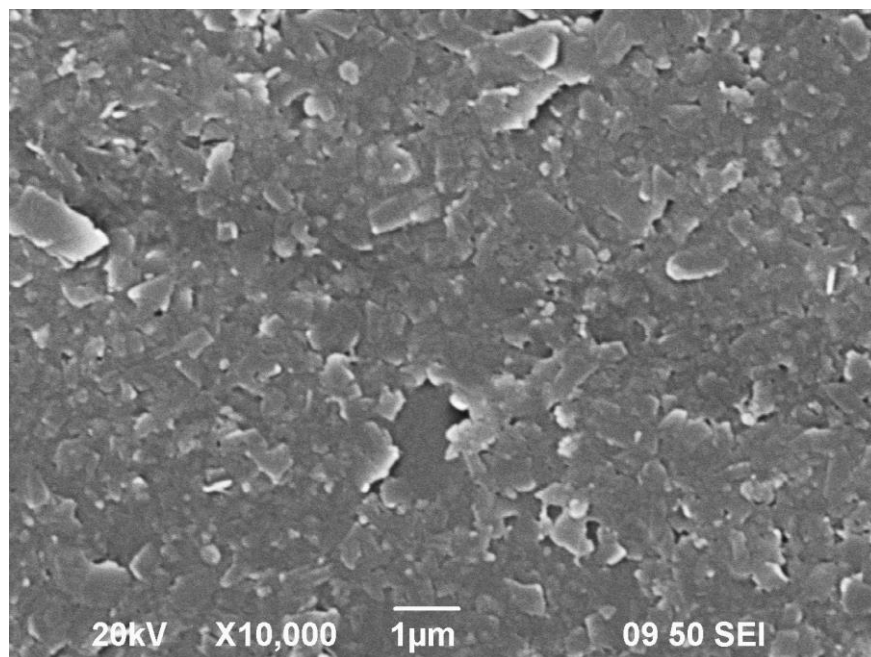


Figure S9. SEM image of the as-made graphene film.