Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Supplementary Information

A one-step approach to green and scalable production of graphene inks for printed flexible film heater

Lingyun Xu[a,b,c], Haopeng Wang[a,b,c], Yadong Wu[b,c], Zian Wang[b,c], Lixin Wu[b,*] and Longhui Zheng[b,d,*]

[a] College of Chemistry and Materials Science, Fujian Normal University, Fuzhou 350007, China.

[b] CAS Key Laboratory of Design and Assembly of Functional Nanostructures, Fujian Key Laboratory of Nanomaterials, Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou 350002, China.

[c] Fujian College, University of Chinese Academy of Sciences, Fuzhou 350002, China.

[d] Fujian Universities and Colleges Engineering Research Center of Soft Plastic Packaging Technology for Food, Fuzhou 350300, China.

Corresponding Authors

*E-mail: lxwu@fjirsm.ac.cn (L. Wu), lhzheng@fjirsm.ac.cn (L. Zheng)

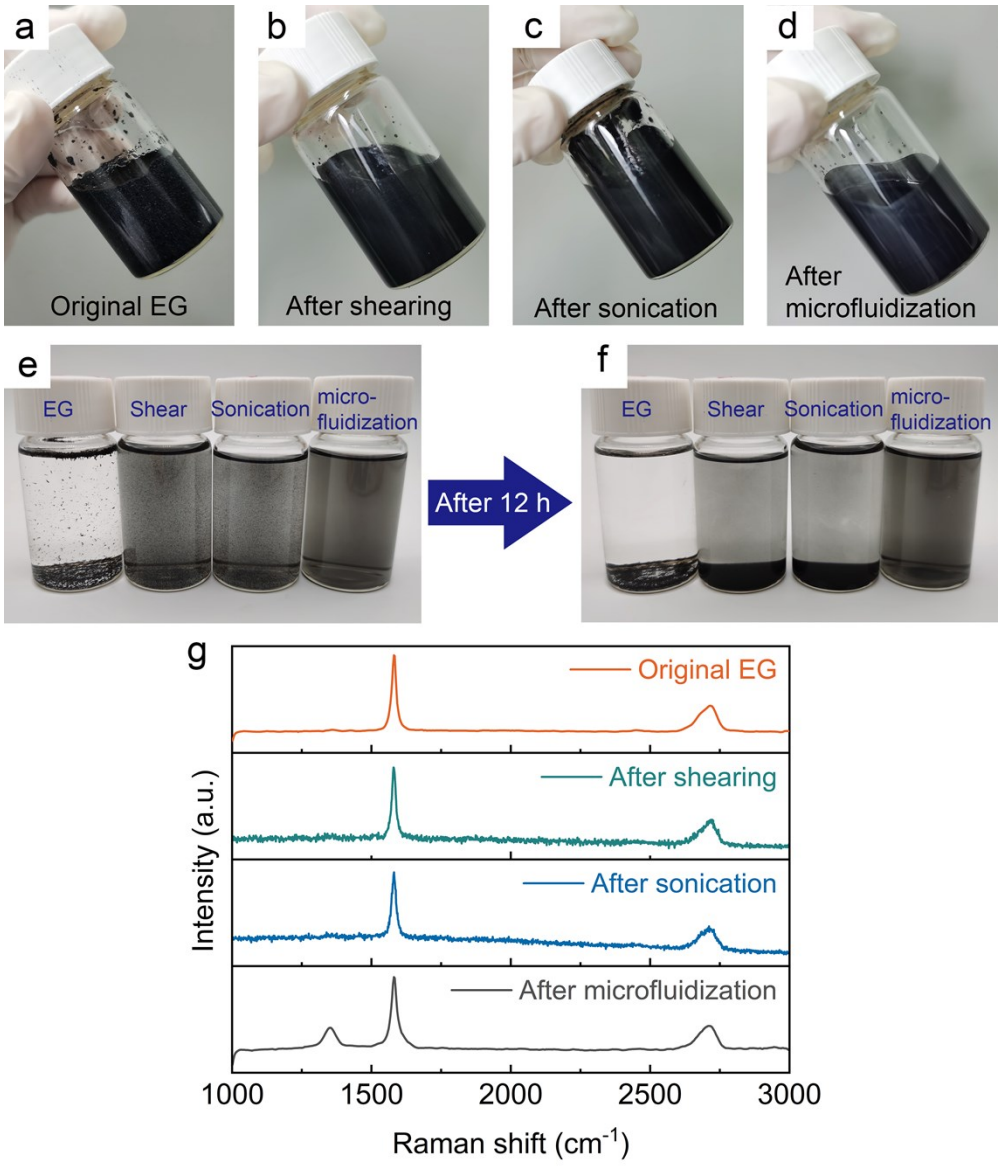

Fig. S1. Digital photos of the state of EG dispersions (a-d) and 100 times diluted EG dispersions (e, f) after different processing steps; Raman spectra of dried EG dispersions after different processing steps (g).

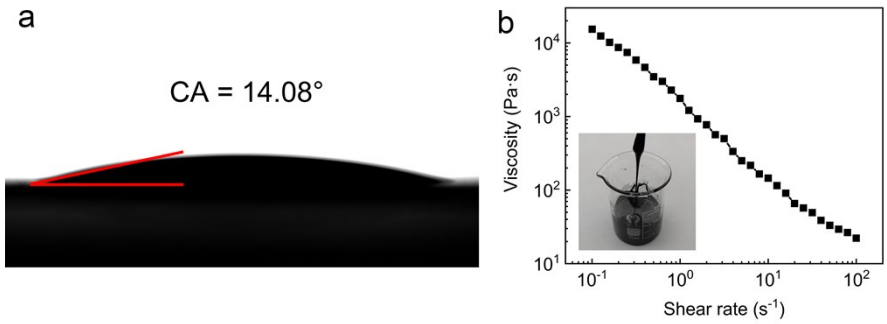

Fig. S2. Image of the contact angle of graphene ink on PI film (a); steady shear rheology of the condensed graphene ink (b), and the inset in (b) is the image of the condensed graphene ink.

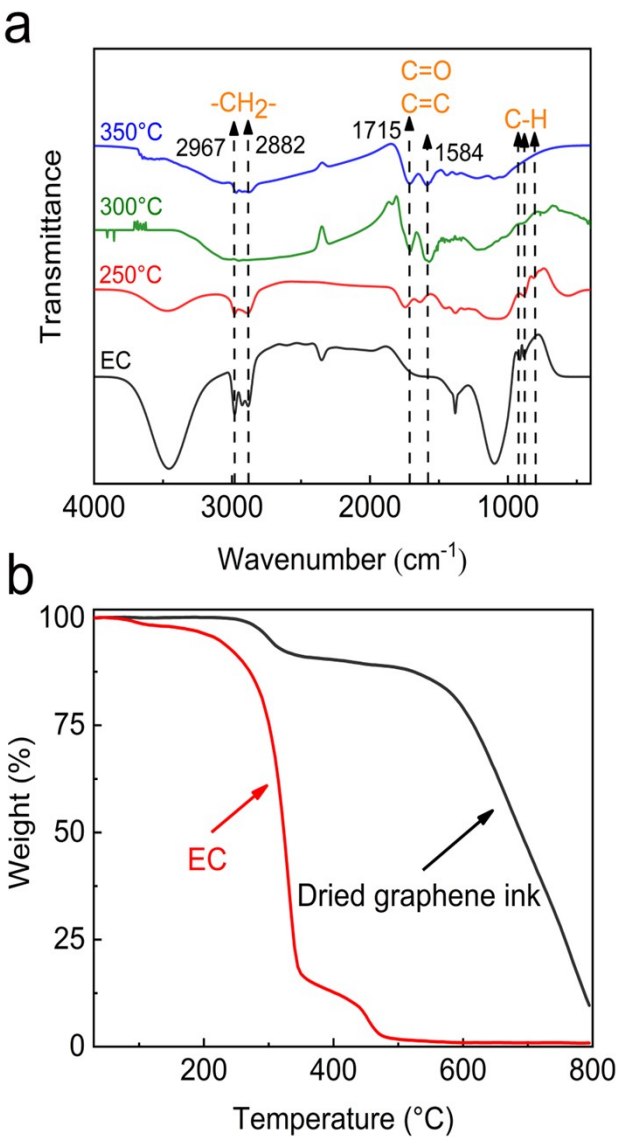

Fig. S3. Infrared spectra of EC and EC at different annealing temperatures (a); TGA curves of EC and the dried graphene ink (b).

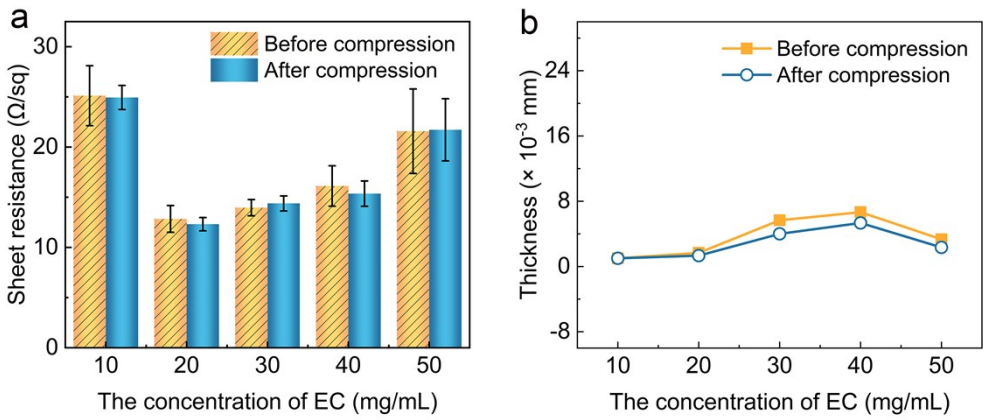

Fig. S4 Sheet resistances (a) and thickness (b) of graphene films with different EC concentrations before and after compression.

Table S1 Summarizing the conductivities of the graphene inks prepared by liquid-phase exfoliation in literature.

Ink formulation	Preparation method	Conductivity	Refer
Graphene/NMP	Tip sonication	3×10^3 S/m	[S1]
Graphene/EC	Sonication	1.86×10^4 S/m	[S2]
Graphene/CMC/SDC	Microfluidization	2×10^4 S/m	[S3]
Graphene/EC/terpineol/ethanol	Sonication	2.35×10^3 S/m	[S4]
Graphene/EC	Sonication	2.9×10^3 S/m	[S5]
Graphene/EC/cyclohexanone	Ultrasound-assisted supercritical CO_2	9.24×10^3 S/m	[S6]
Graphene/EC/cyclohexanone/terpineol	Shear	~2.56×10^4 S/m	[S7]
Graphene/(Hydroxypropyl) methyl cellulose/2, 3-Butanediol	Shear	3×10^4 S/m	[S8]
Graphene/EC	Shear	4.0×10^4 S/m	[S9]
Graphene/NC/lactate/octyl Acetate/ethylene Glycol diacetate	Shear	4.0×10^4 S/m	[S10]
Graphene/EC	Microfluidization	9.7×10^4 S/m	This work

The symbol "~" was used to indicate the datum is an approximate value.

NMP: N-Methyl pyrrolidone.

EC: Ethyl cellulose.

CMC: Carboxymethyl cellulose.

SDC: Sodium deoxycholate.

NC: Nitrocellulose.

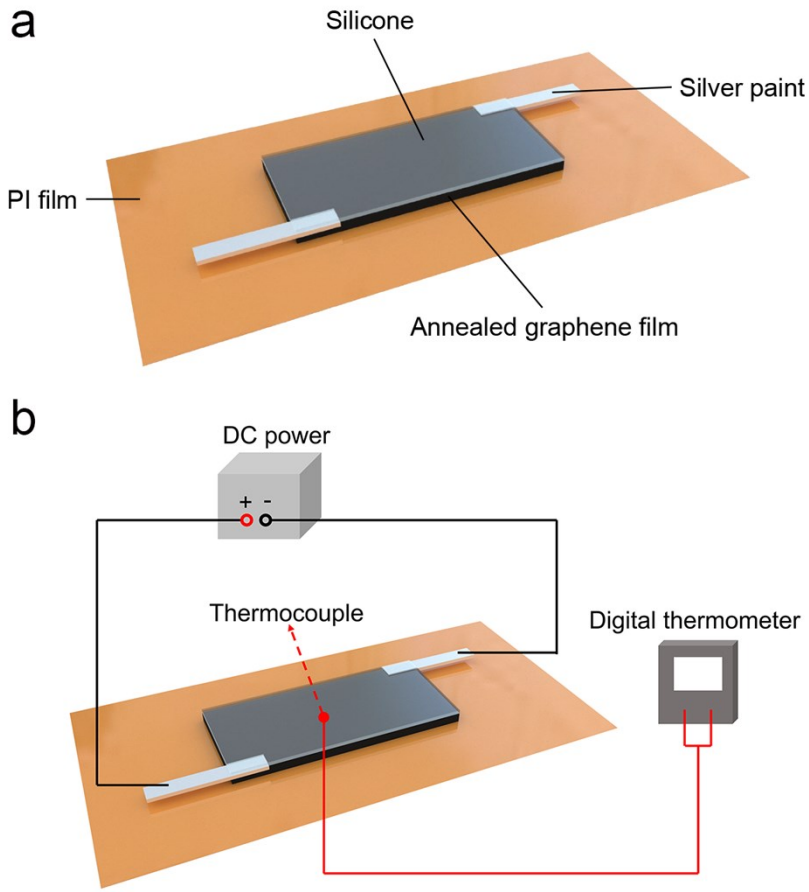

Fig. S5. The schematic diagrams of the structure (a) and heating system (b) of the graphene film heater.

References

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