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Supporting Information

Rapid formation of superelastic 3D reduced graphene oxide networks with simultaneous removal of HI utilizing NIR irradiation

Qiuwei Shi,[a] Chengyi Hou,[a] Hongzhi Wang,*[a] Qinghong Zhang[b] and Yaogang Li*[b]

[a] *State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Materials Science and Engineering, Donghua University, Shanghai 201620, P. R. China. E-mail: wanghz@dhu.edu.cn; Fax: +86-021-67792855; Tel: +86-021-67792881*

[b] *Engineering Research Center of Advanced Glasses Manufacturing Technology, Ministry of Education, College of Materials Science and Engineering, Donghua University, Shanghai 201620, P. R. China. E-mail: yaogang_li@dhu.edu.cn; Fax: +86-021-67792855; Tel: +86- 021-67792526*

Supplementary Information 1: Low magnified view of cross-sectional SEM images of GF

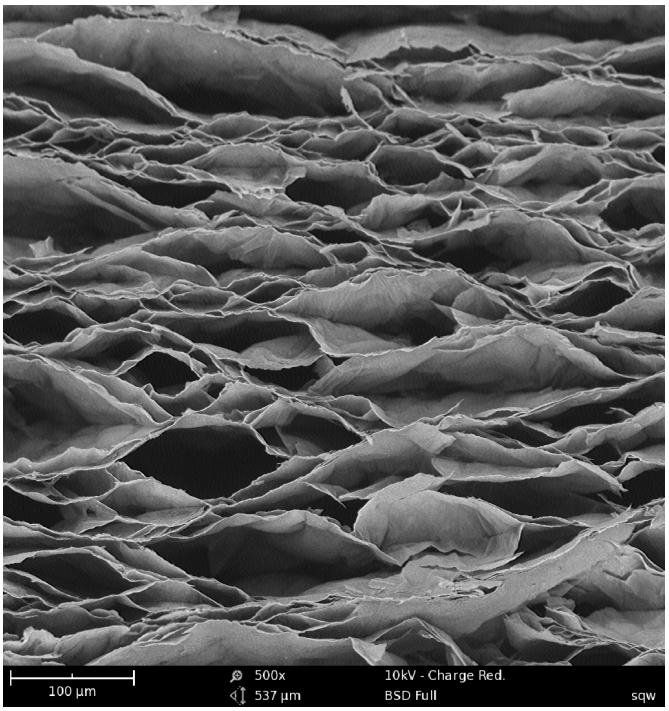

Fig. **S1** Low magnified view of cross-sectional SEM image of GF irradiated by 4 W/cm^2 NIR light for 5 s.

The SEM image was characterized by Phenom G2 Pro Scanning electron microscopy at 10.0 kV.

Supplementary Information 2: EDS spectra of the top and bottom surface of the GF**1**

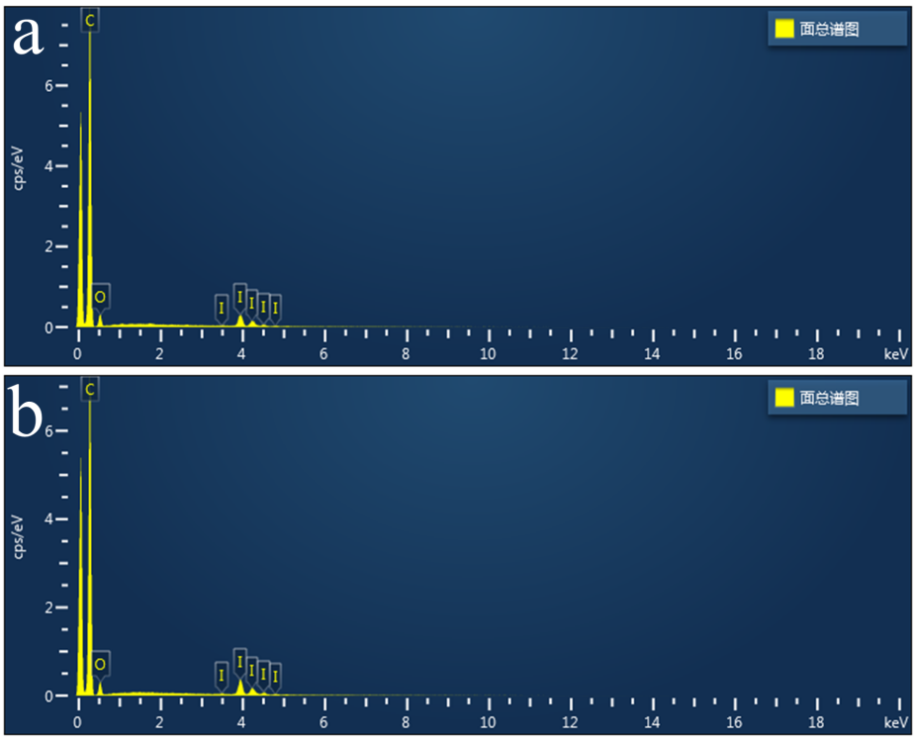

Fig. **S2** EDS spectra of the top (a) and bottom (b) surface of the GF**1**. The result from the EDS spectrum in Fig. S2 shows that the elemental mass of C, O, I in top and bottom of GF**1** was no obvious difference.

Energy dispersive X-ray spectrum of each element was obtained using a JSM-6700F FESEM equipped with an Oxford Instruments EDS detector.

Supplementary Information 3: Brunauer-Emmett-Teller (BET) analysis of GF**1**

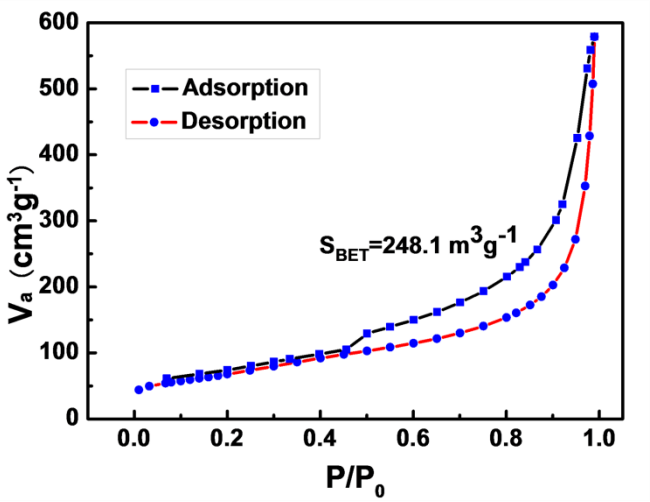

Fig. S3. N_2 adsorption-desorption isotherms of the sample of GF**1** (irradiated by NIR laser with power density is 4 W/cm^2).

N_2 adsorption-desorption isotherms curve of the porous structure GF which was prepared by NIR laser irradiation (power density: 4 W/cm^2) is illustrated in Fig. S2. On the basis of the IUPAC nomenclature, the porous structure GF**1** perform a type IV isotherm, with type H1 hysteresis loops for the relative pressure P/P_0 in the range 0.45–1.0.[1] Furthermore, the Brunauer-Emmett-Teller (BET) analysis exhibits that the specific surface area of the porous structured GF**1** is up to 248.1 m^2/g.

The specific surface area of the graphene foam was tested using physical adsorption of N_2 at liquid-nitrogen temperature on an automatic volumetric sorption analyzer ASAP 2020.

References

1. P. J. M. Carrott, R. A. Roberts and K. S. W. Sing, *Carbon*, 1987, **25**, 59.

Supplementary Video S1. A real-time view of formation process of 3D graphene networks, showing iodine vapor releasing.

Supplementary Video S2. A real-time view of formation process of 3D graphene networks, showing that the released iodine vapor rendered starch iodide paper blue.

Supplementary Video S3. A real-time thermal imaging of formation process of 3D graphene networks, showing that its surface temperature changed remarkably.