Supporting Information

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

Qiuwei Shi, Chengyi Hou, Hongzhi Wang,* Qinghong Zhangb and Yaogang Li*

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/cm² 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 GF1

Fig. S2 EDS spectra of the top (a) and bottom (b) surface of the GF1. The result from the EDS spectrum in Fig. S2 shows that the elemental mass of C, O, I in top and bottom of GF1 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 GF1

![BET isotherm graph](image)

**Fig. S3.** $N_2$ adsorption-desorption isotherms of the sample of GF1 (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 GF1 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 GF1 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**

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.