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Electronic Supplementary Information (ESI)

Smart Electrochromic Supercapacitors Based on Highly Stable Transparent Conductive Graphene/CuS Network Electrodes

Peijian Yao[+a], Shuyao Xie[+a], Meidan Ye[a], Rui Yu[a], Qian Liu[a], Dandan Yan[a], Weiwei Cai[a], Wenxi Guo[a] and Xiang Yang Liu*[ab]*

[a]Research Institute for Soft Matter and Biomimetics, Fujian Provincial Key Laboratory for Soft Functional Materials Research, College of Materials, Department of Physics, Xiamen University, Xiamen 361005, China.

[b]Department of Physics, Faculty of Science, National University of Singapore, Singapore, 117542, Singapore

+ Authors contributed equally to this work.

* Corresponding authors. E-mail: wxguo@xmu.edu.cn, phyliuxy@nus.edu.sg

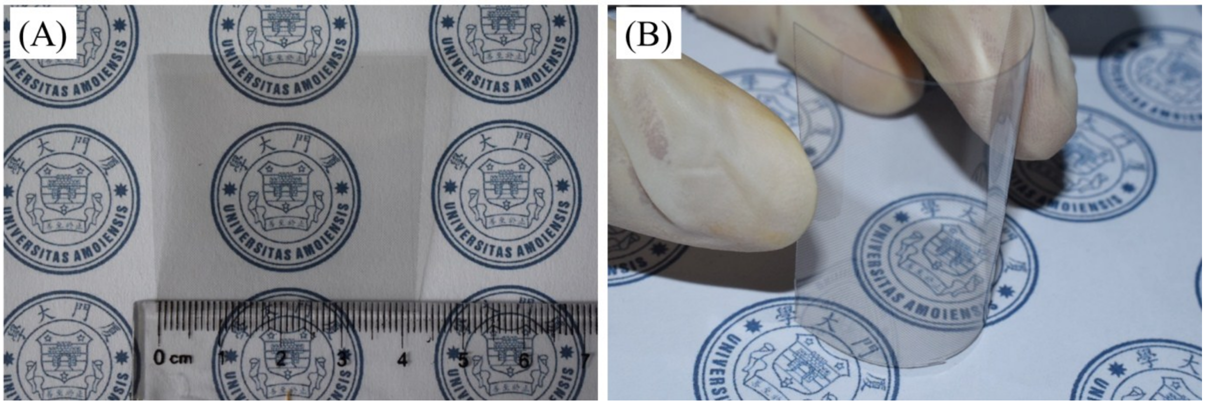

Fig. S1 Photographs of G-GuS samples with a size of about 4 × 4 cm^2 in forms of (a) plane and (b) bend.

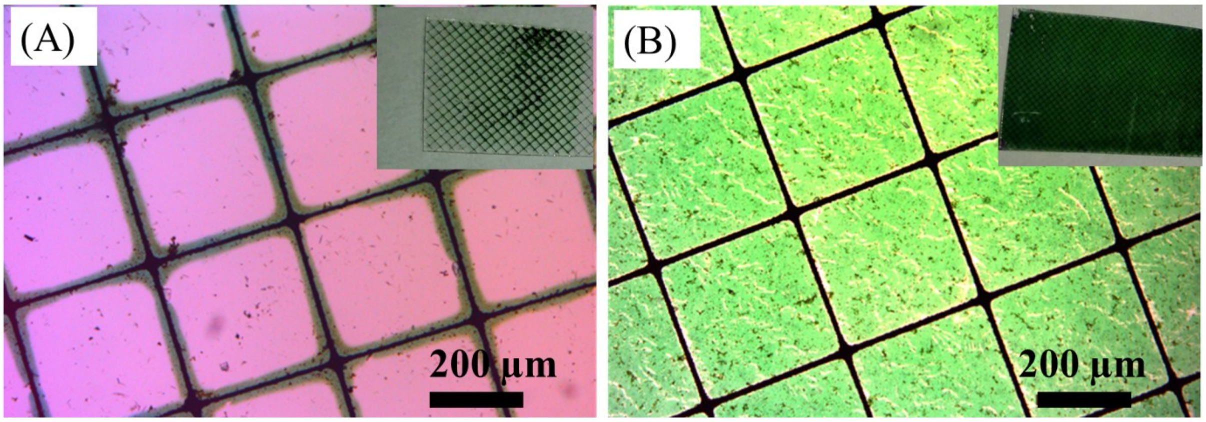

Fig. S2 Optical microscope images (inset photographs took by a cell phone) of PANI electrodeposited on (a) CuS and (b) G-CuS.

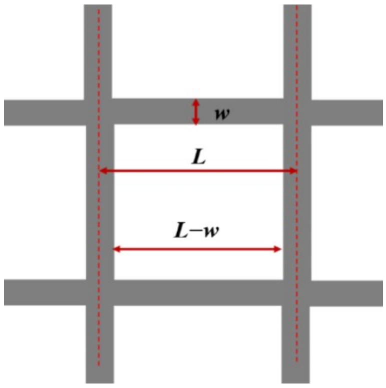

Fig. S3 Parameters for a metal grid film: L is the center-to-center spacing, and w is the width of grid line. The theoretical transmittance (T%) of the metal grid film can be calculated on the basis of the design shown in Fig. S3[1]:

$$T\% = \frac{A_{\text{empty}}}{A_{\text{total}}} \times 100\% = \frac{(L-w)^2}{L^2} \times 100\% \tag{1}$$

where A_{empty} refers to the empty area covered without grid lines, and A_{total} is the total area, and L is the center-to-center spacing, and w is the grid line width.

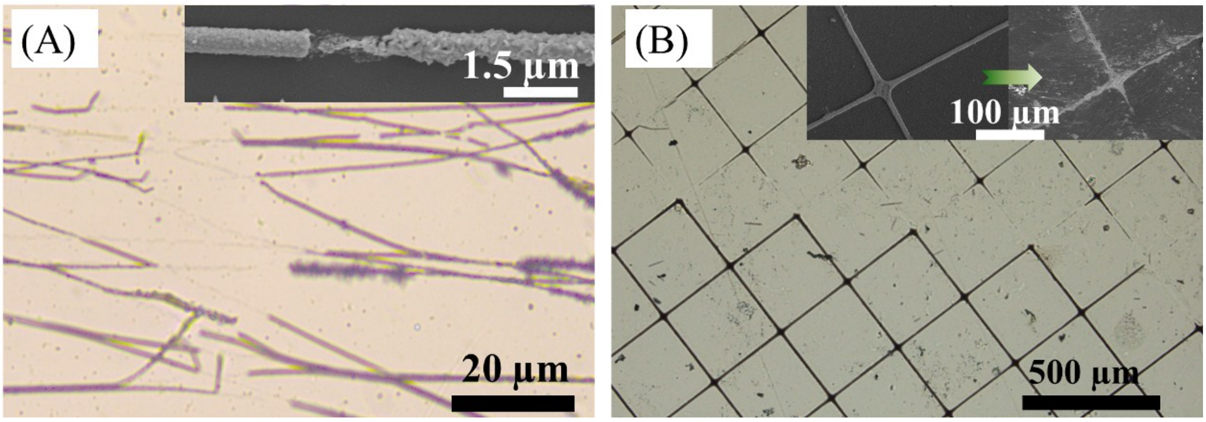

Fig. S4 (a) An optical microscope image of Ag network after electrodeposition for 22 s under a galvanostatic current density of 0.1 mA cm^{-2} in 0.5 M H_2SO_4 aqueous solution containing 0.2 M aniline. Electrolysis took place in Ag fibers, and the SEM image (inset) clearly revealed that an Ag fiber was oxidized to break. (b) An optical microscope image of G-Cu after electrodeposition for 980 s. The Cu grids were broken because of electrolysis as shown by inset SEM images.

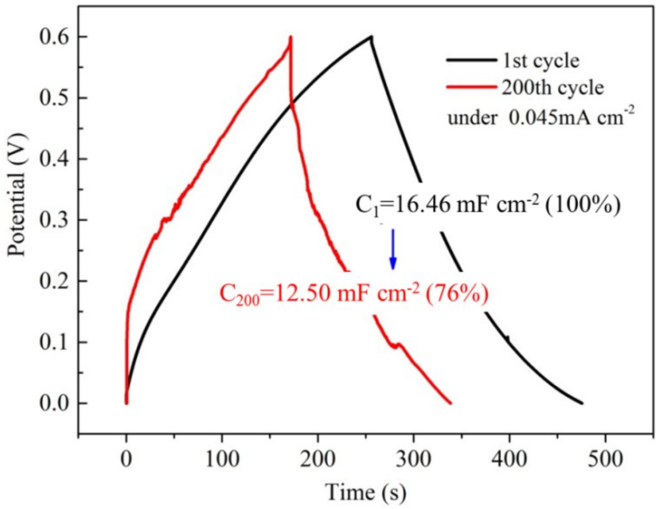

Fig. S5 Galvanostatic charge-discharge cyclic curves of G-CuS/PANI in the potential range of 0 to 0.6 V under a current density of 0.045 mA cm^{-2} for 200 cycles.

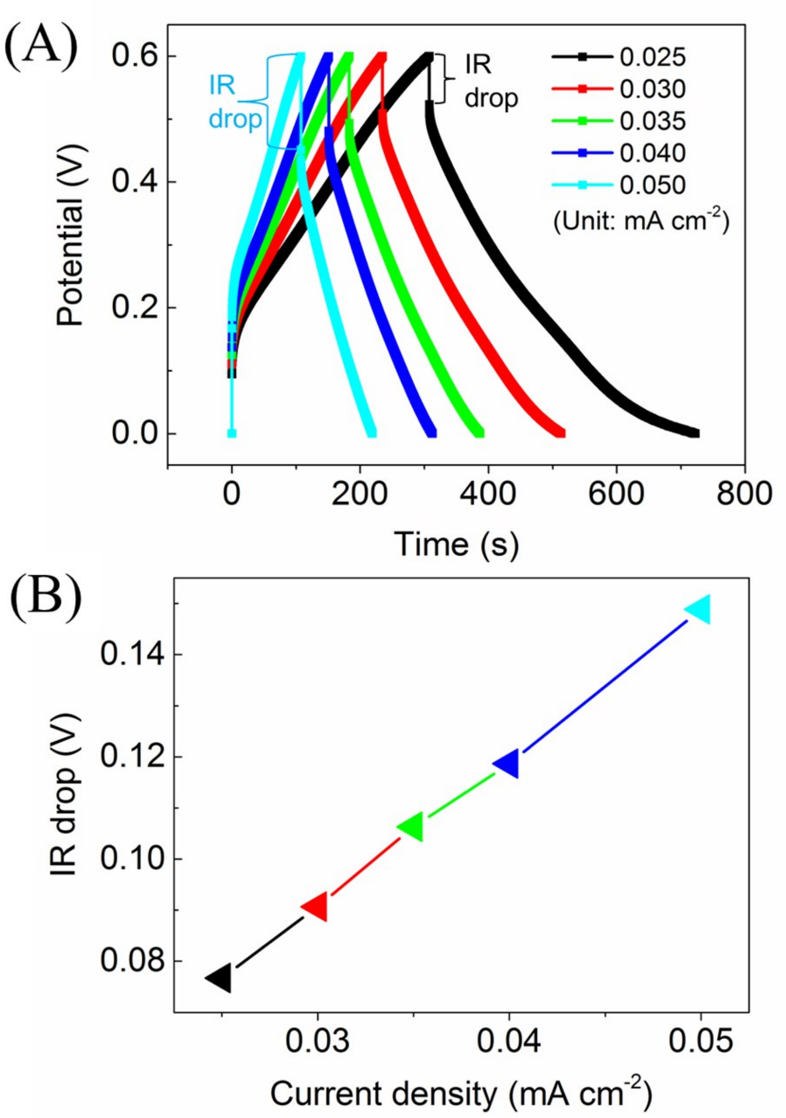

Fig. S6 (a) IR drops in galvanostatic charge-dischare curves at the different current densities. (b) IR drop of G-CuS/PANI as a function of the current density.

Reference

1. Y. Zhu, Z. Sun, Z. Yan, Z. Jin and J. M. Tour, *ACS Nano*, 2011, 5, 6472-6479.