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

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**Fig. S1** Photographs of G-GuS samples with a size of about $4 \times 4$ 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\(^1\):

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

(1)

where $A_{\text{empty}}$ refers to the empty area covered without grid lines, and $A_{\text{total}}$ 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\(_2\)SO\(_4\) 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-discharge curves at the different current densities. (b) IR drop of G-CuS/PANI as a function of the current density.

Reference
