Supporting information

Stretchable flexible electrodes based on in situ coating of graphite with PANI

Yan Peng[1], Siyu Xie[1], Xiaofan Zhu[1], Yuke Deng[3], Weiwei Guo[1], Yuxiao Zhang[2, †], Yue Liu[1, †]

[1]College of Materials Science and Engineering, Kunming University of Science and Technology, Kunming 650093, P. R. China

[2]Institute of Atomic Manufacturing, Beihang University, Beijing 100191, P. R. China

[3]Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, Beijing 101400, P. R. China

Yan Peng and Siyu Xie contributed equally to this work and should be considered as co-first authors.

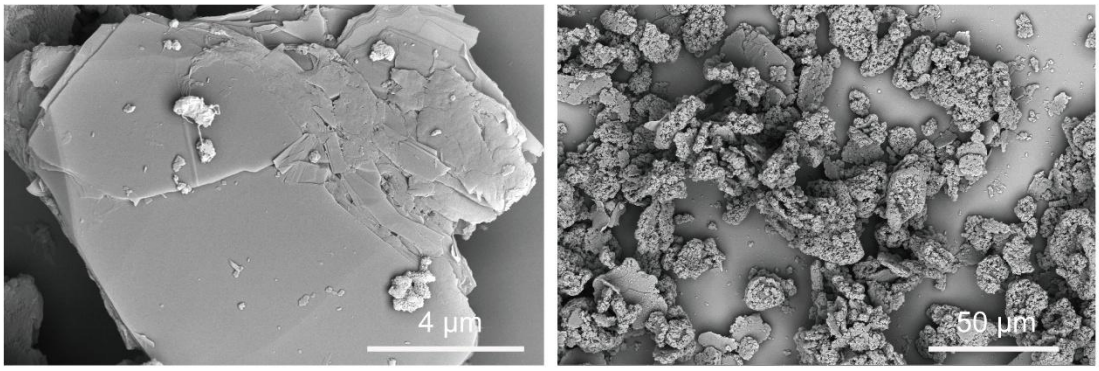

Fig. S1. (Color online) SEM image of the graphite powder surface and PANI@G at low magnification.

For the standard preparation batch, 0.10 g of graphite and 0.50 g of aniline were used, corresponding to a total graphite-and-aniline feed mass of 0.60 g. After polymerization, filtration, washing, and vacuum drying, 0.48 g of dry PANI@G product was recovered. The isolated solid recovery was therefore calculated as:

$$Y_{isolated}=\frac{0.48}{0.10+0.50}\times 100\%=80\%. \quad \text{(Eq. S1)}$$

† Correspondence to: Yuxiao Zhang, Email:1310114565@qq.com Yue Liu, Email: liuyue2023@kust.edu.cn

The product was collected using a 0.22 μm PTFE membrane. No graphite breakthrough was observed during filtration, and graphite loss through the membrane was therefore considered negligible under the present operating conditions. On this basis, the graphite mass retained in the recovered product was taken as approximately 0.10 g, while the remaining 0.38 g was assigned operationally to the PANI-derived solid fraction. The apparent mass fractions were therefore estimated as approximately 20.8 wt% graphite and 79.2 wt% PANI-derived material:

$$W_{PANI\text{-}derived}=\frac{0.48-0.10}{0.48}\times 100\%=79.2\%. \quad \text{(Eq. S2)}$$

We emphasize that 79.2 wt% is an operational mass-balance estimate rather than an exact molecular-level PANI composition or aniline conversion. The oxidative polymerization process, removal of soluble low-molecular-weight oligomers during washing, and possible contributions from the protonation/deprotonation state of PANI may affect the final dry mass. The unrecovered mass is therefore attributed primarily to soluble low-molecular-weight PANI oligomers and other soluble species removed during washing, rather than to graphite leakage through the filter.

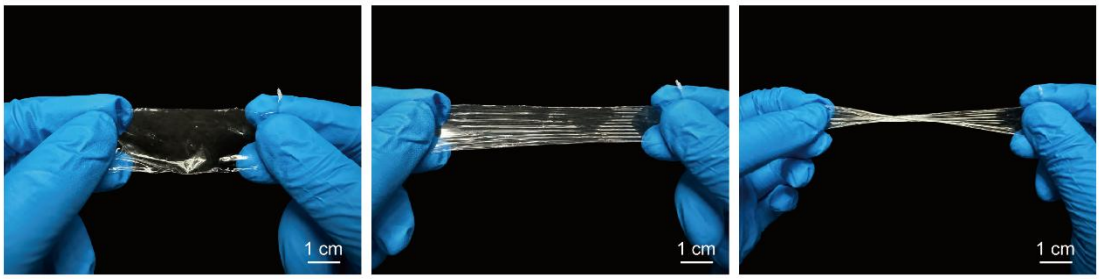

Fig. S2. (Color online) Stretching and torsion of the SEBS substrate.

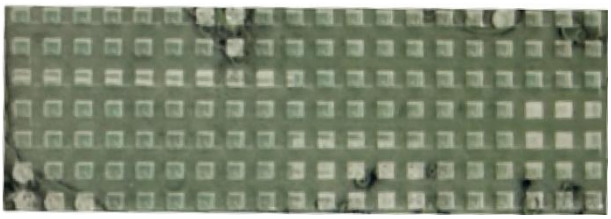

Fig. S3. (Color online) Photograph of laser-patterned grid electrodes.