Flexible Energy Storage Devices Based On Graphene Composite Fibers

Wei Weng
Junjie Yang, Yang Zhang, Guoyin Chen, Wujun Ma, Shaohua Chen, Meifang Zhu

Donghua University, 2999 North Renmin Road, Songjiang district, Shanghai, China

gotovic@163.com

Nowadays, flexible electronics is a hotspot worldwide. As an indispensable component, flexible energy storage devices (FESDs) serving as the power system has witnessed a tremendous advance over the decade. Among a variety of formats, FESDs in fiber or textile shape characterized with high flexibility and wearability are deemed as a promising one.

As for the materials, graphene has been actively studied in the FESDs since its advent in 2004. And after 2011, when the graphene fiber was worked out for the first time, much effort has been devoted to the application of the graphene fibers in FESDs. However, because the graphene nanosheets are prone to self-stacking and crumple, the electrochemical properties of the primary graphene fibers are poor or mediocre. To this end, various structures have been engineered together with diverse fillers.

Here, some typical graphene composite fibers proposed by our lab are introduced. Firstly, graphene composite fibers with highly active fillers, e.g., MnO_2 and activated carbon, were presented.[1, 2] Secondly, graphene composite fibers with non-active fillers, e.g., PVA polymer and Ag nanowire, were illustrated.[3] Their electrochemical performance was enhanced by improving the properties of wettability and conductivity. Thirdly, graphene composite fibers with designed structures were addressed, e.g., alignment and porosity.[4, 5]

References

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Figures

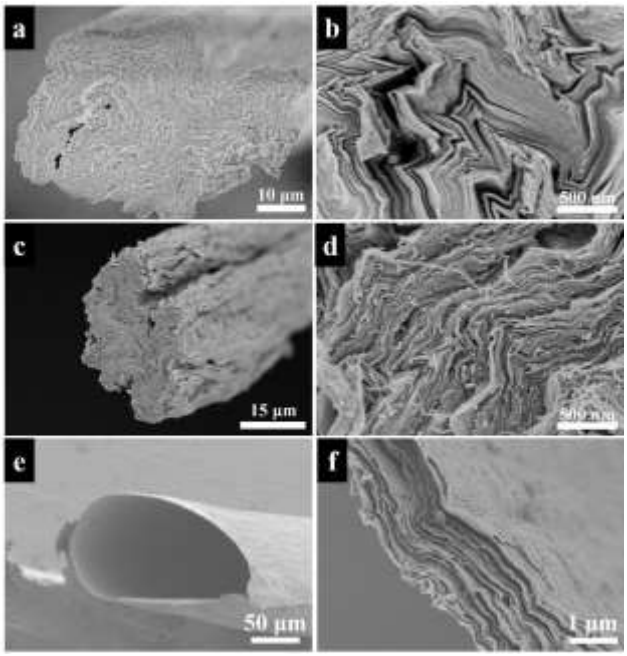

Figure 1: graphene fiber (a and b), graphene/CNT composite fiber (c and d), graphene hollow fiber (e and f).