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Graphene Composite Fibers for Flexible Supercapacitors

Abstract
Flexible energy storage devices are indispensable for flexible and wearable electronics. As the prevailing type, flexible supercapacitors have attracted much attention over the last decade.[1] Among them, fiber-shaped supercapacitors may possess an inherent advantage in flexibility, which can be facilely woven into clothing.[2] To this end, various fibers have been utilized, e.g., metal fibers, chemical fibers, carbon fibers, carbon nanotube fibers and graphene fibers.[2] Here, we would like to introduce some progress on graphene composite fibers for fiber-shaped supercapacitors in our lab. Graphene, a superior material for electrochemical energy storage, however suffers some problems that prevent graphene fibers from high electrochemical properties. The first one is the re-stacking of graphene sheets in the process of fiber formation, leading to a largely deteriorated performance. Therefore, some nanofillers are introduced between graphene sheets to make full use of graphene and/or in the meantime the nanofibers make a contribution to the whole energy output.[3, 4] The second problem is the hydrophobic character of graphene sheets that hinders the wetting of graphene sheets by electrolytes. This can be addressed by adding hydrophilic components.[5] In addition, several facile methods of fabricating graphene composite fibers are illustrated herein.

References

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[4] Chen, G., T. Chen, K. Hou, W. Ma, M. Tebyetekerwa, Y. Cheng, W. Weng, and M. Zhu, ***Carbon***, **2018**, 127, 218-227.
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Figures

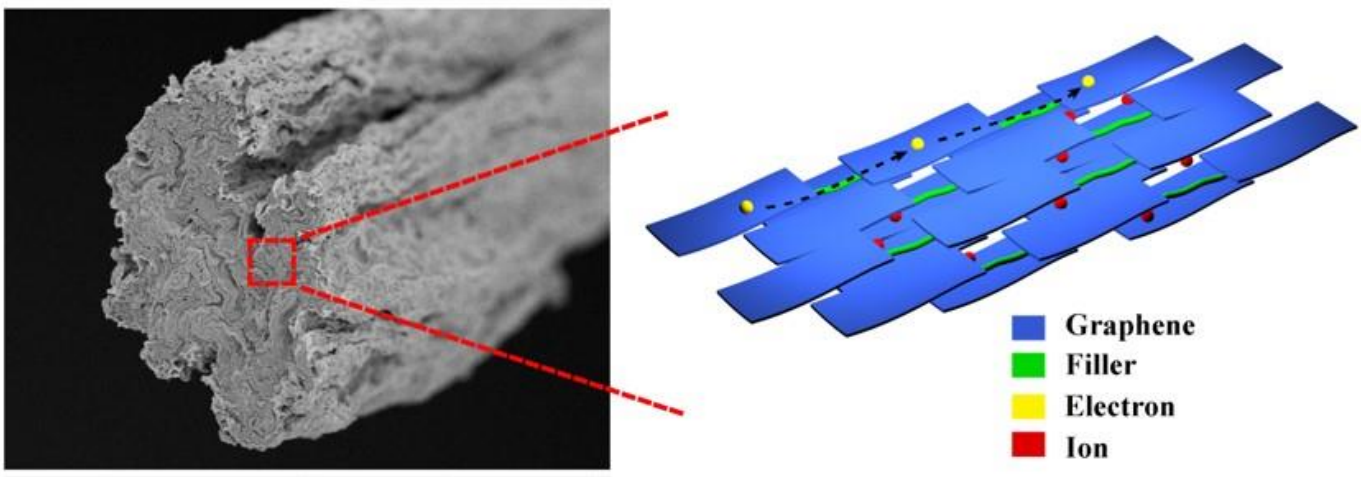

Figure 1: SEM image and scheme of graphene composite fiber.