Highly flexible and shape-persistent graphene microtube and its application in supercapacitor

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Abstract

Graphene microtube has a robust potential application in gas separation, catalysis, water treatment and electronics. At present it remains two big challenges: high persistence of the tubular structure and high quality of the microtube. Here, a novel electrochemical technique was proposed, in which graphene oxides can be simultaneously deposited and reduced on a template wire at room temperature. After removing the template, the tubular structure was formed and complied well with the shape of the template. Moreover, the tube wall is composed of highly aligned graphene sheets. These combined characters bring about excellent flexibility and electrochemical properties, e.g., the specific capacitance of the graphene microtube is 2.5 times the value of the graphene fiber with the same sectional area.

References

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Figures

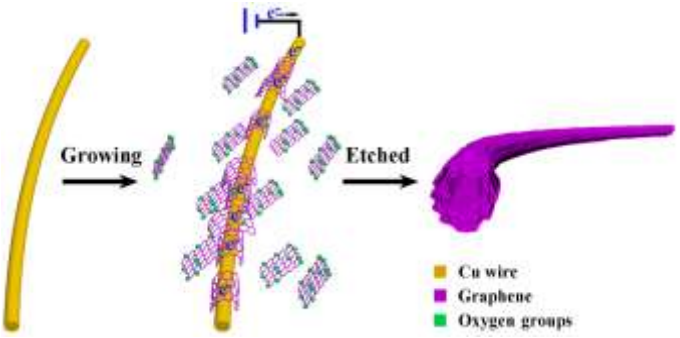

Figure 1: Preparation scheme of the electrochemically grown graphene microtube.

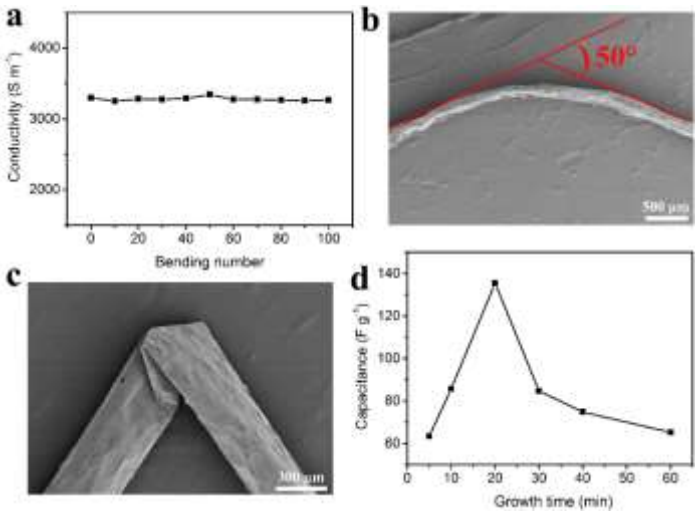

Figure 2: Dependence of the conductivity of graphene microtube on the bending number with a bending angle of 50° (a). SEM morphology of the bent graphene microtube after 100 times of bending with an angle of 50° (b). SEM morphology of the folded graphene microtube (c). Dependence of the specific capacitance of the graphene microtube on the growth time (d). The current density was 0.1 A g-1.