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Two-Dimensional Pseudocapacitive Nanosheets for All-Solid-State Micro-Supercapacitors

Two-dimensional (2D) pseudocapacitive materials, characterized by nanoscale dimension in thickness, infinite length in the plane and reversible redox reactions, are currently regarded as groundbreaking electrode candidates for micro-supercapacitors (MSCs). Here, we synthesized ultrathin MnO_2 nanosheets and mesoporous polypyrrole-based graphene nanosheets uniformly anchored with redox polyoxometalate (mPPy@rGO-POM). Further, a novel and universal mask-assisted filtration technology for the simplified fabrication of all-solid-state planar MSCs was developed. Remarkably, the resulting MSCs exhibited outstanding areal capacitance and volumetric capacitance, exceptionally mechanical flexibility, excellent cyclability and impressive serial or parallel integration for modulating the voltage or capacitance.

References

[1] Qin, J.Q., Wu, Z.-S.*, Zhou, F., Dong, Y.F., Xiao, H., et al. Chinese Chemical Letters, 29 (2018), 582-586.
[2] Qin, J.Q., Zhou, F., Xiao, H., Ren, R.Y., Wu, Z.-S*. Science China Materials, 61 (2017), 233-242.

Figures

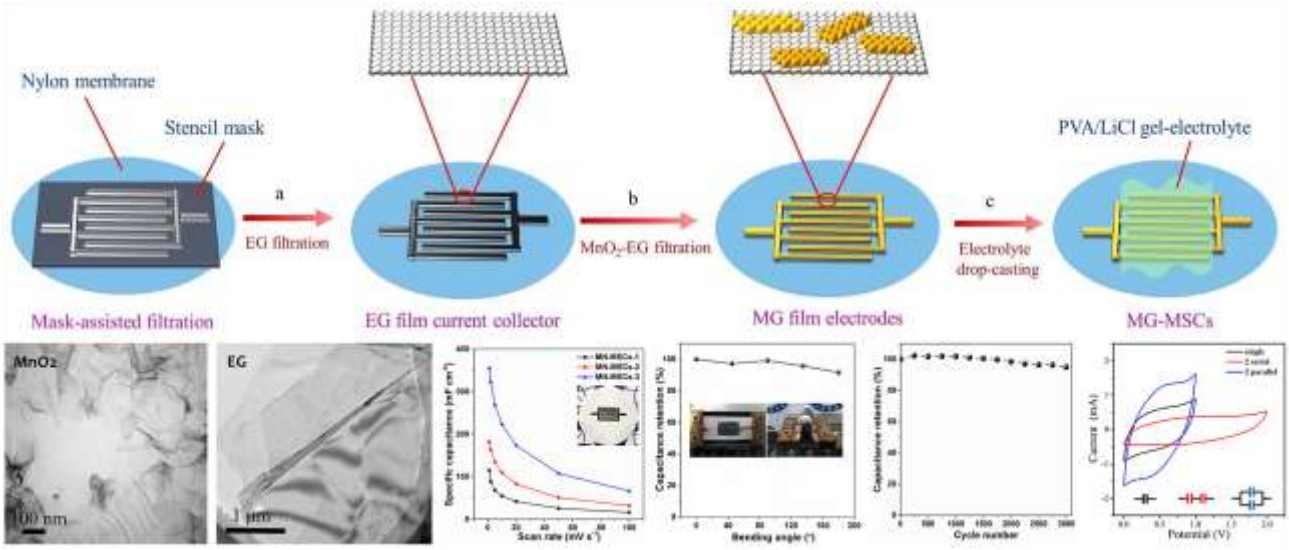

Figure 1: Fabrication schematic, materials characterizations and electrochemical performance of all-solid-state planar MSCs based MnO_2 nanosheets.

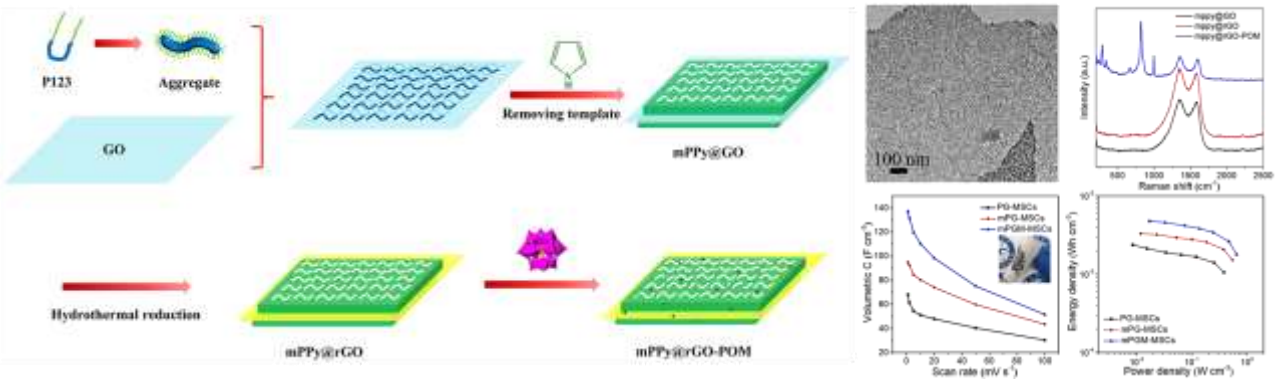

Figure 2: Materials synthesis and characterizations of mesoporous polypyrrole-based graphene nanosheets anchoring redox polyoxometalateand for all-solid-state planar MSCs.