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MOF derived interconnected structured porous carbon for high-performance supercapacitor

The accessible surface area, conductivity, and pore size of carbon materials determine the capacitive performance. Although metal-organic frameworks (MOF) derived porous carbon has been widely used as electrode materials for supercapacitor, the limited ion diffusion/transportation as well as relatively low conductivity have hampered its high capacitance achieved.[1] To address this issue, an interconnected hierarchical nanoporous carbon structure (HNPC) derived from nanosized MOF crystals is proposed, which presents high ion-accessible surface area and ion diffusion/transportation rate as well as enhanced electric conductivity. Benefiting from the interconnected structure, the resulting HNPC exhibits an ultrahigh capacitance in both aqueous electrolyte and organic electrolyte. More importantly, the high energy density, excellent long-term cycle stability are achieved. This simple and cost-effective process can be readily scaled up to produce HNPC materials commercially.

References

[1] Shuai Zhang, Xuecheng Chen, Ewa Mijowska, Electrochimica Acta 269 (2018) 580-589.

Figures

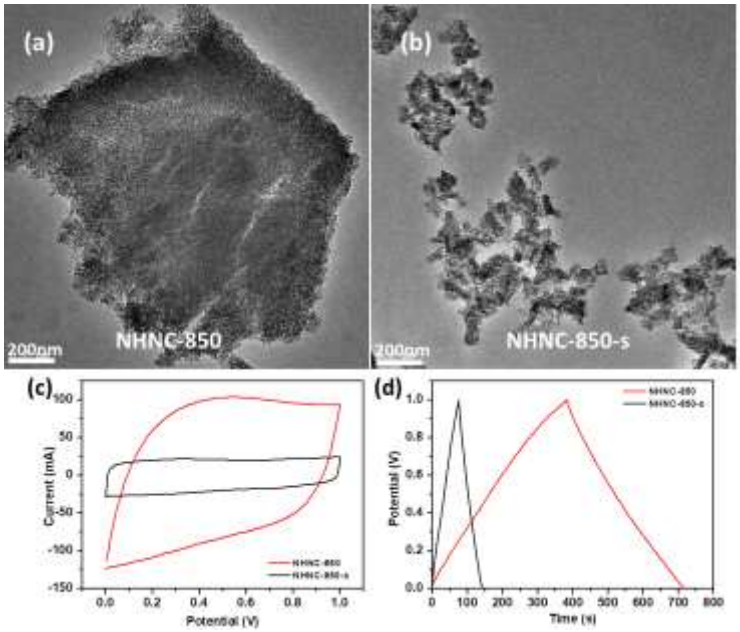

Figure 1: TEM images of (a) HNPC with interconnected structure (b) HNPC with separated structure. Electrochemical performance of HNPC with interconnected and separated structure of (c) CV cures (d) Charge/discharge profiles.