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MnO_2-decorated 3D porous carbon skeleton derived from mollusc shell for high-performance supercapacitor

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Abstract：A three-dimensional porous carbon skeleton with hexagonal channels was synthesized by using mollusc shell as the carbon source. The obtained mollusc shell based macroporous carbon material (MSBPC) has high conductivity and is very favorable for use in the electrolyte penetration and electron transfer, making it an excellent carbon substrate for composite electrode materials. After incorporation of MnO_2 nanosheets, the MSBPC/MnO_2 was synthesized and applied in supercapacitors, which exhibited a high specific capacitance of 386 F g^{-1} at 1 A g^{-1} with an excellent rate performance (278.7 F g^{-1} at 10 A g^{-1}), and outstanding cycling stability, with a capacitance retention of 83% after 5000 cycles at 20 A g^{-1}. The good electrochemical performance indicates the high potential of the prepared MSBPC/MnO_2 as a novel supercapacitor electrode material with a high power density, excellent long life cycling, and environmental friendliness.