Self-standing binary metal phosphide for high-performance supercapacitive energy storage

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Ever-widening energy paucity has drawn considerable research attention towards electrochemical capacitors. Highly conductive metal phosphides have emerged as excellent electrode material for electrochemical capacitors. Herein, we report the synthesis of binder-free nanowire nickel cobalt phosphide by hydrothermal process followed by phosphine treatment. As prepared electrode delivered specific capacitance of 2566 F g-1 at 1 A g-1 and retained 1415 F g-1 at 10 A g-1 showing good rate capability. The congregated asymmetric supercapacitor yielded an energy density of 39.7 Wh Kg-1 at a power density of 798.6 Wkg-1 and 16.8 Wh Kg-1 at 7957.8 WKg-1 with an appealing cyclic stability of 84% after 10,000 cycles. The excellent supercapacitive properties of as-prepared binary metal phosphide confirms its worth for widespread practical application for electrochemical capacitors.