Asymmetric Supercapacitors with High Energy and Power Density Fabricated Using LiMn_2O_4 Nano-rods and Activated Carbon Electrodes

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A novel asymmetric Li ions supercapacitor was fabricated using LiMn_2O_4 nano-rods and activated carbon (AC) electrodes as cathode and anode, respectively. The LiMn_2O_4 nano-rods that derived from $\beta\text{-MnO}_2$ nano-rods not only provide more active sites for charge-transfer reaction, but also served as an energy source to supply a high energy density. The test results showed that the highest energy density of Li ions supercapacitor at the rate of 30 C achieved 33.16 Wh/kg, which was closed to 2.04 times than that of AC/AC supercapacitor. Meanwhile, a large power density had been sustained. In addition, because of low cost and toxicity, easy synthesis, and an abundant resource of LiMn_2O_4 , this novel asymmetric Li ions supercapacitors could be considered as promising energy storage devices for next generation supercapacitors.

Keywords: $\beta\text{-MnO}_2$ nanorods; LiMn_2O_4 nanorods; activated carbon; asymmetric supercapacitor

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