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Novel Carbon Nanoscale Architectures for Supercapcitors[1]
GUANHUA ZHANG, 1.Departments of Physics, Arizona State University, Tempe, Arizona 85287, USA 2.School of Physics and Electronics, Hunan University, Changsha 410082, HUIGAO DUAN, School of Physics and Electronics, Hunan University, Changsha 410082, PR China, JINGYUE LIU, Departments of Physics, Arizona State University, Tempe, Arizona 85287, USA — Supercapacitors have received considerable attention because of their high power density, fast recharge capability and long cycle life. Hierarchically structured carbons are highly desirable because of their potential to provide high capacitance and good rate capability. To fabricate such structures, however, is complicated, expensive, and time-consuming. We recently developed a novel synthesis approach to fabricate three-dimensionally patterned growth of hollow carbon arrays (CNTAs) on a flexible carbon fibers (CFs) substrate. The facile synthesis protocol is repeatable, scalable and easy to process. The CNTAs@CFs were directly used as integrated electrodes for supercapacitors and exhibited a high specific capacitance of 200 F/g at 20 A/g in 6 M KOH aqueous solution, and an excellent cycling ability with a 98% of the initial capacitance remained after 4000 cycles. Moreover, the capacitance still maintained 182 F/g even when the current density increased to 40 A/g. The CNTAs@CFs electrodes without the use of any auxiliary materials are expected to open up new opportunities for carbon-based materials to power flexible electronic devices.

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