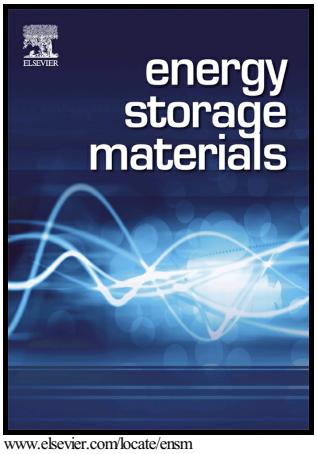

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Abstract

Wearable electronic devices (WED) require flexible, stable, and long-lasting power sources for their ever-expanding functionalities. Fiber-based micro-supercapacitors (FMSCs) are promising power solutions for novel WEDs because of their mechanical flexibility, small size and good integrability. Various porous carbon fibers have been explored as electrodes for FMSCs. However, current FMSCs often show poor rate capability due to modest electrical conductivity in fiber electrodes. Here, we demonstrate the synthesis of a micro-nano-integrated core-sheath fiber comprised of a microscale core made of commercial graphite fibers and a nanoscale hybrid sheath comprised of nitrogen doped graphene oxide sheets and multi-walled carbon nanotubes. The graphite fiber core provides fast electron transfer pathways, while the high surface area nano-hybrid sheath enables efficient capacitive energy storage. The core-sheath fiber achieves more than six times increases in capacitance retention compared to hybrid carbon fibers without the conductive core. Solid-state FMSCs were assembled using the core-sheath fibers as electrodes, which concurrently possess high length