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Ultrahigh volumetric performance of HRGO/MnO_2 hybrid all solid state flexible supercapacitors[1] FATIMA AMIR, Winthrop University, VIET HUNG PHAM, Brookhaven National Laboratory, EVAN SCHULTHEIS, Winthrop University, JAMES DICKERSON, Brookhaven National Laboratory, CFN/WINTHROP UNIVERSITY COLLABORATION — The development of flexible energy storage devices with high energy and high power densities is critical to the emergence of wearable electronics technologies. All solid-state flexible supercapacitors, a subset of these energy storage devices, are believed to be a key solution in powering fast, flexible mobile devices. Herein, we report an easy and low cost method to fabricate bendable holey reduced graphene oxide (HRGO)/manganese oxide (MnO_2) electrodes using electrophoretic deposition. Cross sectional analysis of the layers using scanning electron microscopy (SEM) showed a layer-by-layer deposition. The obtained HRGO/MnO_2 supercapacitor exhibited excellent electrochemical capacitive performance within a $LiClO_4$ gel electrolyte, with a volumetric capacitance ranging between of 608.15F/cm^3 and 233.95F/cm^3 for electrodes masses between 0.2mg and 2.2mg. Additionally, the assembled supercapacitors exhibited an ultrahigh volumetric energy density of 54.06Wh L^{-1}, and a power density of 9221.82 W L^{-1} which is the highest value so far reported for flexible supercapacitors.

[1]U.S. Department of Energy,Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS)

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