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A B S T R A C T:

With rapidly growing commercial markets of portable and flexible electronics, flexible supercapacitors (SCs) have become one of the most promising energy storage devices due to their unique characteristics. However, the low operating voltage and energy densities severely restrict their practical application. At the same time, the liquid-electrolyte has leak issues under deformation, resulting in short circuit of the device. Herein, an all-solid-state novel symmetric supercapacitor is designed based on nanostructured δ-MnO_2@CNTs@sponge electrodes (MCS). The device presents a high voltage (0-2V), remarkable cycle life (>10000 cycles; 94.2% capacitance retention) and high energy (28.5 Wh Kg^{-1} with power density of 2780 W Kg^{-1}). It also processes remarkable compression ability up to 80% with no obvious volume damage. After fully charged with four devices in series, it can easily light up a light-emitting diode (LED) under different compression states without electrolyte leakage. This strategy provides a novel device design method, and can be effectively applied to the future flexible electronic products.

Keywords: Supercapacitors, δ-MnO_2@CNTs@sponge, Compressible, Long cycle life,

1. Introduction