Electronic Supplementary Material (ESI) for Green Chemistry.

Supplementary Information

Fast, Scalable, and Eco-Friendly Fabrication of Energy Storage Paper Electrode

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Table S1. Zeta potential values of GO, cellulose pulp fibers, PEI, and their composite.

	Zeta potential / mV
GO	-35.8
Pulp	-6.13
PEI	36.0
GO/pulp/PEI composite	-0.303

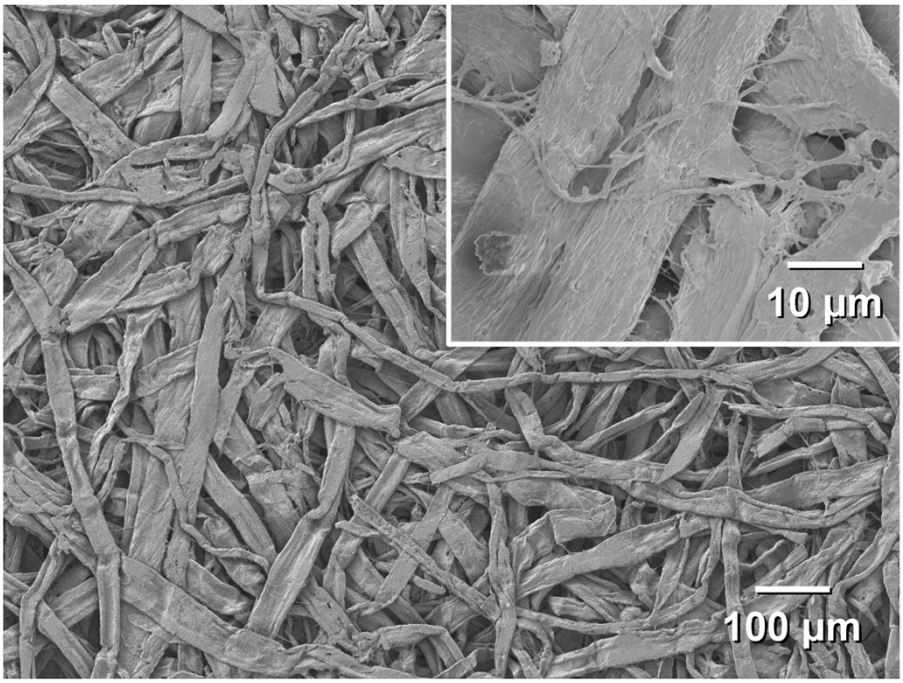

Fig. S1 Field-emission scanning electron microscope image of the cellulose paper without GO. By comparing Fig. 2c with Fig. S1, it was confirmed that GO sheets were embedded into the cellulose paper matrix.

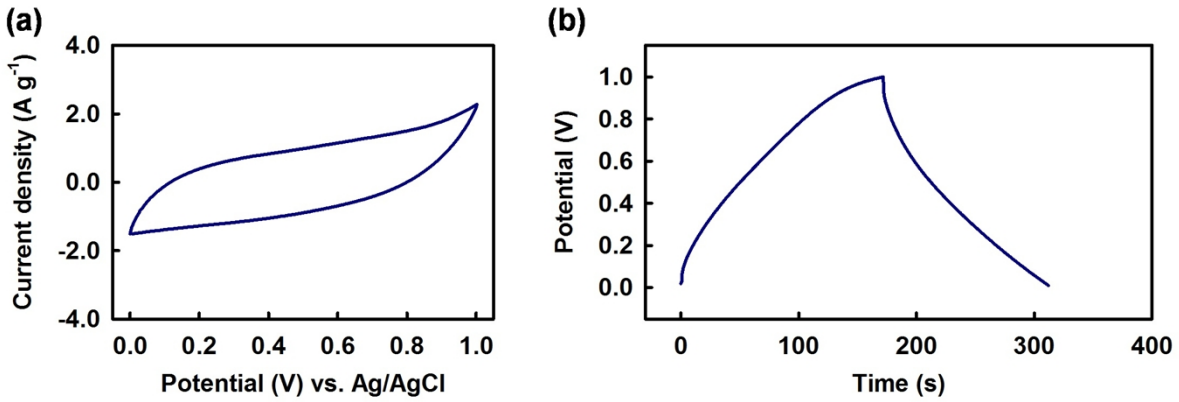

Fig. S2 (a) Cyclic voltammetry curves at a scan rate of 20 mV s^{-1} and (b) charge-discharge curves at current densities of 0.5 A g^{-1} for the rGO/cellulose paper electrode prepared at a flash-reduction time of 0.072 s. The rGO/cellulose paper composite prepared by the flash reduction for 0.072 s demonstrated a rectangular-shaped cyclic voltammetry curve with slight distortion and somewhat non-linear charge-discharge curve, indicating electric double-layer capacitor behavior with slight pseudo-capacitance possibly due to the presence of a few oxygen-containing functional groups. The specific capacitance of the rGO/cellulose paper composite prepared at a flash-reduction time of 0.072 s was ca. 60 F g^{-1}, which was lower than that prepared at 0.036 s (212 F g^{-1}).

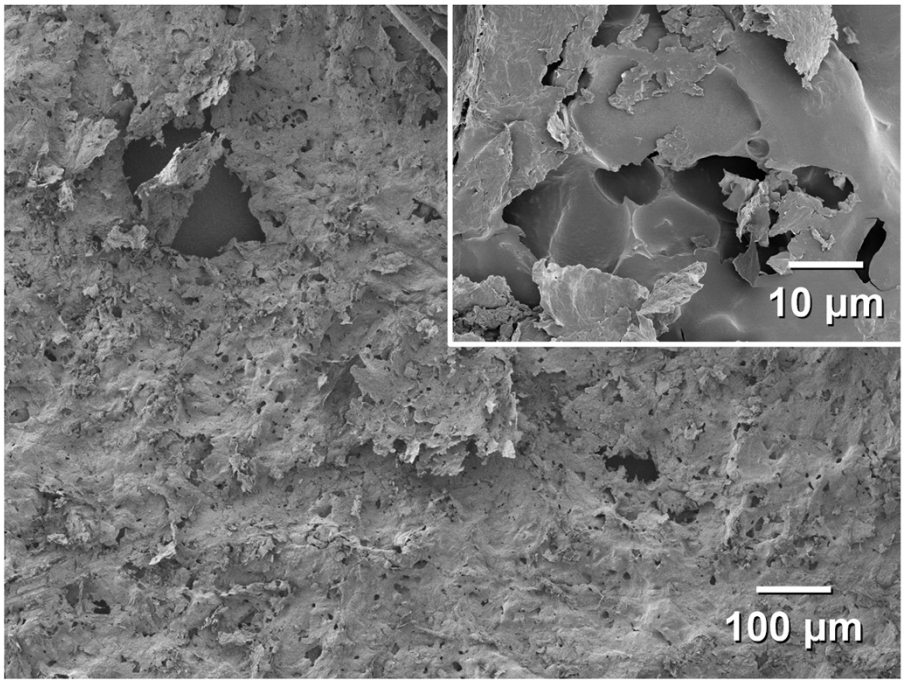

Fig. S3 Field-emission scanning electron microscope image of the rGO/cellulose paper composite prepared at a flash reduction time of 0.072 s. This image suggested that the excess irradiation of the pulsed light could cause the damage to the structure of the rGO/cellulose paper composite.