Electronic Supplementary Material (ESI) for RSC Advances.


Supplementary information for:

# Electrical Characterization of Leaf-based Wires and Supercapacitors

Ramesh Y. Adhikari,[a] Jack Terrell,[a] James Targos,[a] Kenneth A. Huffman,[a,b] Huihui Wang,[b] and Joseph Cradlebaugh[c]

a. Department of Physics
b. Department of Engineering
c. Department of Chemistry

Jacksonville University, Jacksonville, FL 32211, USA

**Corresponding Author:**

Ramesh Y. Adhikari, E-mail address: radhikari@ju.edu

**Current in Charging RC Circuit:** For a charging RC circuit, the current ( $I(t)$) in the circuit at any time ($t$), when a constant voltage is applied, is given as:

$$I(t) = I_0 e^{-t/RC}$$

where, $I_0$ is the initial current in the circuit, $R$ is the resistance of the resistor in the circuit, and $C$ is the capacitance of the capacitor in the circuit.

**Voltage in Charging RC Circuit:** For a charging RC circuit, the voltage ($V(t)$) across the capacitor at any time ($t$), when a constant current is applied, is given as:

$$V(t) = V_0(1 - e^{-t/RC})$$

where, $V_0$ is the initial voltage in the circuit, $R$ is the resistance of the resistor in the circuit, and $C$ is the capacitance of the capacitor in the circuit.

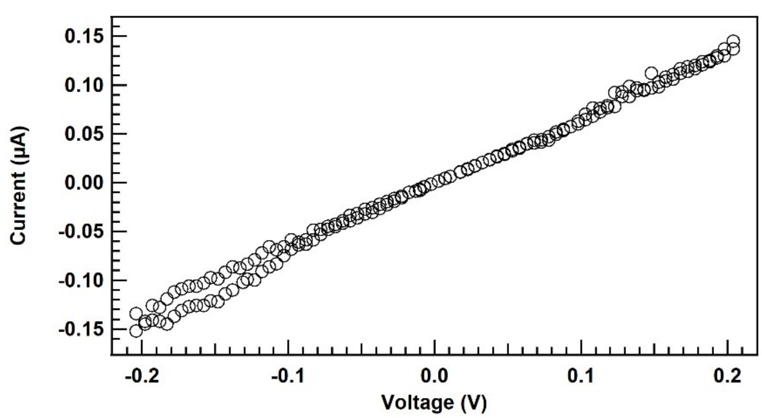


**Fig. S1**: A typical current-voltage sweep through the conducting channel from -0.2 V to 0.2V and back to -0.2V.

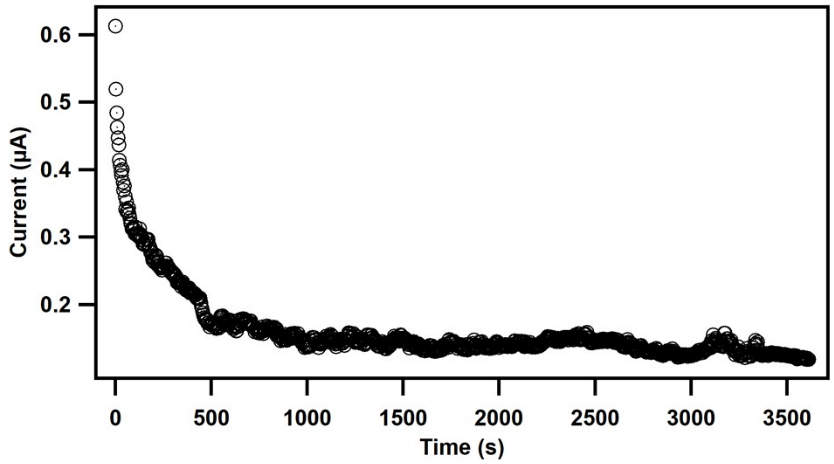


**Fig. S2**: Current through the circuit with the leaf-based capacitor over a long period of time. 0.3V bias was applied with the source measure unit.

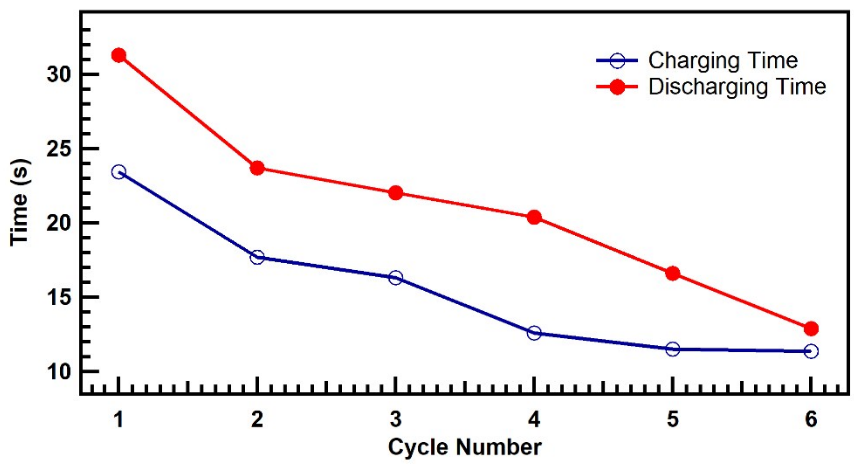


**Fig. S3**: Charging and discharging time for the leaf-based capacitor. Discharging time is longer than the charging time, both of which shorten over the multiple cycles and converge.