Supporting Information

Conductive 1D High-nucleus Silver polymer as a Brilliant Non-hybrid Supercapacitor Electrode

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1. Electrochemical measurements

The cyclic voltammetry (CV) measurement like other electrochemical characterization includes of galvanostatic charge-discharge (GCD) and electrochemical impedance spectroscopy (EIS) was achieved with the same equipment, PalmSens3 electrochemical workstation using a three electrode system at ambient temperature. In which, Ag/AgCl and high-surface-area Pt electrode applied as the reference and counter electrodes, respectively.

The cyclic voltammetry curves were plotted with different scan rates from 200-1000 mVs^{-1} in potential window between −0.5 to +0.5 V. The EIS spectroscopy were carried out in the frequency range from 50 kHz to 50 mHz in OCP (AC perturbation was 10 mV). The GCD test

was fulfilled at various current densities (5.0 to 20.0 A/g). The capacities of the electrode materials were calculated by both CV curves and GCD curves (discharge part) based on equation 1 and 2, where ΔQ, ΔV and m are the integrate of voltammetric charges from CV curves, the potential range in the CV (V) and the mass of the sponge electrode (g) for **equation1** and I, Δt, ΔV and m are the discharge current and time (s), the potential window (V) and mass of the electroactive material (g), respectively in **equation 2**:

$C_{sp} = \Delta Q / 2\Delta V \times m$ **(equation 1)**

$C_{sp} = I \times \Delta t / \Delta V \times m$ **(equation 2)**

2. Electrode and device Preparation

The working electrode assembled by mixing the complex and binder (polytetrafluoroethylene) with 95: 5 mass ratios. The obtained viscous slurry after 5 minutes ultrasonication was deposited on a 1 × 1 cm^2 size Ti foam, then pressed under 10 MPa pressure and dried under vacuum for 10 h at 80 ℃ before any electrochemical test. It should be mentioned that the weight of active electrode material was in a range of 1-1.5 mg. In order to practical application study, as-prepared SSc electrodes were used as the positive and the negative electrodes in two-electrode cell configuration. A paper soaked and saturated in H_2SO_4 (1M) was placed between two electrodes and both electrodes were completely attached to the paper by clamps. The electrodes were connected to a green LED by two lizard clamp cable. The designed device was used, illustrating that the green LED hold on for few minutes.

Table S1. Crystal data and structure refinement for **CP_1**

Chemical formula	$C_{31}H_{30}Ag_8F_{12}NO_9$
formula mass	1651.52 g/mol
T (K)	150(2)
Wavelength	0.71073 Å
Crystal system	Monoclinic
space group	P2(1)/c
a (Å)	15.0304(14)
b (Å)	22.8131(18)
c (Å)	13.6252(13)
α (deg)	90
β (deg)	107.640(3)
γ (deg)	90
V (Å^3)	4452.3(7)
Z	4
$\mu_{calcd.}$(g/m^3)	2.464
Absorption coefficient	3.538 mm^{-1}
F(000)	3116
Reflections collected	61813 / 10222 [R(int) = 0.0421]
Refinement method	Full-matrix least squares on F^2
Goodness-of-fit on F^2	1.032
R indices (all data)	R_1[a] =0.0582, wR_2[b]= 0.0923

[a] $R_1 = [\Sigma\ abs(abs(Fo) - abs(Fc))]/ [\Sigma\ abs(Fo)]$. [b] $wR2 = [\Sigma(w(Fo^2 - Fc^2)^2)/ \Sigma[w(Fo^2)^2]^{0.5}$.

Table S5. Selected bond lengths [Å] and angles [°] for **CP_1**.

Ag(1)-C(1)	2.117(6)	**Ag(4)-O(2)**	2.329(4)
Ag(1)-C(21)	2.146(5)	**Ag(4)-Ag(2)#2**	3.0022(6)
Ag(1)-Ag(4)	2.8360(6)	**Ag(5)-N(1)**	2.261(6)
Ag(1)-Ag(6)	2.9119(6)	**Ag(5)-C(11)#2**	2.329(5)
Ag(1)-Ag(8)	2.9679(7)	**Ag(5)-O(32)**	2.343(5)
Ag(1)-Ag(3)	2.9980(7)	**Ag(5)-C(1)**	2.587(6)
Ag(1)-Ag(5)	3.1166(7)	**Ag(5)-Ag(7)**	2.8737(7)
Ag(1)-Ag(7)	3.1744(7)	**Ag(5)-Ag(2)#2**	3.0794(7)
Ag(1)-Ag(2)	3.2033(6)	**Ag(6)-O(22)**	2.296(4)
Ag(2)-C(11)	2.149(5)	**Ag(6)-C(11)**	2.346(5)
Ag(2)-C(31)	2.154(6)	**Ag(6)-C(21)**	2.409(5)
Ag(2)-Ag(7)#1	2.8962(7)	**Ag(6)-C(22)**	2.464(6)
Ag(2)-Ag(8)	2.9166(8)	**Ag(6)-C(12)**	2.642(6)
Ag(2)-Ag(4)#1	3.0022(6)	**Ag(6)-Ag(7)#1**	3.0051(7)
Ag(2)-Ag(6)	3.0439(7)	**Ag(7)-O(14)**	2.29(4)
Ag(2)-Ag(5)#1	3.0794(7)	**Ag(3)-Ag(1)-Ag(7)**	109.646(19)
Ag(2)-Ag(3)	3.1716(7)	**Ag(5)-Ag(1)-Ag(7)**	54.353(14)
Ag(3)-O(1)	2.277(4)	**C(1)-Ag(1)-Ag(2)**	77.24(15)
Ag(3)-C(31)	2.314(5)	**C(21)-Ag(1)-Ag(2)**	95.71(14)
Ag(3)-C(21)	2.403(6)	**Ag(4)-Ag(1)-Ag(2)**	127.217(19)
Ag(3)-C(32)	2.649(6)	**Ag(6)-Ag(1)-Ag(2)**	59.475(16)
Ag(3)-Ag(4)	3.1767(7)	**Ag(8)-Ag(1)-Ag(2)**	56.253(17)
Ag(3)-Ag(8)	3.3209(8)	**Ag(3)-Ag(1)-Ag(2)**	61.413(15)
Ag(4)-C(21)	2.270(5)	**Ag(5)-Ag(1)-Ag(2)**	124.929(19)
Ag(4)-C(31)#2	2.274(5)	**Ag(7)-Ag(1)-Ag(2)**	2.589(6)

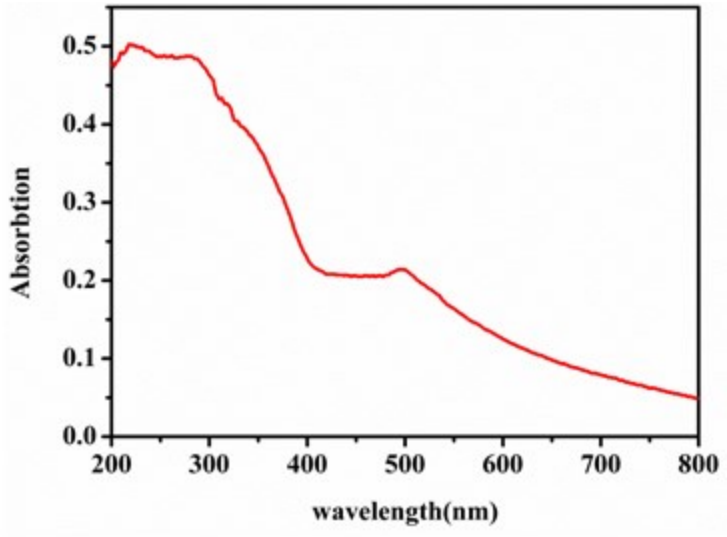

Figure S1. The solid-state UV absorption spectrum of CP_1.

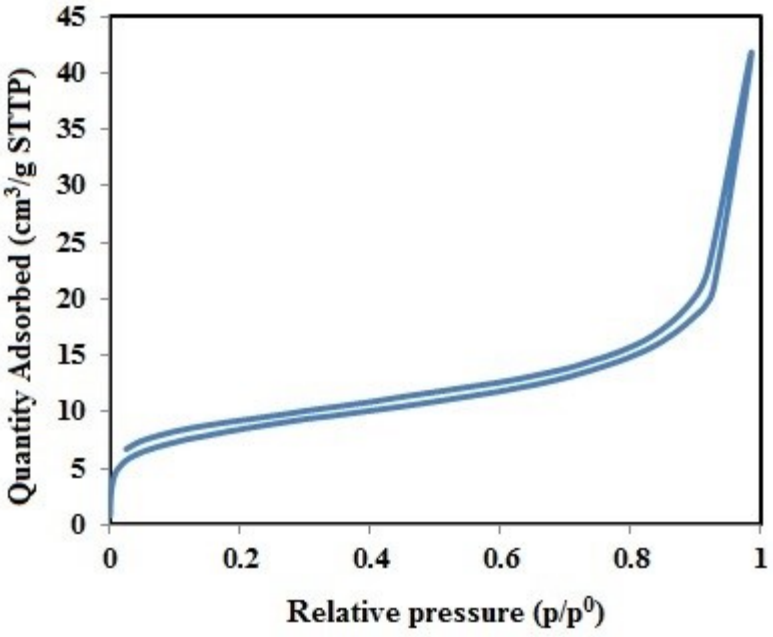

Figure S2. N_2 adsorption isotherms collected at 77 K.

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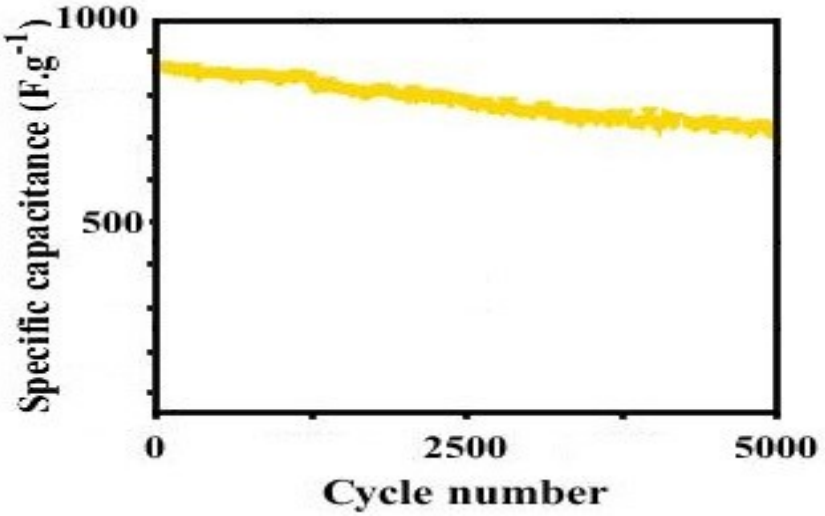

Figure S3. Cyclic stability of SSc symmetric supercapacitor at 16A.g^{-1} for 5000 cycles.

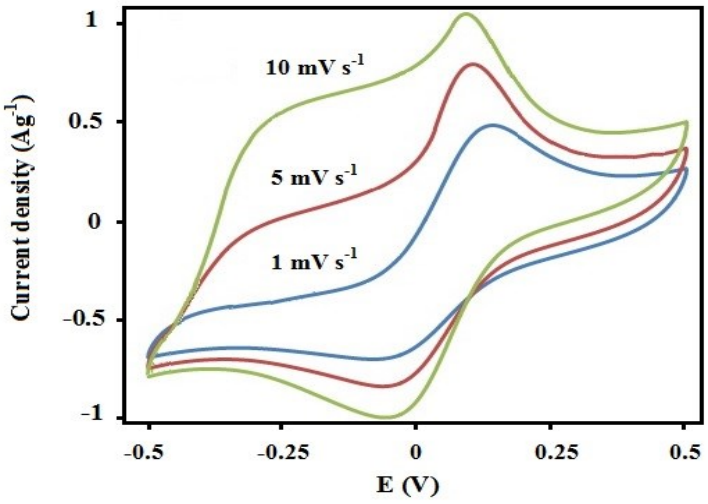

Figure S4. The CV curves of SSc at low scan rates (1-10 mV s^{-1}).

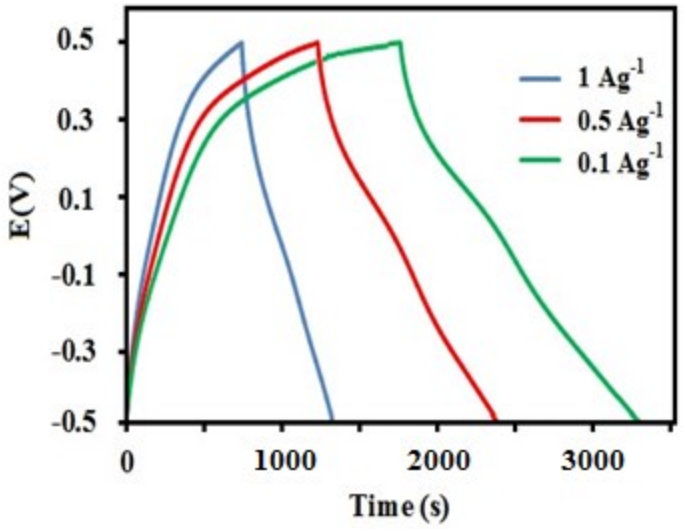

Figure S5. The charge-discharge curves at low current densities (0.1-1 A g^{-1}).

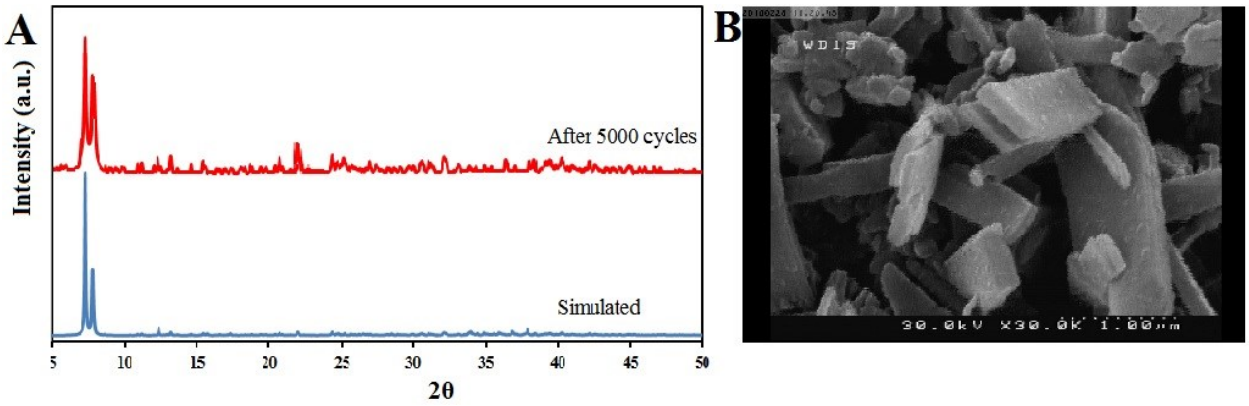

Figure S6. (A) XRD pattern of SSc after 5000 cycle in comparison with simulated one and (B) SEM images of SSc after usage as electrode.