Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Performance of FTO-Free Conductive Graphene-Based Counter Electrodes for Dye-Sensitized Solar Cells

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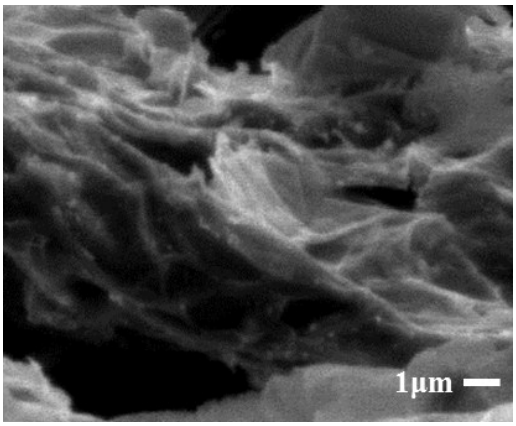

Figure S1. SEM image of the surface of CE-1film.

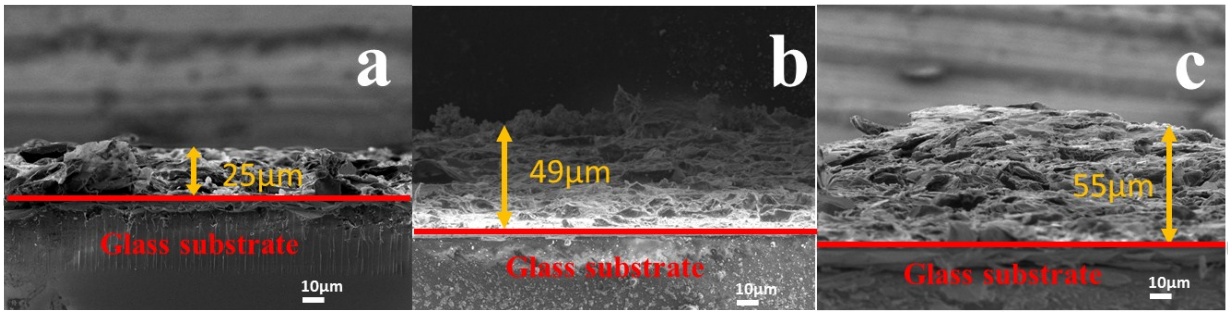

Figure S2. SEM cross-sectional images of CE-1(a), CE-2(b) and CE-3(c).

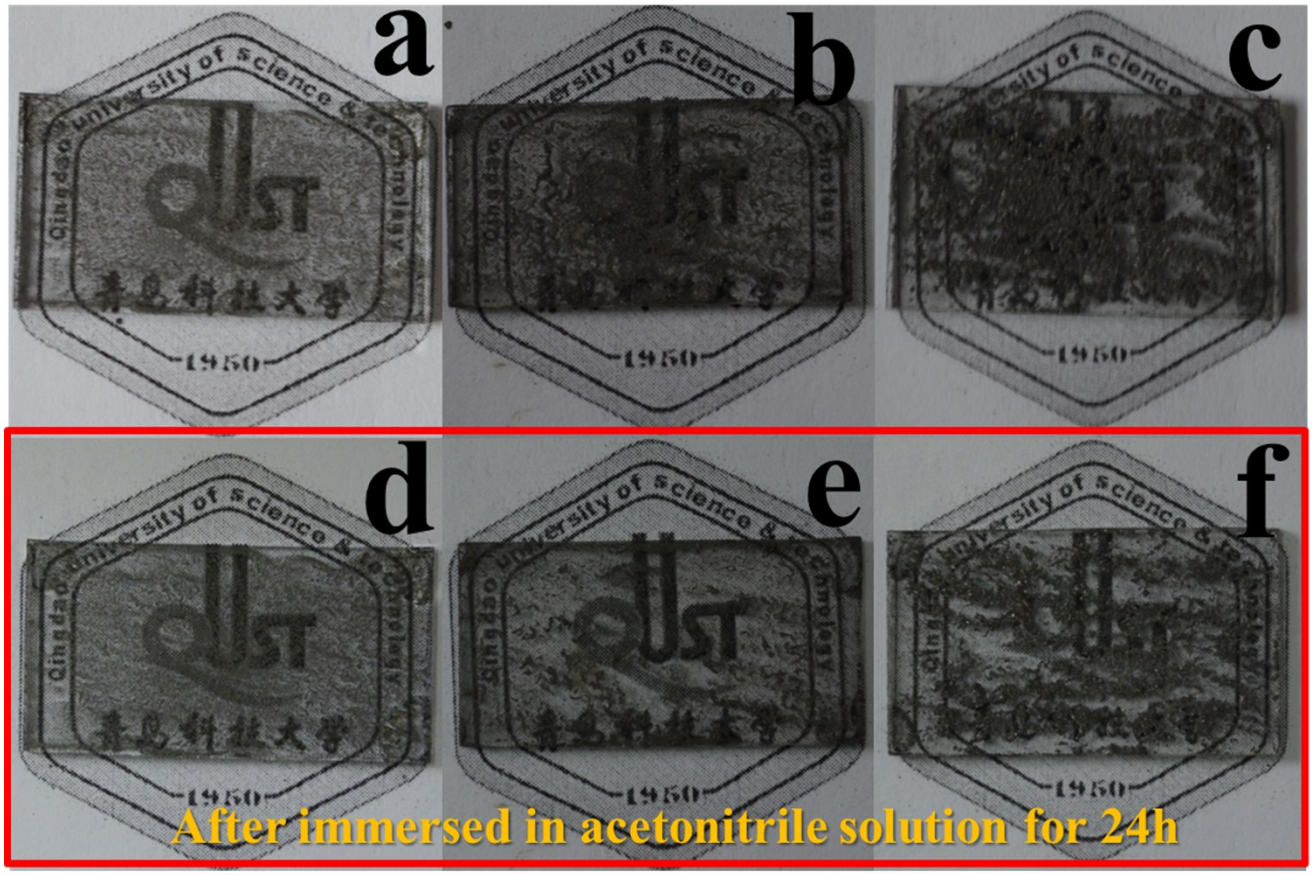

Figure S3. Photographs of CE-1(a/d), CE-2(b/e) and CE-3(c/f) before/after immersing in acetonitrile solution for 24 h.

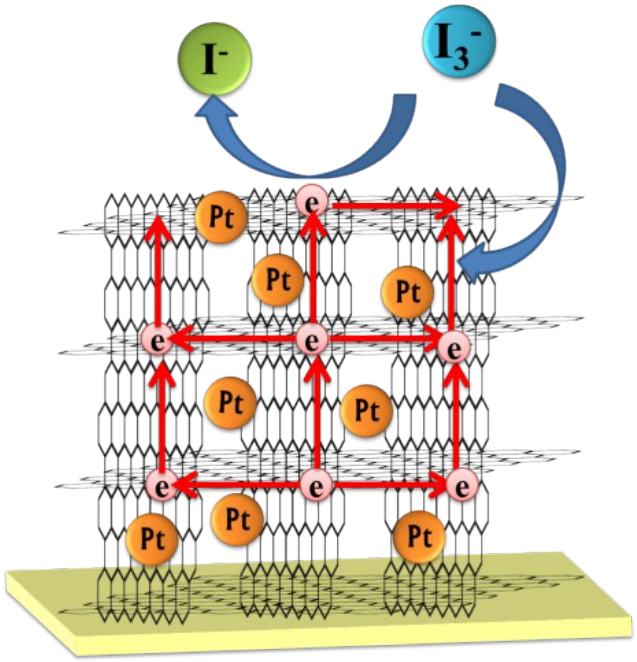

Figure S4. Schematic diagram of electron transport of CE-1 with network structure graphene for the reduction of I_3^- ions in DSSCs.

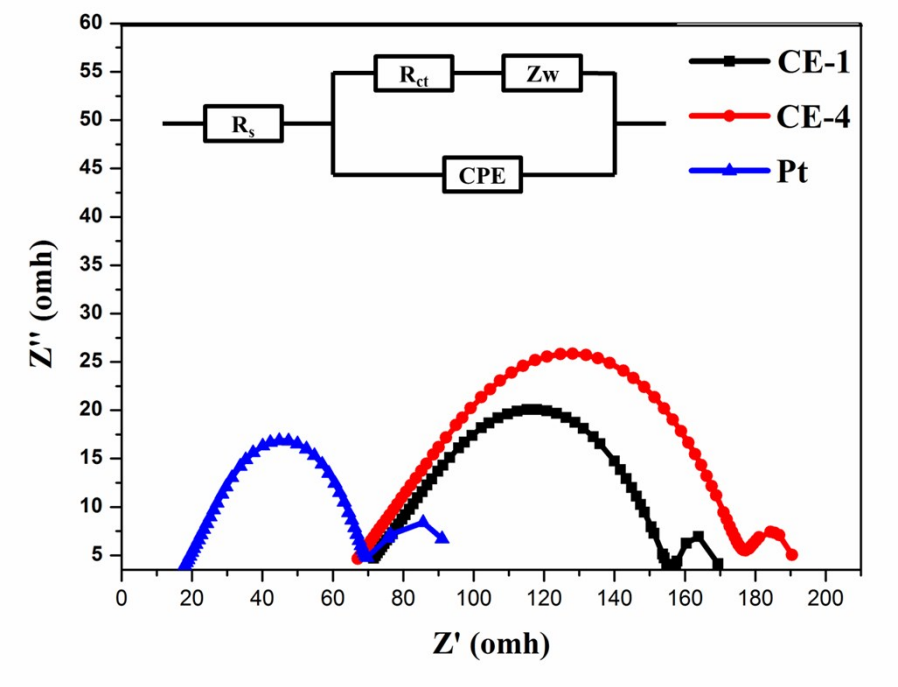

Figure S5. Nyquist plots of symmetrical cells fabricated with Pt, CE-1, and CE-4. Inset: equivalent circuit.

Table S1. EIS parameters of the dummy cells assembled with two identical CEs.

Samples	**Rs(Ω)**	**Rct(Ω)**	**Zw(Ω)**
CE-1	70.2	87.6	13
CE-4	67.5	110.5	14.07
Pt	19.2	52.1	28.3

Electrochemical impedance spectroscopy (EIS) experiments were performed using symmetric cells fabricated with two identical electrodes (CE/electrolyte/CE). The intercept on the horizontal axis represents series resistance (Rs), which results from conductive substrate resistance and lead resistance. The first semicircle represents charge transfer resistance (Rct) and constant phase element (CPE) at the CE/electrolyte interface. The second arc corresponds to the Nernst diffusion impedance (Zw) between the triiodide/iodide redox couple in the electrolyte. The obtained parameters can be calculated from the fitting results of equivalent circuit, as shown in the inset of Figure S5, and the relevant values are summarized in Table S1.