Supplementary Materials

Air-gap-assisted solvothermal process to synthesize unprecedented graphene-like two-dimensional TiO_2 nanosheets for Na^+ electrosorption/desalination

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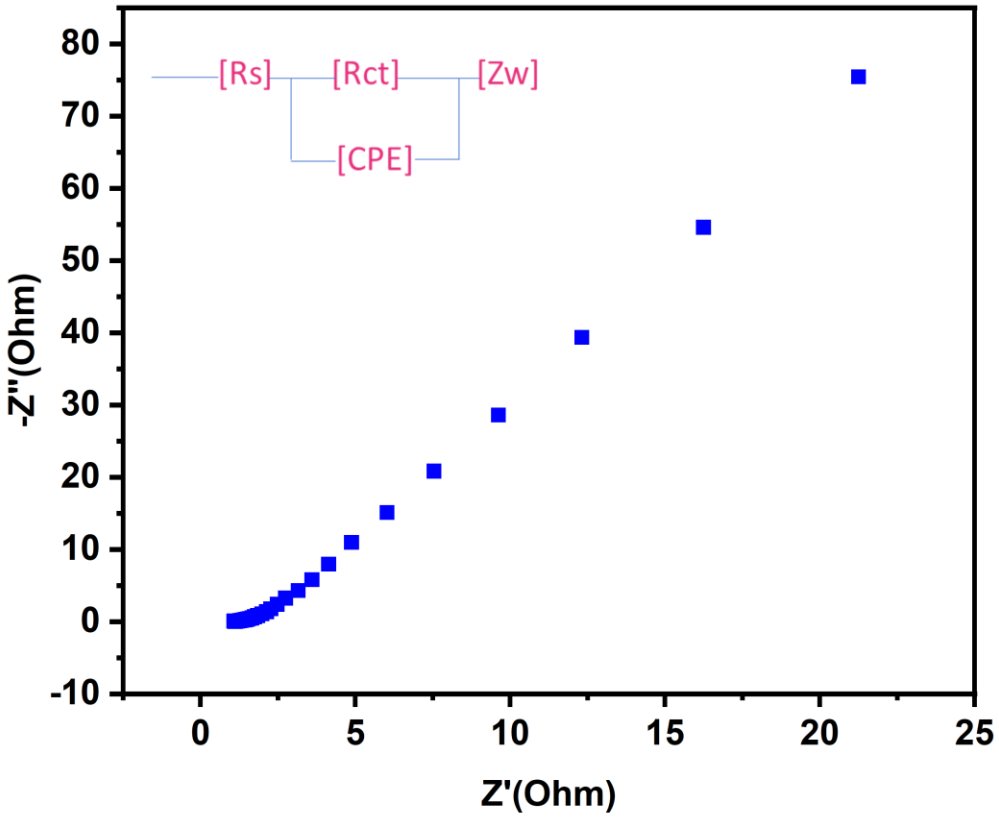
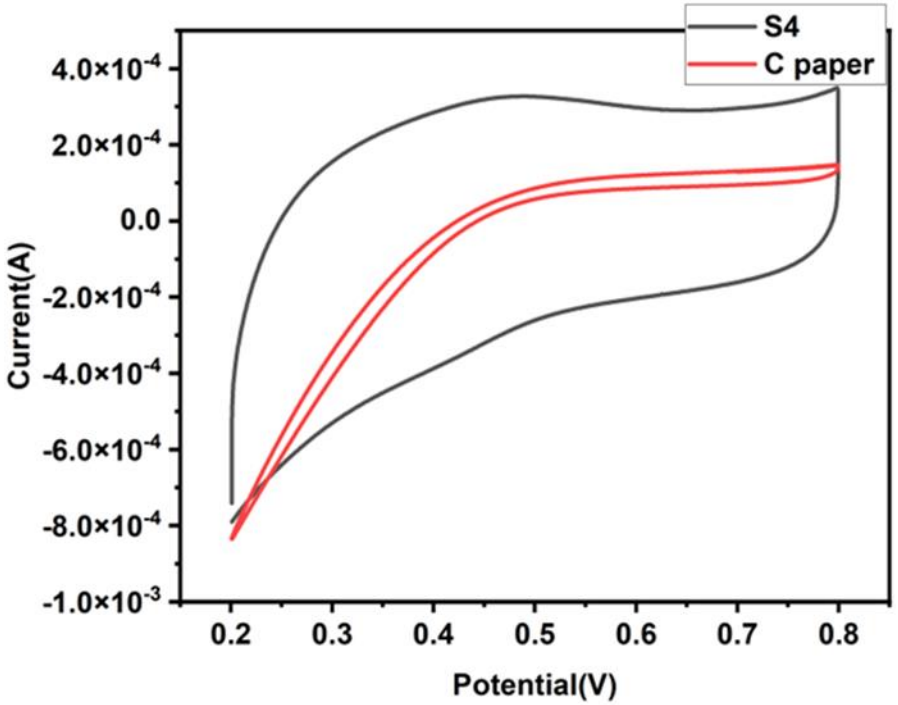


Supplementary Figure 1 EIS plot of the 2D TiO_2@PC electrode measured at 0.378 V versus SCE and their Randles equivalent circuit.

The two-dimensional nature of this material can offer a high surface area, which can provide ample active sites for electrochemical reactions. Such materials are often known to provide enhanced capacitive behaviors and fast ion transport.

Series Resistance, or Rs, is the high-frequency intercept on the Nyquist plot's Z' axis. It takes into consideration the resistance caused by current collectors, contacts, and the electrolyte (in this example, NaCl). Charging Transfer Resistance, or Rct, is a term used to describe the resistance to charge transfer at the electrode/electrolyte interface. Usually, it is represented as being in parallel conjunction with a constant phase element (CPE) in series, which explains the non-ideal capacitive behavior at the electrode/electrolyte area. The diffusion of ions (Na^+ and Cl^-) in the electrode is considered by the Zw (Warburg Impedance). To illustrate the resistive and capacitive parts of ion diffusion, it is modeled as a resistor and capacitor. From the EIS plot of the S4 electrode, a very small or negligible semicircle was observed, indicating that the S4 electrode offers a very low charge transfer resistance, making it an ideal material for the electro-sorption of the metal ions.



Supplementary Figure 2 Comparative of the Cyclic voltammetry (CV) curves of 2D TiO_2 and carbon paper devoid of active material.