

High specific capacitance of CuS nanotubes in redox active

polysulfide electrolyte

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Supporting information

Synthesis of [Cu(tu)]Cl·1/2H₂O nanowires precursor and CuS NTs

[Cu(tu)]Cl·1/2H₂O nanowires precursor were prepared by a simple solution methods.

The typical procedures are as follows. 50 ml 0.1 M CuCl₂ solution were mixed with 50 ml 0.2 M tu (tu = thiourea) without stirring. The white nanowires formed in one minute. After reacted at room temperature for about one hour, the white [Cu(tu)]Cl·1/2H₂O nanowires precursor were filtrated and washed with double distilled water (saturated with N₂) and absolute ethanol for several times. Then the white [Cu(tu)]Cl·1/2H₂O nanowires precursor were transferred to a 500 ml beaker and diluted with double distilled water, followed by addition of 0.1 M NaOH solution under gentle agitation to adjust the pH of solution to 9. The solution allowed to stand for several hours in atmosphere. Finally black CuS NTs were washed with water and absolute ethanol several times and dried at 90 °C.

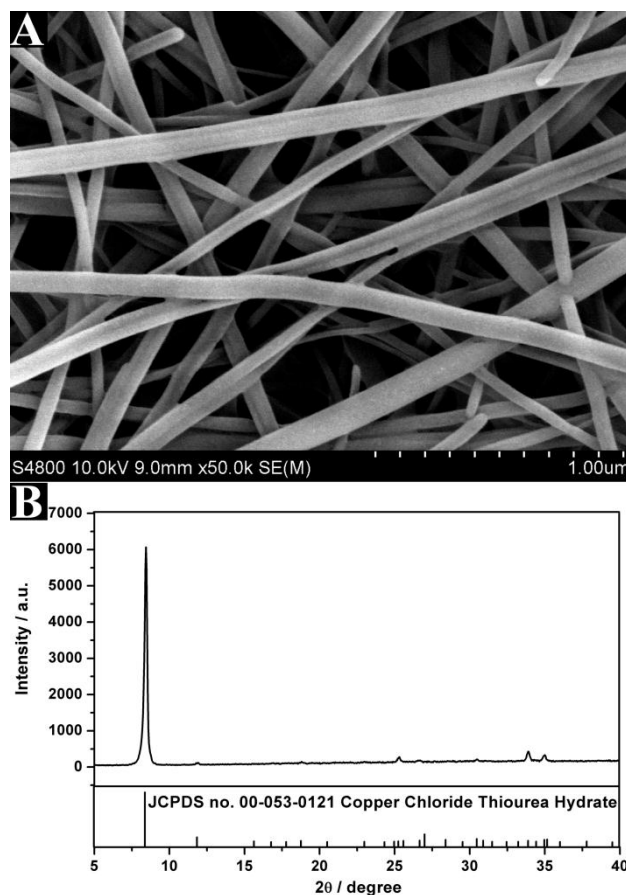


Fig. S1 SEM (A) and XRD (B) images of $[\text{Cu}(\text{tu})]\text{Cl}\cdot\frac{1}{2}\text{H}_2\text{O}$ nanowires precursor

Preparation of CuS NTs electrode

CuS NTs electrode used for electrochemical measurements was prepared as follows. CuS NTs, acetylene black as conducting materials and poly(vinylidene fluoride) as binder were mix in a weight ratio of 85:10:5 to yield a paste, N-Methyl-2-pyrrolidone (NMP) was used as the solvent. The paste was load in Ni foam electrode and dried at 80 °C before use. The mass loading was between 3-5 mg/cm^2 .

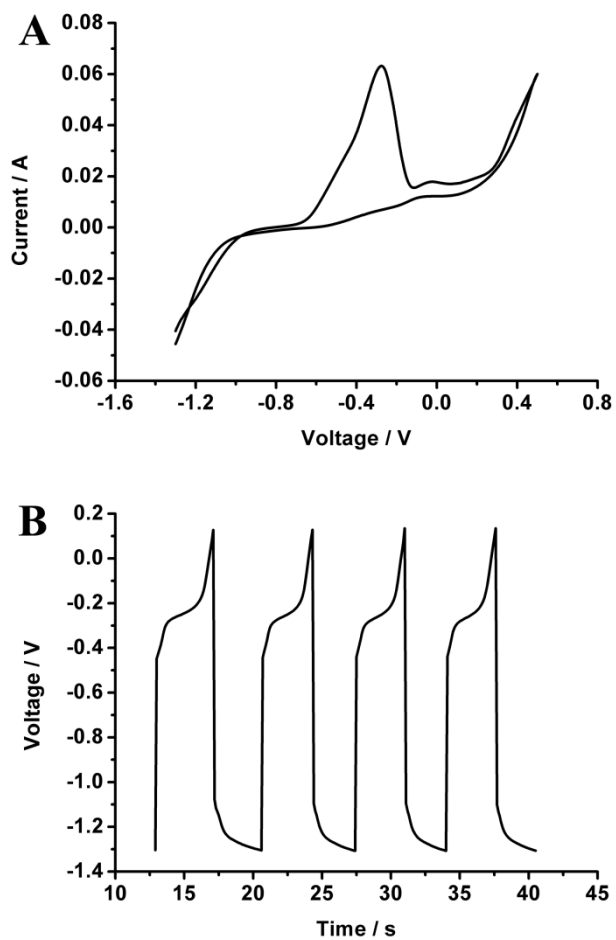


Fig. S2 CV curve (scan rate of 10 mV s^{-1}) and charge-discharge curve (current density of 15 A/g) of Ni foam in polysulfide electrolyte