

Exploring One-Pot Colloidal Synthesis of Klockmannite CuSe nanosheets electrode as Symmetric Solid-State Supercapacitor Device

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Supplementary information:

Supporting information S1: Surface wettability test

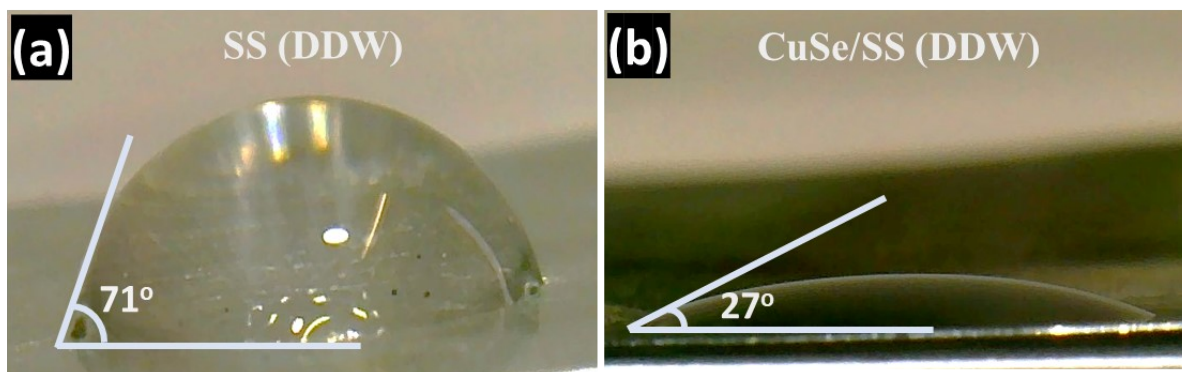


Figure S1: Contact angle measurement (a) stainless steel substrate and (b) CuSe/SS with DDW.

Supporting information S2: Fabrication of flexible all-solid-state symmetric supercapacitor:

In order to verify the practicability of the CuSe electrode in its current state, a solid-state symmetric device was constructed utilizing two identical CuSe electrodes with the same dimensions (3 X 4 cm) and an electrolyte of PVA-NaOH sandwiched in between. To summarize, 1 g of NaOH was first dissolved in 10 mL of double distilled water (DDW). Next, 0.97 g of PVA was added to 20 mL of DDW, and the mixture was heated to 80 °C while being constantly stirred until it became clear and viscous. The layer of this transparent gel was painted over the two pieces of CuSe film. Thereafter, the pre-coated electrodes with gel electrolyte were dried in open-air and then stacked on each other. Subsequently, a one-ton pressure was applied uniformly normal to the substrate surface over the entire assembly for overnight to ensure complete solidification of gel electrolyte through removal of water content, resulting all-solid-state symmetric supercapacitor. Pressure applied helps penetration of gel inside empty porous area and ensures good adhesion

between two electrodes as well. It is noteworthy to mention that electrolyte in fabricated symmetric supercapacitor is all-solid-state PVA-NaOH electrolyte.

Supporting information S3: CV measurement for CuSe SSD at different potential range:

To determine an accurate potential window for CuSe SSD, CV was performed at several potential windows such as 0.78 V, 0.9 V, 1 V, 1.1V, and 1.2V. Fig. S1 depicts the CV for various potentials at a fixed scan rate of 100 mV/s. The CV reveals that the device has a 1.1 Volt stable potential window with a large CV area and uniform distribution of current.

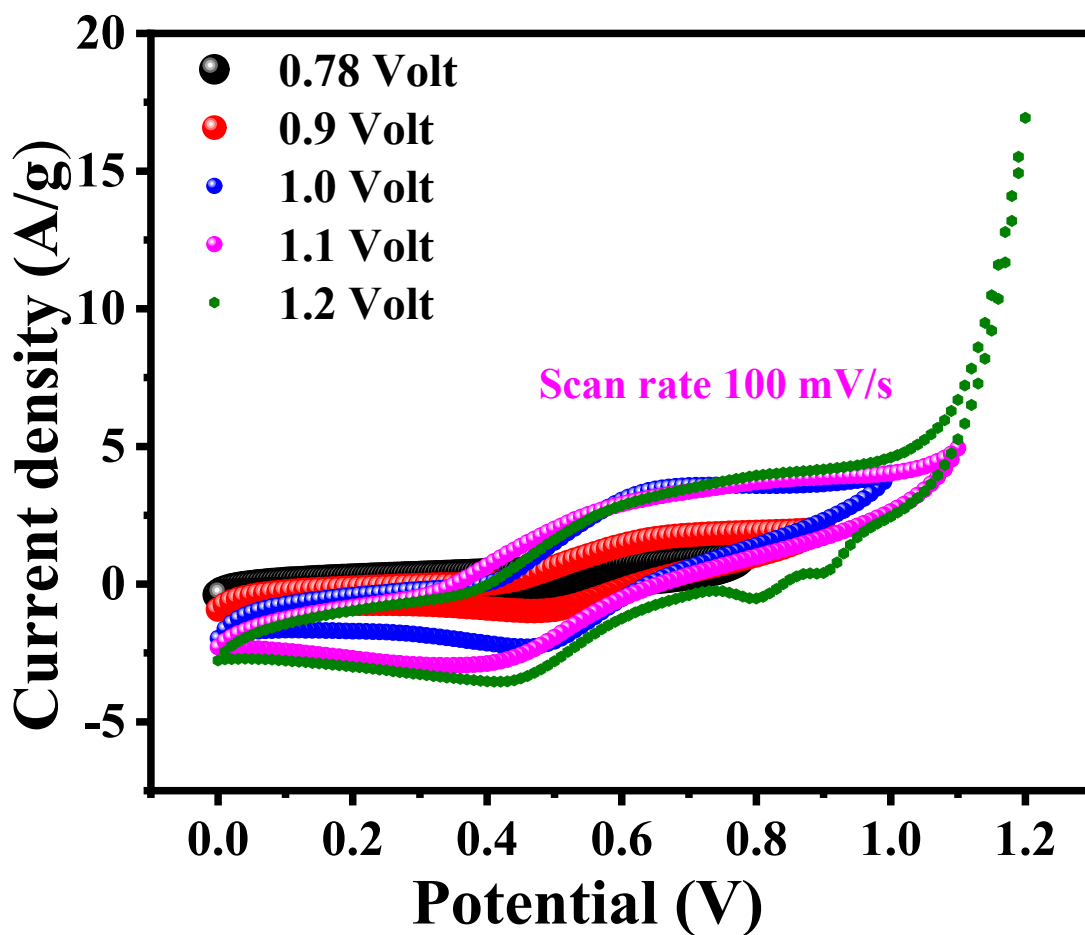


Figure S2: CV curves of CuSe SSD fabricated with PVA-NaOH gel electrolytes for different voltage windows ranging from 0.78 to 1.2 V at scan rate 100 mV/s.