Supporting Information

One-pot facile synthesis of Janus-structured SnO_2/CuO composite nanorods and their application as anode materials in Li-ion batteries

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This file includes:

• Schematic diagram of flame spray pyrolysis process.

• The SEM images of the SnO_2/CuO (70/30) composite powders collected at different heights of the flame.

• Initial charge curves of the pure SnO_2 and Janus-structured SnO_2/CuO composite powders at different current densities.

• The morphologies of SnO_2 nanorods formed from the SnO_2/CuO composite powders.

Flame spray pyrolysis process.

The schematic diagram of the flame spray pyrolysis process was shown in Fig. S1. The flame spray pyrolysis system consisted of a droplet generator, flame nozzle, powder collector, and blower. An ultrasonic spray generator (1.7 MHz) with 6 resonators was used to generate droplets that were carried into the high-temperature diffusion flame by oxygen, which acted as the carrier gas. Propane and oxygen acted as the fuel and oxidizer, respectively to create the diffusion flame. The flame nozzle consisted of five concentric pipes. The droplets generated from the precursor solution were supplied to the diffusion flame through the central pipe by the carrier gas. The flow rates of the fuel, oxidizer and carrier gases were maintained at 5, 40, and 10 L min^{-1}, respectively.

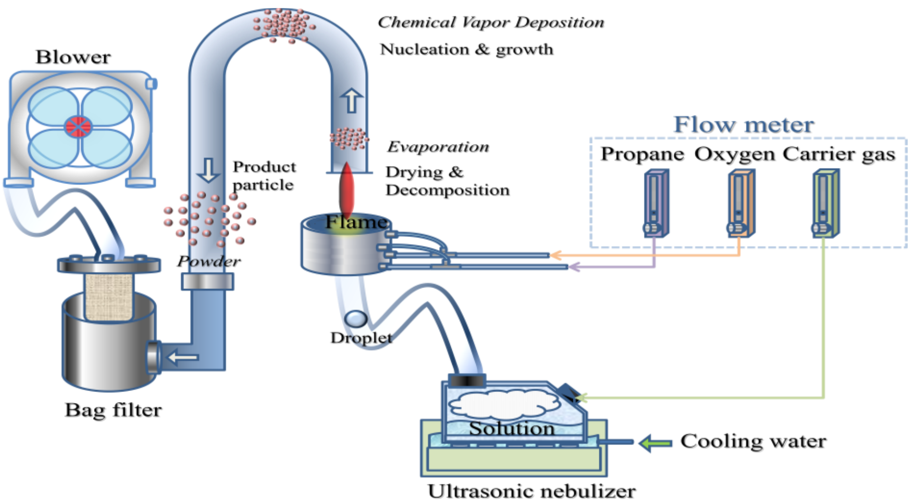


Fig. S1. Schematic diagram of the flame spray pyrolysis process.

The SEM images of the SnO_2/CuO (70/30) composite powders collected at different heights of the flame.

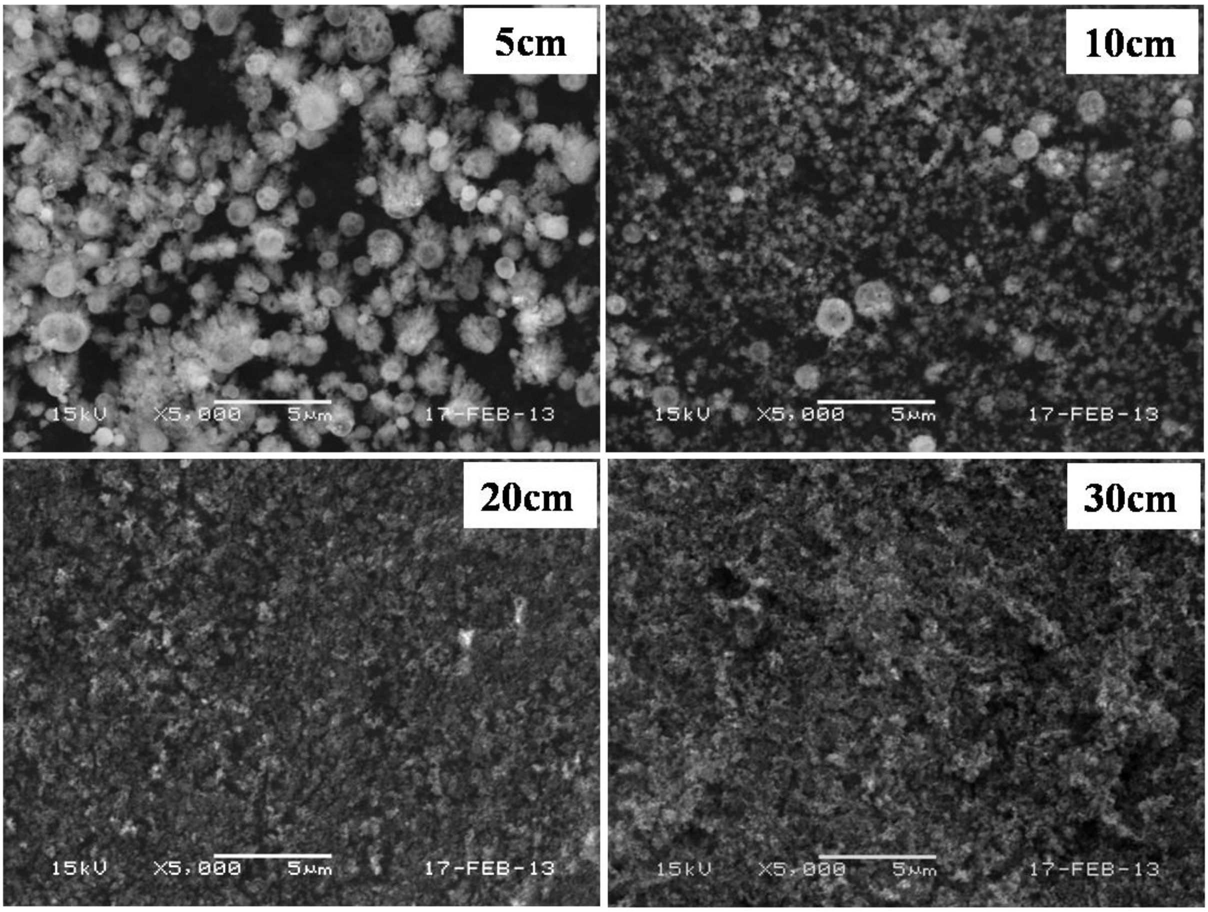
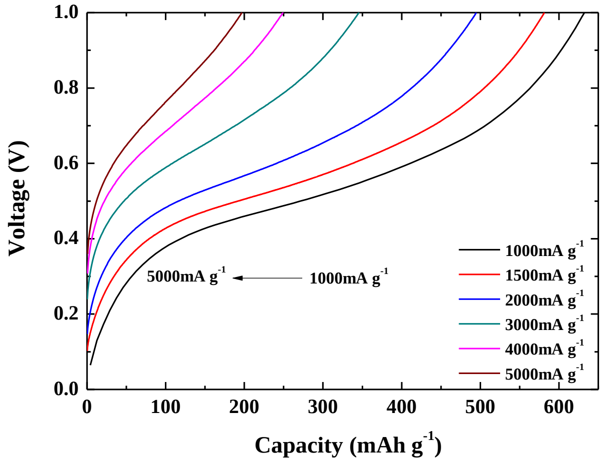


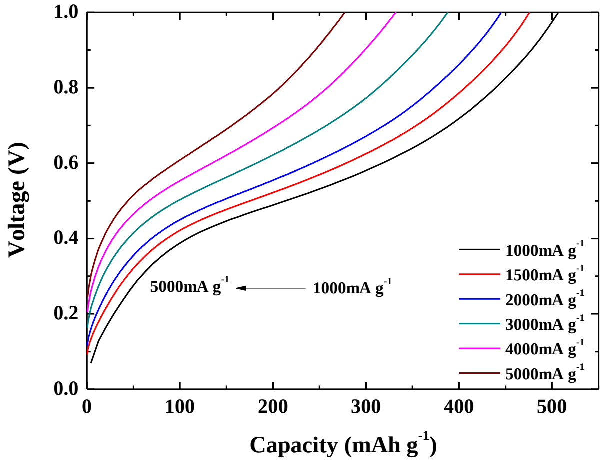
Fig. S2. The SEM images of the SnO_2/CuO (70/30) composite powders collected at different heights of the flame.

The initial charge curves of the pure SnO_2 and Janus-structured SnO_2/CuO composite powders.

Fig. S3. shows the initial charge curves of the pure SnO_2 and Janus-structured SnO_2/CuO composite powders at different current densities in the voltage range of 0.001–1 V. The pure SnO_2 and Janus-structured SnO_2/CuO composite powders had similar shapes initial charge curves irrespective of current densities. However, the Janus-structured SnO_2/CuO composite powders had better rate performances than the pure SnO_2 powders.



(a) SnO_2/CuO (100/0)



(b) SnO_2/CuO (70/30)

Fig. S3. The initial charge curves of the pure SnO_2 and Janus-structured SnO_2/CuO composite powders at different current densities in the voltage range of 0.001–1 V. C=capacity, V=voltage, I = current.

Electronic Supplementary Material (ESI) for Nanoscale

The morphologies of SnO_2 nanorods formed from the SnO_2/CuO composite powders.
Fig. S4. shows the morphologies of SnO_2 nanorods formed from the Janus-structured SnO_2/CuO composite powders by etching of CuO. The SnO_2/CuO composite powders were immersed in diluted nitric acid solution for removal of CuO. The TEM images of the etched SnO_2 powders showed the well-crystalline nanorod structure.

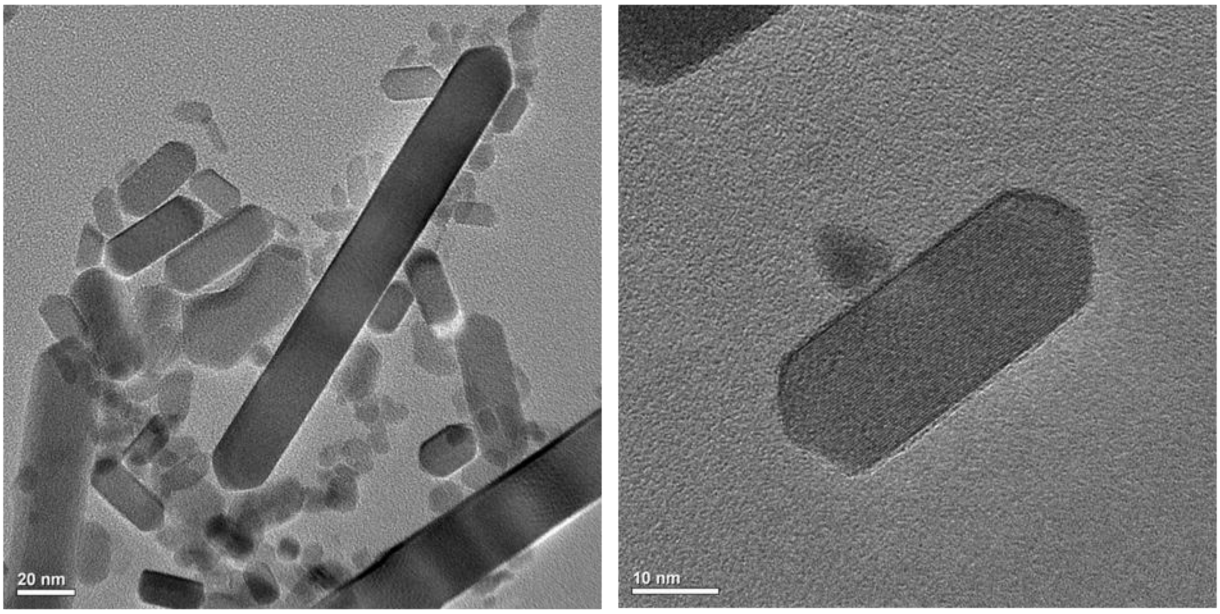


Fig. S4. The morphologies of SnO_2 nanorods formed from the Janus-structured SnO_2/CuO composite powders by etching of CuO.