Supporting information

**XRD and SEM.** The samples were analyzed by X-ray diffraction (XRD) employing a Philips X'pert X-ray diffractometer with Cu Kα radiation (λ = 1.54178 Å). A scan rate of 0.05 deg·s⁻¹ was applied to record the pattern in the 2θ range of 10-80°. The samples were also investigated using a JEOL-7500B scanning electron microscope (SEM) at an accelerating voltage of 5.0 kV.

**Electrochemical measurements.** The electrochemical behaviors were measured via CR2016 coin-type test cells assembled in a dry argon-filled glove box. The test cell consisted of a working electrode and lithium sheet which were separated by a Celgard 2400 membrane and electrolyte of 1 M LiPF6 in EC–EMC–DMC (1:1:1 v/v). The working electrode consisted of 70 wt% active material, 15 wt% acetylene black and 15 wt% polyvinylidene difluoride. The typical loading of the films was approximately 1.0 mg cm⁻². The cells were cycled by LAND CT 2001A at room temperature.

![XRD and SEM images](image)

**Fig. S1** (a) XRD and (b, c) SEM images of the flower-like CuO prepared using reaction time eight hours, while other conditions remained unchanged.

![SEM images](image)

**Fig. S2** (a) and (b) are the SEM images of the CuO prepared in an ultrasonic environment, while other reaction conditions remained unchanged.
Fig. S3 Cyclic voltammogram of a flower-like CuO electrode between 0V and 3V at a scan rate of 0.5 mV s⁻¹.

Fig. S4 Electrochemical measurements of the commercial CuO powder. (a) Voltage profiles for the first galvanostatic discharge curve and charge-discharge curves for 100 cycles. (b) Cycling performance of the sample. The galvanostatic test is performed at a current rate of 200 mA g⁻¹ between 0.005 V and 3 V.
Fig. S5 SEM image of flower-like CuO after cycling test at various rates.