Electronic Supplementary Information

for

In situ Transmission Electron Microscopy Study of the Electrochemical Sodiation Process for a Single CuO

Nanowire Electrode

Liqiang Zhang,^{ab‡} Yuecun Wang,^{c‡} Degang Xie,^{c‡} Yushu Tang,^{ab} Chunyang Wu,^d Lishan Cui,^{ab} Yongfeng Li^{a*}, Xiaohui Ning^{c*} and Zhiwei Shan^c

^aState Key Laboratory of Heavy oil Processing, China University of Petroleum, Beijing Changping 102249, China ^bDepartment of Materials Science and Engineering, China University of Petroleum, Beijing 102249, China. ^cThe Center for Advancing Materials Performance from the Nanoscale (CAMP-Nano),Xi An Jiao Tong University, Xian, 710049, China.

^dSchool of Materials Science and Engineering, Zhejiang University, Hangzhou, Zhejiang 310027, China.

Supplementary Figures



Fig. S1. The CuO NW became pretty brittle during cycling and was broken after the 2nd charging.



Fig. S2. A CV curve for CuO NW used as NIB measured at a scan rate of 0.2 mV s⁻¹ between 0.01 V and 3.0 V.



Fig. S3. Plots of the reaction front migration distance (L) vs. the time. The length of the pristine CuO NW are (a) 2.3 μ m; (b) 1.9 μ m; (c) 0.6 μ m respectively, and there diameters are ~40nm.

Supplementary Movies

- **Movie S1.** An *in situ* TEM movie showing completely suppression of the radial expansion and elongation during the sodiation of a CuO nanowire. Note there is no strain in the reaction front. The video was recorded at 4 frames/second, and played at 50× speed.
- **Movie S2.** An *in situ* TEM movie showing the reaction front of the CuO nanowire during the sodiation. The video was recorded at 4 frames/second, and played at 20× speed.