Electronic Supplementary Information

Electrochemical Flow-based Solution-Solid Growth of Cu$_2$O Nanorods Array: Potential Application to Lithium Ion Batteries

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Figure S1. Cross-sectional SEM images of (a) 200 nm-thick Cu$_2$O films and (b) 10 μm-thick Cu$_2$O films.
Figure S2. (a) Tilted SEM image and (b) XRD pattern of Cu₂O NRs electrodeposited on Cu foil for 4 hours.
Figure S3. (a) Cross-sectional and (b) top-view SEM images, and (C) XRD pattern of Cu NRs electrodeposited in a glove box filled with N₂ gas (electrodeposition condition; 50 μM CuSO₄·H₂O, pH of 5.6, Vᵣ of -14 V, Vₒ of 0.5 V, frequency of 0.5 Hz, and duty of 50%).
Figure S4. (a) Cross-sectional and (b) top-view SEM images, and (c) XRD pattern of Cu NRs electrodeposited at the pH of 3.8 in an ambient atmosphere (electrodeposition condition: 50 µM CuSO₄·H₂O, 100 µM H₂SO₄, V_R of -14 V, V_O of 0.5 V, frequency of 0.5 Hz, and duty of 50%).
Figure S5. XPS results of Cu$_2$O NRs which was electrodeposited for 4 hours.
Figure S6. XPS results of C1s, P2p and F1s emission lines according to the ion milling times: (a) 200th discharge, (b) 200th charge. C1s, P2p and F1s correspond to Li$_2$CO$_3$, Li$_3$PO$_4$, and LiF, respectively. The results show that the formation and decomposition of LiF are irreversible while those of Li$_3$PO$_4$ are reversible. Some Li$_2$CO$_3$ are irreversibly formed on the top surface of the NRs.