Electronic Supplementary Material (ESI) for Faraday Discussions.

Electronic supplementary information

Low-current field-assisted assembly of copper nanoparticles for current collectors

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This PDF file includes: Figures S1 to S7.

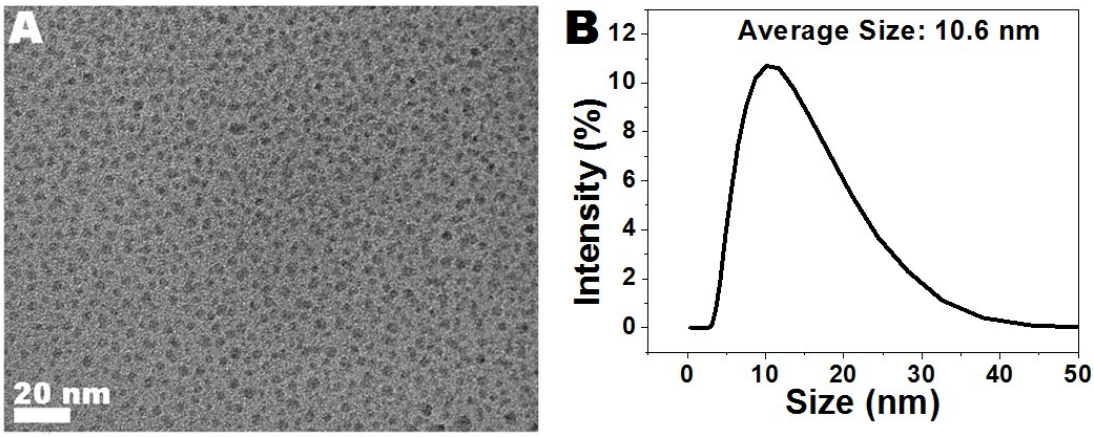

Fig. S1. (**A**) TEM image and (**B**) DLS size distribution of Cu NPs in dispersion. The larger size obtained in DLS data than in TEM images is attributed to the organic stabilizer shell and a relatively thick hydration layer.

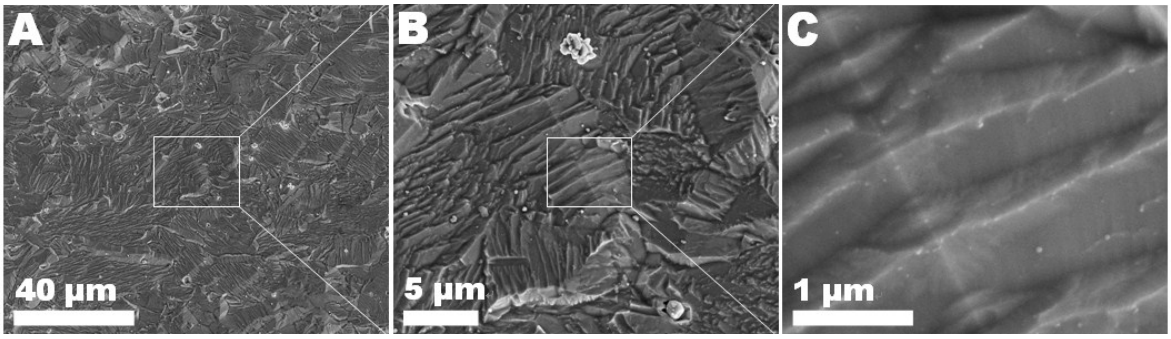

Fig. S2. (**A-C**) SEM images of Cu foil used for the preparation of NP-based film by field-stimulated assembly.

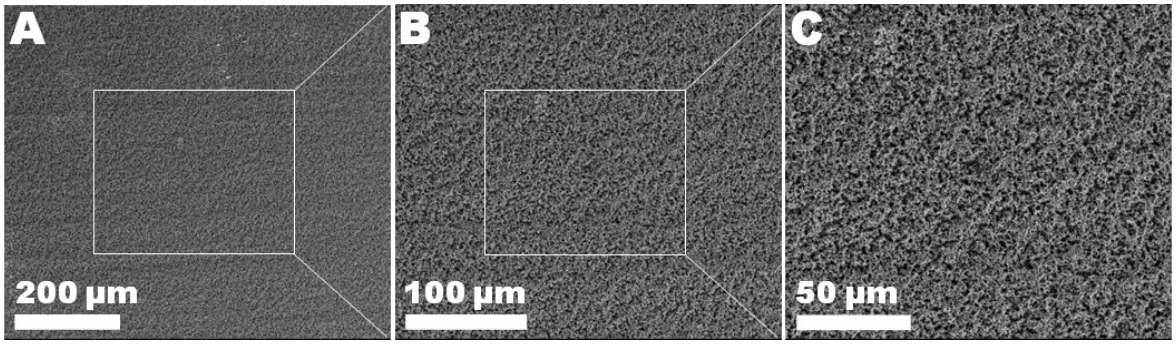

Fig. S3. (**A-C**) SEM images of 3D Cu film by field-stimulated assembly of Cu NPs at a potential of 2000 mV (current: ～75 mA) for 8 min.

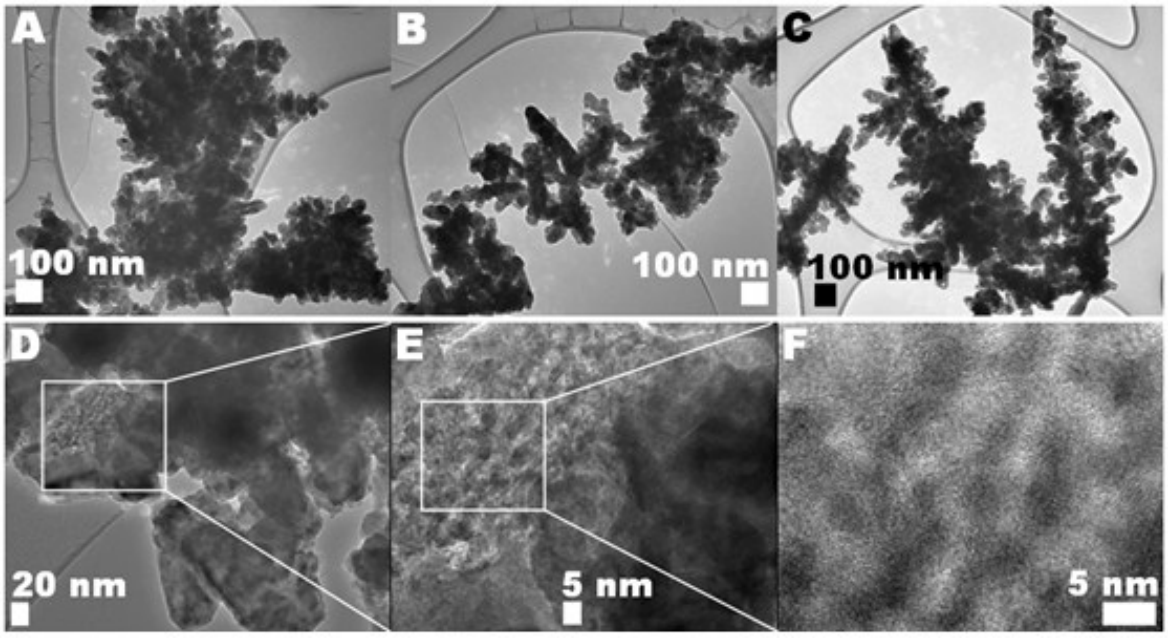

Fig. S4. (**A-F**) TEM images of the dendrites formed from Cu NPs during the field-stimulated assembly under a potential of 2000 mV (current: ~75 mA) for 8 min.

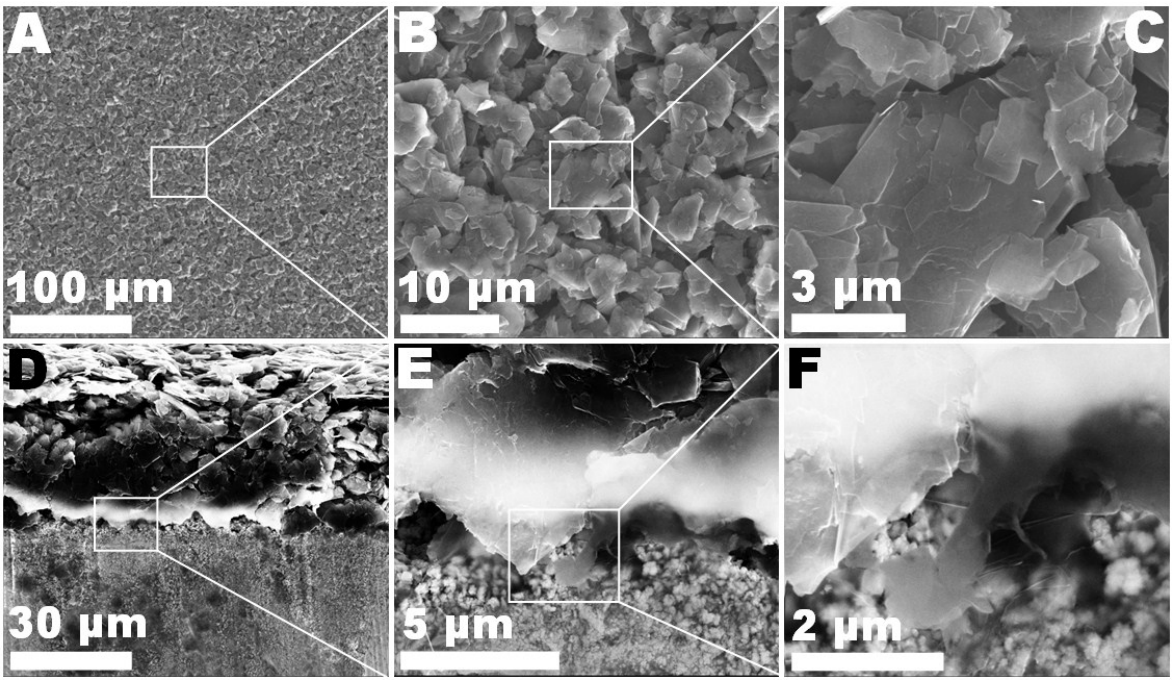

Fig. S5. (**A-C**) Top-view and (**D-F**) cross-sectional SEM images of dried graphite (~3 mg) slurry coating on NP-based Cu current collector prepared under a potential of 2000 mV (current: ~75 mA) for 8 min.

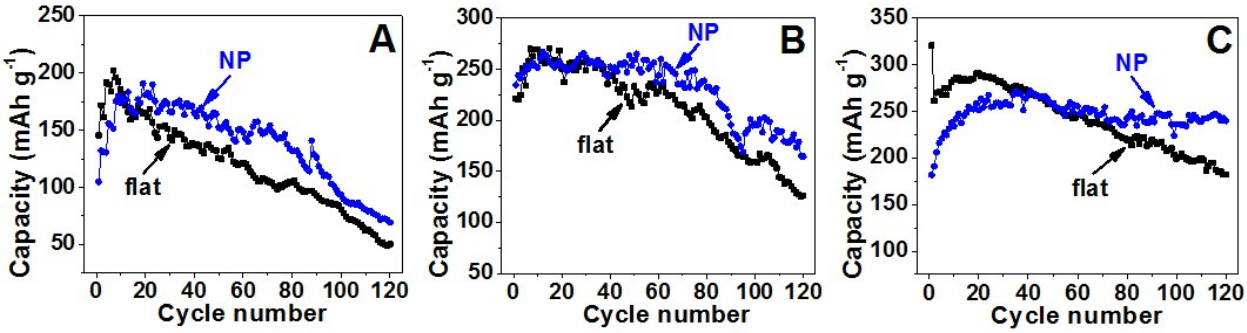

Fig. S6. Cycle performance of (**A**) 11.5, (**B**) 7.0 and (**C**) 3.0 mg graphite on flat and NP-based Cu electrodes at 0.25 C rate, respectively.

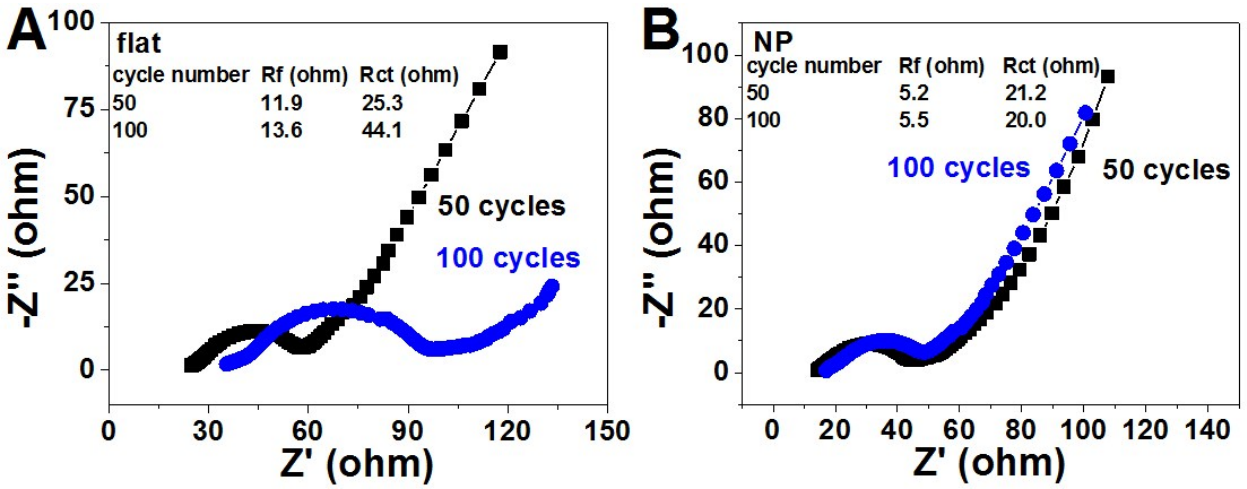

Fig. S7. Impedance spectra of (**A**) flat and (**B**) NP-based Cu current collectors after 50 and 100 charge-discharge cycles at 0.25 C rate with 7.0 mg graphite loading.