Electronic Supplementary Material (ESI) for CrystEngComm

Supporting information

Vapor-phase crystallization route to oxidized Cu foils in air as anode materials for lithium-ion batteries

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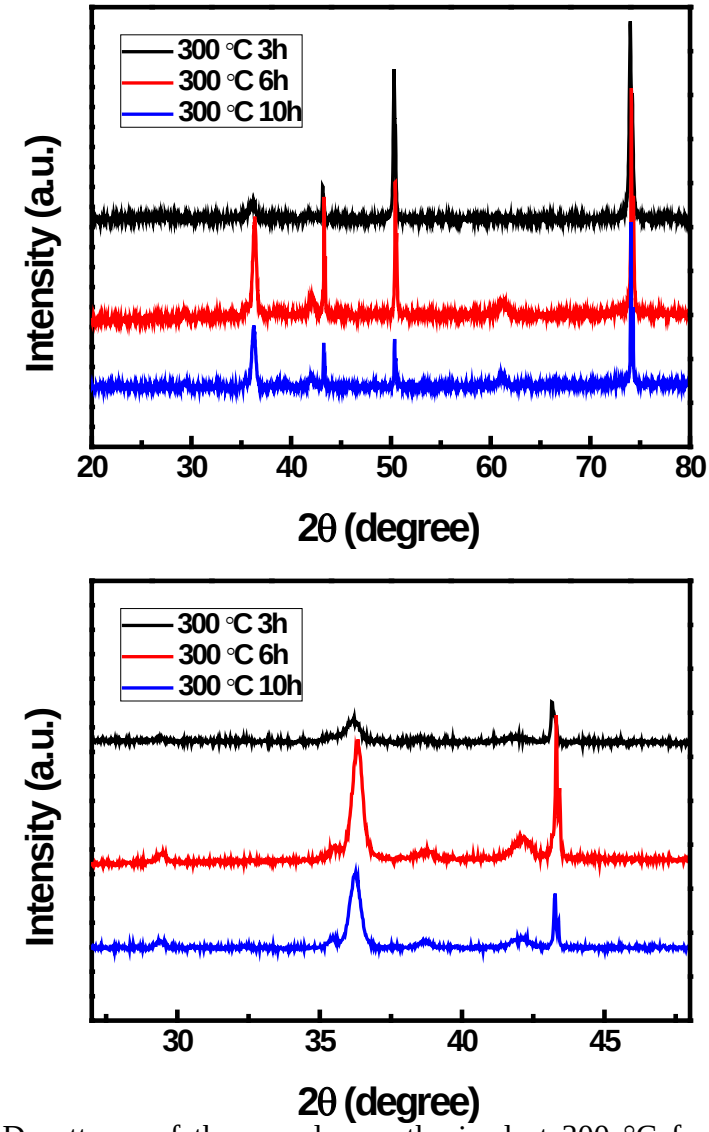

Fig. S1. XRD patterns of the samples synthesized at 300 °C for differetn reaction times (indicated in the graphs).

Table S1 Calculated thickness of the oxidized products upon temperature

Temperature for oxidizing Cu foils	Thickness of the oxidized products (μm)
200 °C	1.4
400 °C	3.9
600 °C	17.0

We calculated the oxide thickness as a function of temperature and time using the following equation:[1,2]

$$d_{oxide}(t) = A\exp(-Q/RT) \times t^{1/2} + d_0$$

where $d_{oxide}(t)$ is the thickness of the formed copper oxide as a function of time,R is the gas constant 8.314×10^{-3} kJ K^{-1} mol^{-1}, T is the temperature, and t is time in minutes, d_0 is the initial copper oxide thickness, and the activation energy Q was found empirically to be 33.1, 42.21, and 78.9 1 kJ mol^{-1} for 200, 400, and 600 °C, respectively. The initial coefficient A is in units of Å·$min^{-1/2}$ with values ranging from 5.518×10^{5} to 6.658×10^{7}.

1 M. Ramirez, L. Henneken and S. Virtanen, *Appl. Surf. Sci.*, 2011, 257, 6481.

2 I. Chung Cheng and A. M. Hodge, *Adv. Eng. Mater.*, 2012, 14, 219.

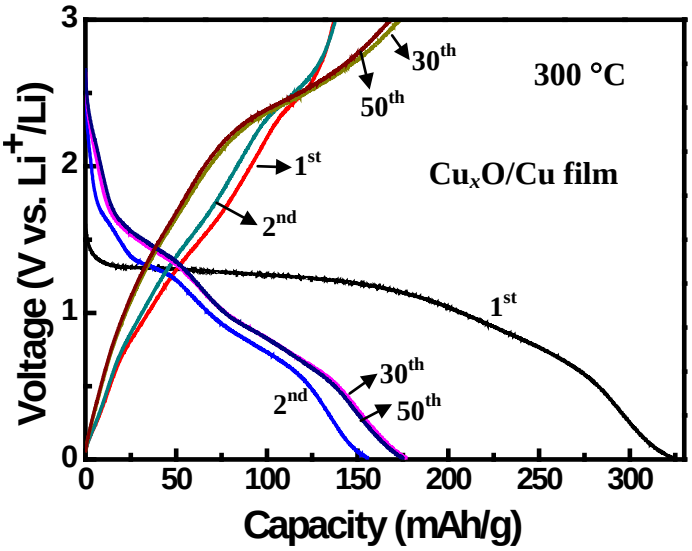

Fig. S2. Typical discharge–charge curves of the copper oxide synthesized at 300 °C

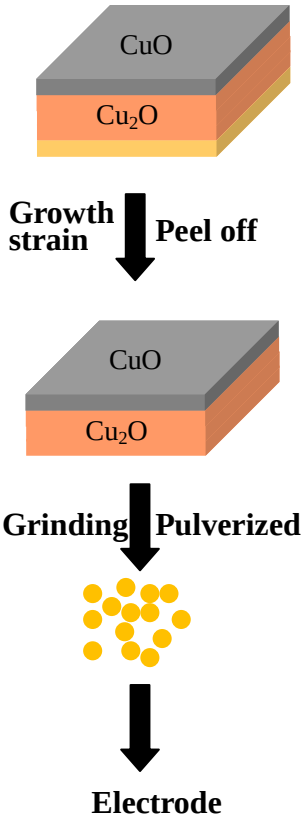

Fig. S3. Schematic illustration of fabricating Cu_xO/C blend electrode.

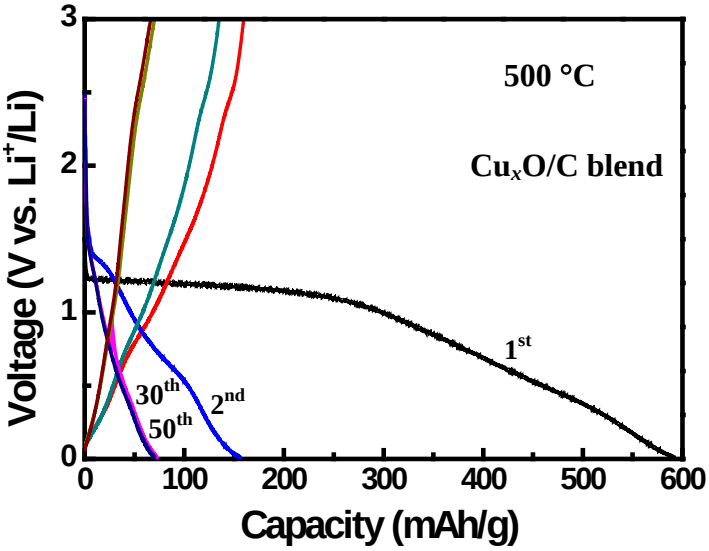

Fig. S4. Typical discharge–charge curves of the copper oxide synthesized at 500 °C

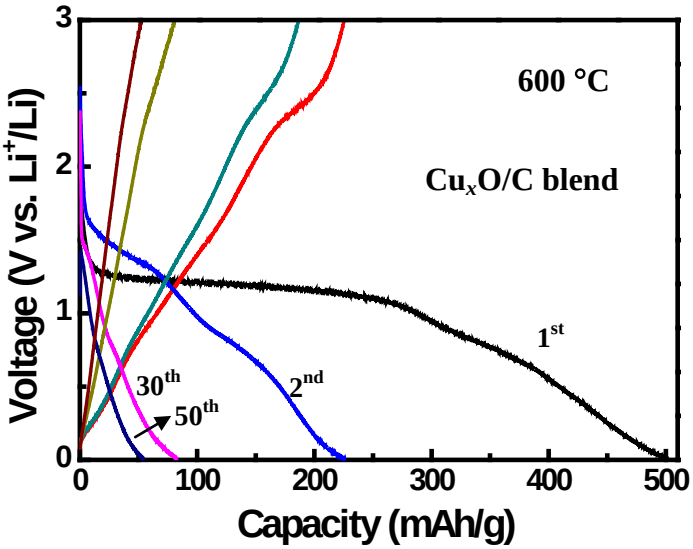

Fig. S5. Typical discharge–charge curves of the copper oxide synthesized at 600 °C.

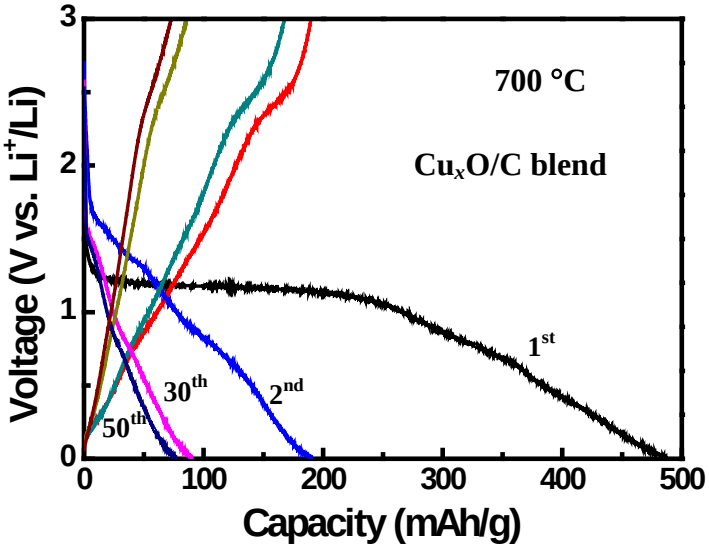

Fig. S6. Typical discharge–charge curves of the copper oxide synthesized at 700 °C.

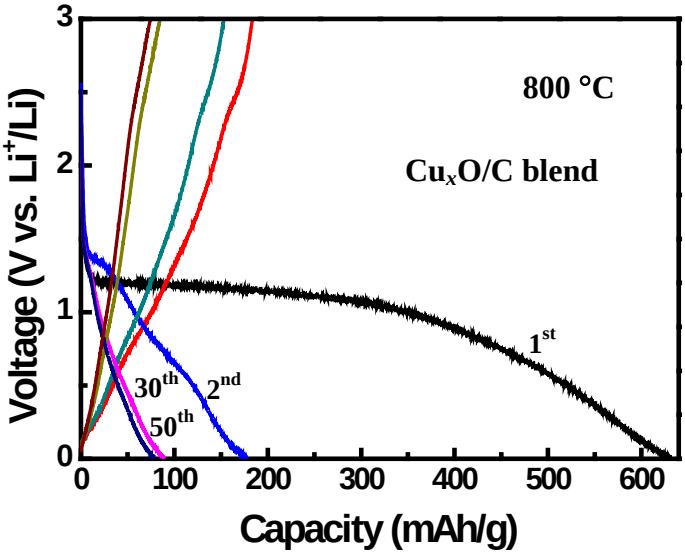

Fig. S7. Typical discharge–charge curves of the copper oxide synthesized at 800 °C.