

Supporting Information

Faceted Cu₂O structures with enhancing Li-ion battery anode performances

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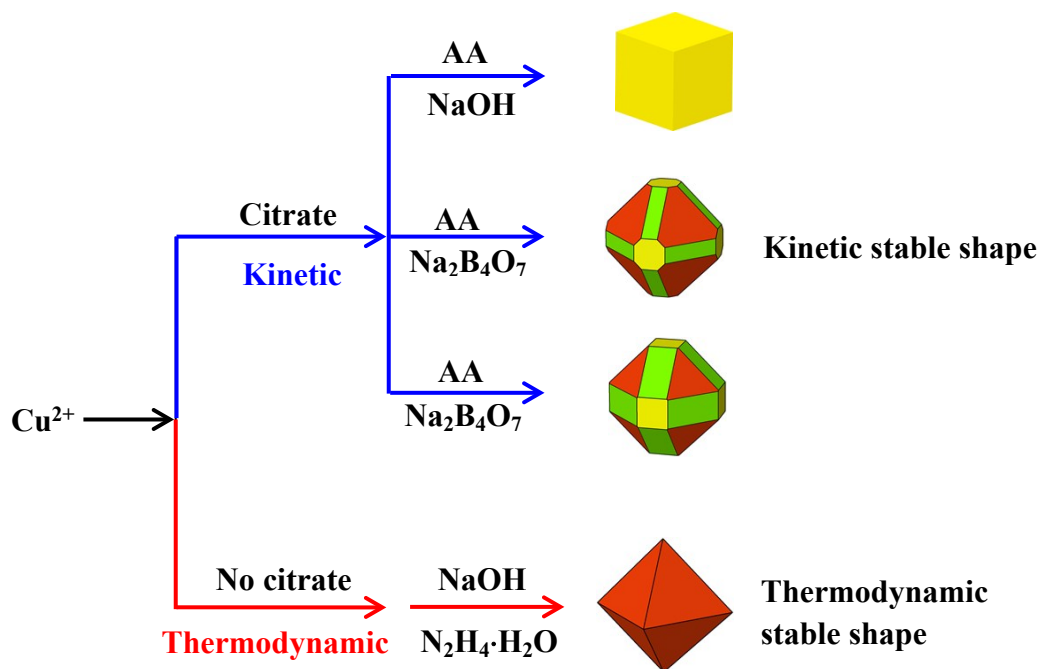


Figure S1 Schematic illustration of chemical reaction and crystallization process based on reduction synthesis of Cu_2O polyhedra from Cu^{2+} .

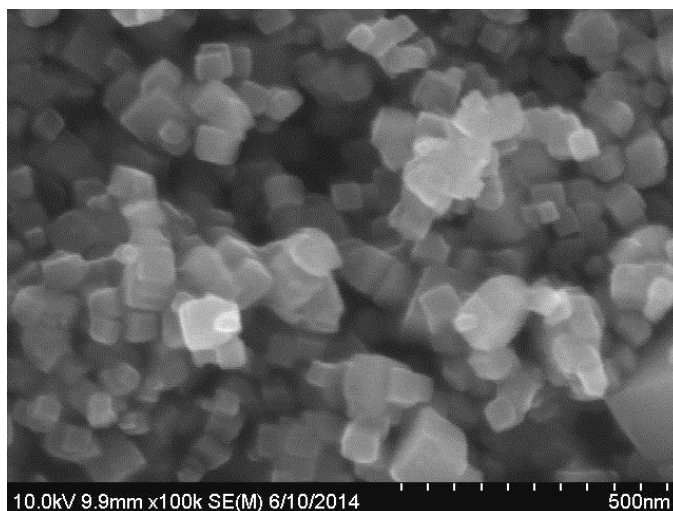


Figure S2 SEM images of Cu_2O cubes synthesized without using citrate.

The synthesis method: 0.5 mmol CuSO_4 and 2 mmol NaOH were dissolved in 14 ml water. Then, 6 ml ascorbic acid (AA, 0.1 M) was added to above solution with stirring. After reaction of about 2-3 h, yellow precipitates were filtered and dried at 50 °C for further characterization.

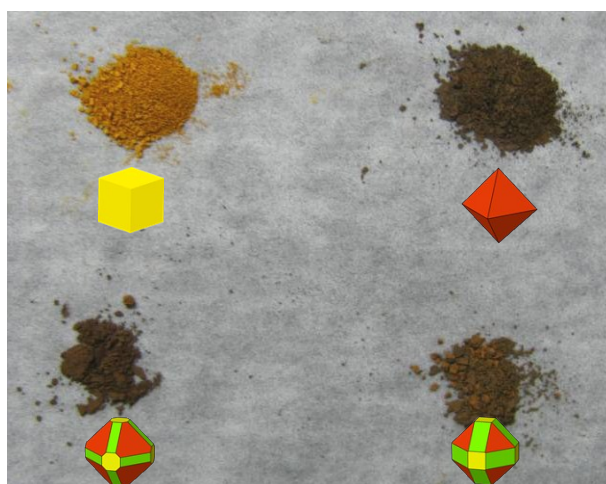


Figure S3 The digital images of the obtained Cu_2O polyhedra.

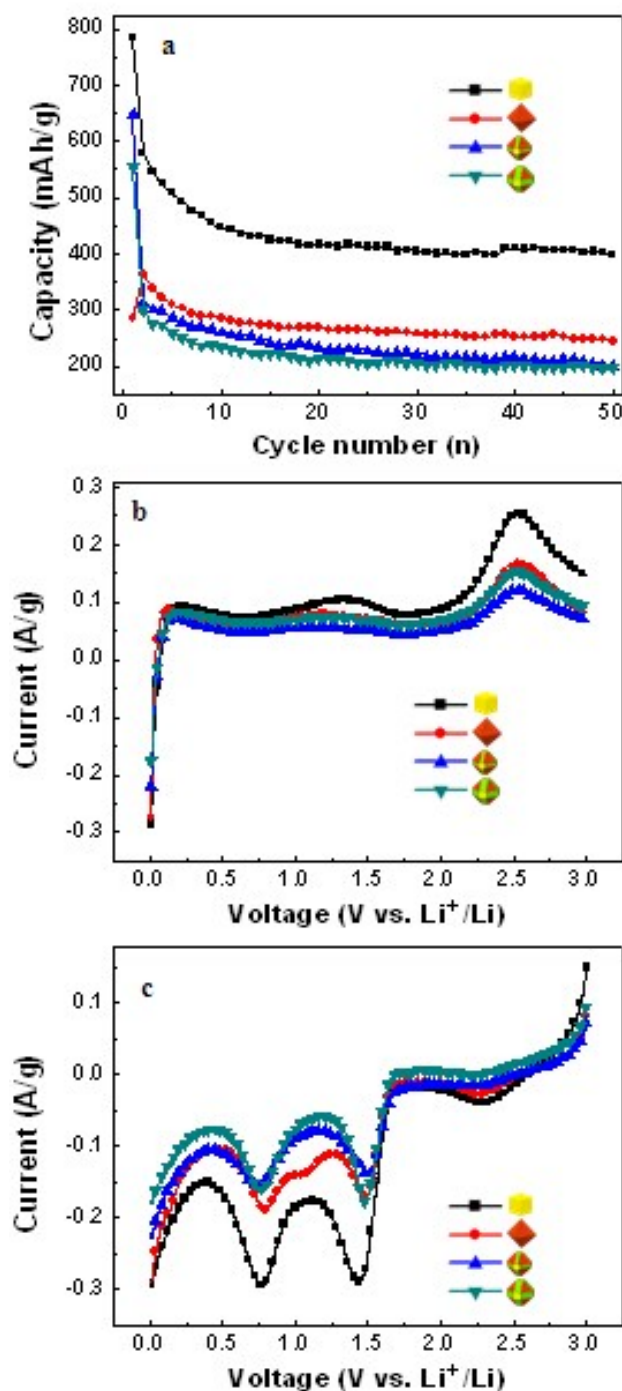


Figure S4 Cycling performance (a) and CV curves (b, c) of Cu₂O with different morphologies: cube, octahedron and truncated octahedron with different degree of {110} facets. Comparison of reduction peak (b) and oxidation peaks (c). Cycling stability of Cu₂O anodes obtained at current rate of 100mA/g. CV curves obtained at the scan rate of 0.3 mV/s and potential range of 0.01-3.0V vs. Li⁺/Li, which were measured after 50 discharge-charge cycles.

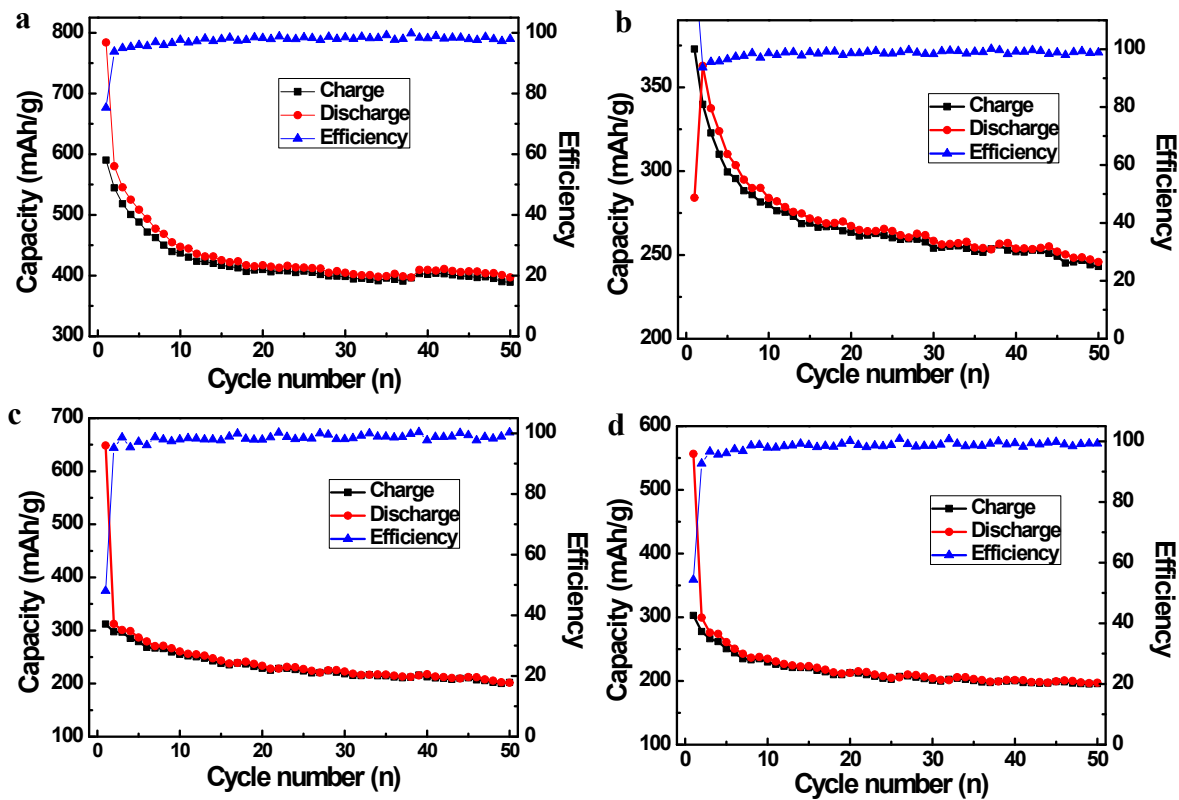


Figure S5 Cycling performance curves of Cu_2O anodes with different morphologies. (a) cube, (b) octahedron, (c) truncated octahedron with exposing small area of {110} planes, and (d) truncated octahedron with exposing large area of {110} planes. Cycling curves of Cu_2O anodes obtained at current rate of 100 mA/g and the potential range of 0.01-3.0 V vs. Li^+/Li .

Table S1 Morphologies and sizes of Cu₂O materials and their lithium ion battery anode performances. 1C = 674 mA/g

Morphology	Size /nm	Reagent	1st capacity/mAhg ⁻¹	Capacity/mAhg ⁻¹ (rate/cycle number)	Ref.
Cube	50-55	CuSO ₄ +NaOH+cit+AA	550	140 (1C/50 cycles)	1
Cube	65-70	CuSO ₄ +NaOH+cit+AA	560	160 (1C/50 cycles)	1
Cube	75-80	CuSO ₄ +NaOH+cit+AA	610	236 (1C/50 cycles)	2
Cube	1-2μm	CuSO ₄ +Na ₂ CO ₃ +cit+glucose	600	390 (0.2C/50 cycles)	2
Octahedron	41±7	Cu(II)ace+ODA+ODE	280	110 (1mA/50 cycles)	3
Octahedron	500-1000	CuSO ₄ +NaOH+N ₂ H ₄	476	87 (100 mAg ⁻¹ /50 cycles)	4
Octahedron	100-150	CuAc ₂ +N ₂ H ₄	700	43 (100 mAg ⁻¹ /50 cycles)	5
26-faceted polyhedron	1μm	CuCl ₂ +NaOH+glucose+SDS +CTAOH	600	105 (80 mAg ⁻¹ /50 cycles)	6
Cube	~100nm	CuSO ₄ + cit + NaOH +AA	784	397 (100 mAg ⁻¹ /50 cycles)	This work

RT=room temperature, cit=trisodium citrate, AA=ascorbic acid, ace=acetylacetonate, ODA= octadecylamine, ODE=1-octadecene.

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