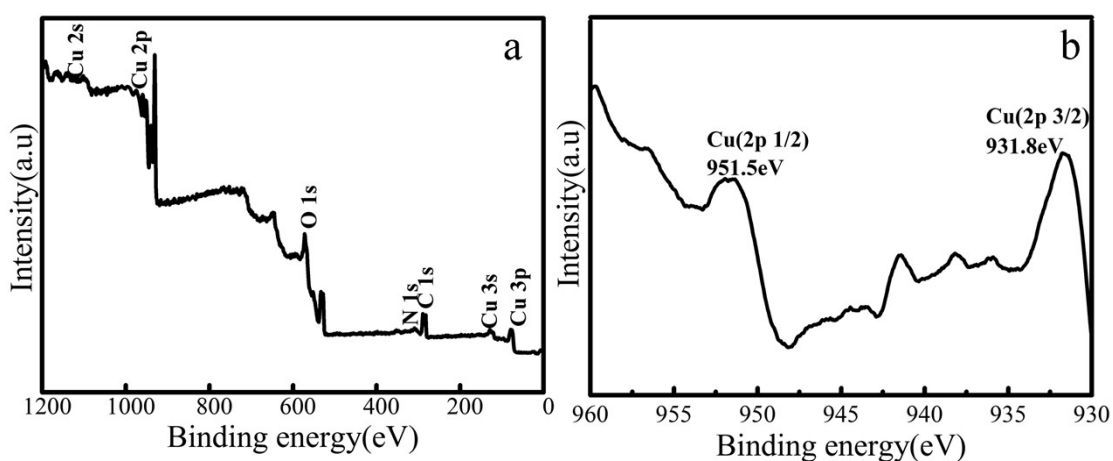


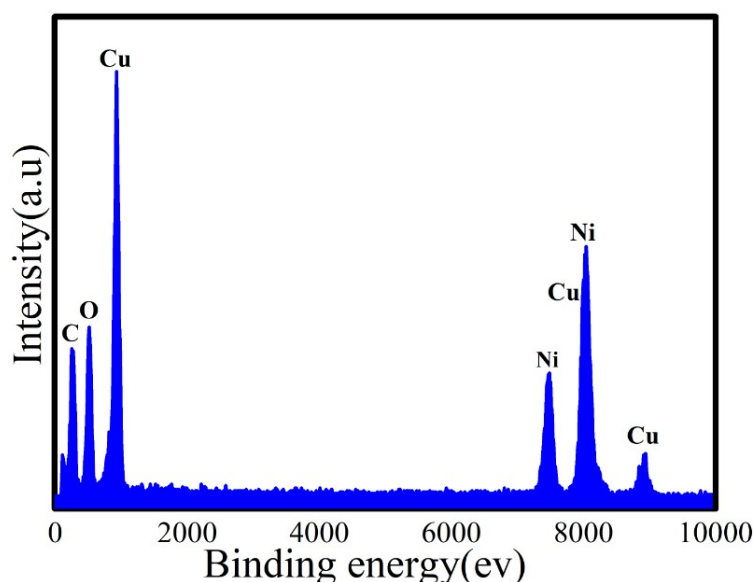
## Supporting information

### Leaf-like copper oxide mesocrystals by collagen-assisted biomineralization show attractive biofunctional and electrochemical performance

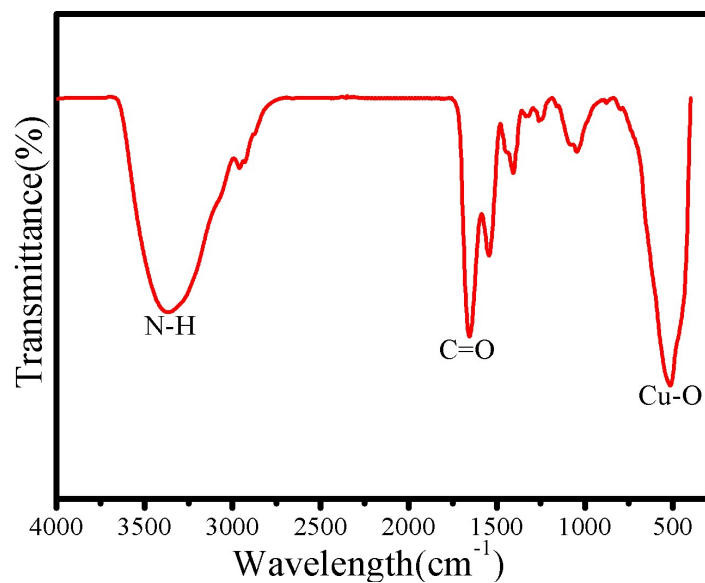
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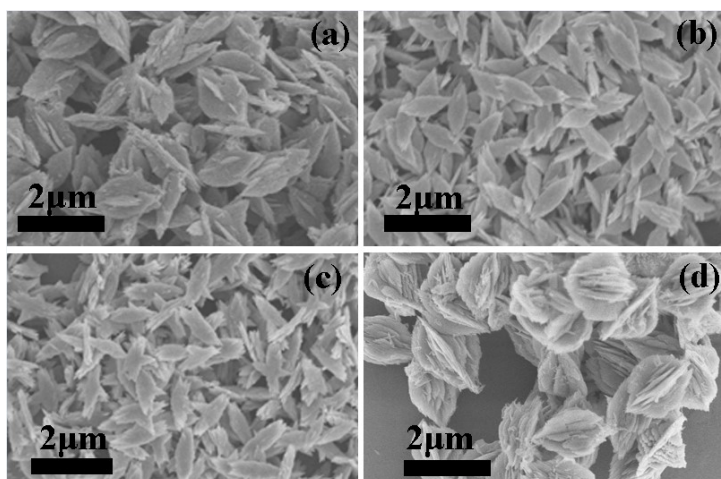
**Figure S1.** XPS spectra of the as-prepared CuO samples obtained after 12 hrs via collagen-templated biomineralization ([collagen] = 0.5 wt %, [Cu(II)] = 0.02 mol/L). (a). Survey spectrum; (b). High-resolution Cu 2p spectrum.



**Figure S2.** EDX spectrum the as-prepared CuO samples obtained after 12 hrs via collagen-templated biomineralization ([collagen] = 0.5 wt %, [Cu(II)] = 0.02 mol/L).



**Figure S3.** FT-IR spectrum of the as-prepared CuO samples obtained after 12 hrs via collagen-templated biomineralization ([collagen] = 0.5 wt %, [Cu(II)] = 0.02 mol/L).



**Figure S4.** FESEM images of CuO nanocrystals obtained after 12 hrs via collagen-templated biomineralization with a constant concentration of collagen ([collagen] = 0.1 wt %) and various concentrations of Cu<sup>2+</sup>: (a) 0.01 mol/L, (b) 0.02 mol/L, (c) 0.03 mol/L, (d) 0.1 mol/L.

**Table S1.** Comparison of the electrochemical performance of CuO nanomaterials as anodes.

Materials	First discharge capacity	Reversible capacity	Cycle performance	Initial coulombic efficiency	Ref.
Bundle-like CuO	1179mAh/g (0.3C)	800mAh/g	666mAh/g (0.3C 50th)	67.85%	1
Almonds-like CuO	1200mAh/g (0.3C)	820mAh/g	590mAh/g (0.3C 50th)	68.33%	2
CuO microspheres	860mAh/g (0.1C)	500mAh/g	500mAh/g (0.1C 25th)	58.12%	3
leaf-like CuO nanoplate	1094.7mAh/g	661.9mAh/g	/	59.5%	4
CuO microspheres	967.1mAh/g (0.1C)	601.6mAh/g	569.8mAh/g (0.1C 50th)	62.2%	5
CuO microspheres	1063.9mAh/g (0.1C)	589.6mAh/g	429mAh/g (0.1C 50th)	62.4%	6
CuO nanorods	/	/	654 mAh/g (0.5C 200 <sup>th</sup> )	97%	7
CuO nanosheets		467mAh/g	442 mAh/g	60%	8
CuO nanoparticle	1196mAh/g (0.5C)	/	540mAh/g (0.5C 100 <sup>th</sup> )	/	9
leaf-like CuO	880 mAh/g	648.6mAh/g	694.7mAh/g	73.7%	10
leaf-like CuO	1002.4 mAh/g (0.1C)	563.8mAh/g	421mAh/g (0.1 C 55 <sup>th</sup> )	72.7 %	11
needle-like CuO	1047mAh/g	/		65%	12
Lotus leaf-like structure	1369mAh/g (0.2C)	1041mAh/g	910mAh/g (0.2C 80 <sup>th</sup> )	76%	This work

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