Electronic Supplementary Information

Liquid Metal-Supported Synthesis of Cupric Oxide

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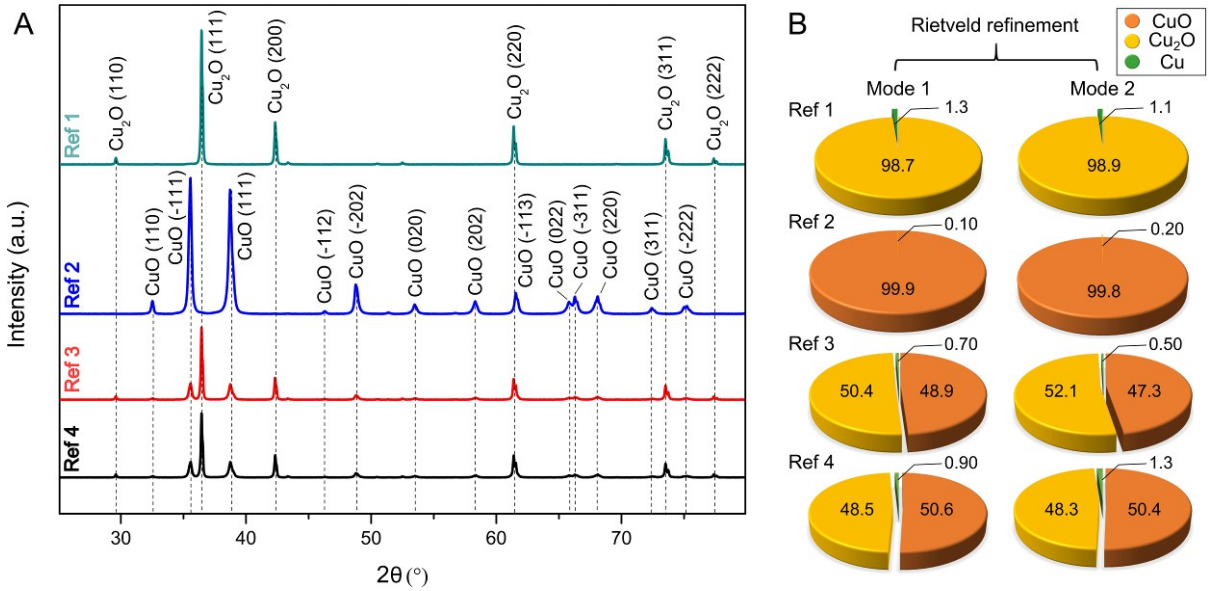

Fig. S1. X-ray diffraction analysis of CuO and Cu_2O reference samples. (A) XRD patterns. (B) Rietveld phase quantification.

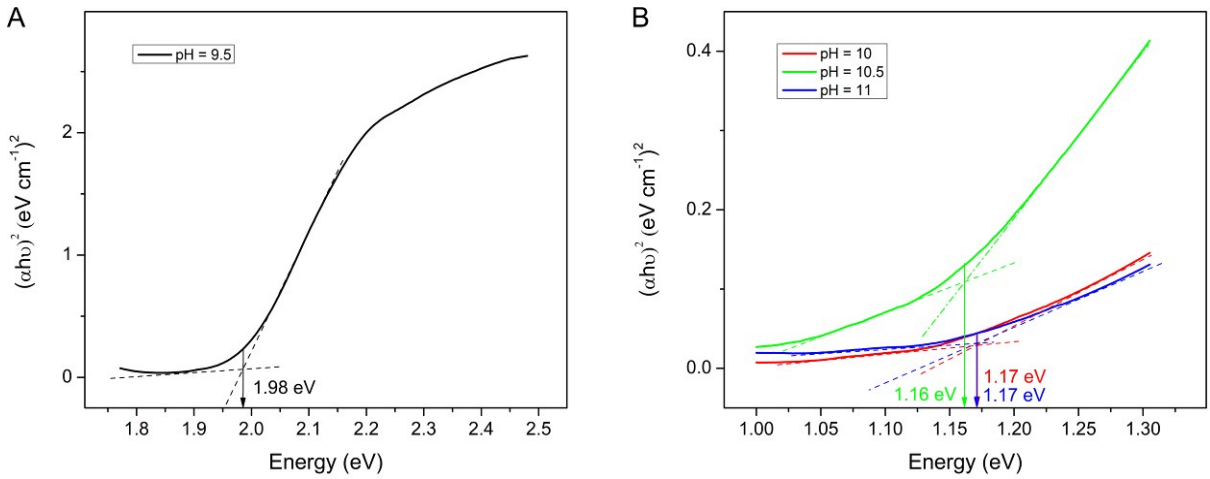

Fig. S2. Tauc plots extrapolated from data in Fig. 5. (A) Tauc plot of the visible light absorption spectrum in the wavelength range of 480 to 680 nm. (B) Tauc plots of the near infrared light absorption spectra in the range of 950 to 1800 nm.

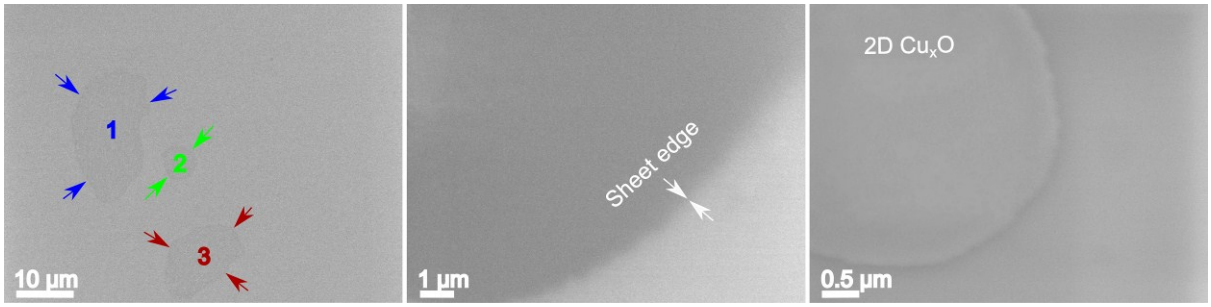

Fig. S3. SEM images of sheets exfoliated form the suface of the bulk LM. The sheet was obtained by limiting the reaction time to 1 sec. The sample was touch-printed on Si wafer. In this experiment, 50 µL of 1.0 M NaOH solution was added onto a galinstan droplet (120 µL) in a glass petri-dish. The NaOH solution was left on galinstan for 2.0 min before it was removed using a Pasteur pipette. Approximately 4.5 ml of stock solution (made from 8 ml of 0.25 M NH_4OH and 14 ml of 0.01 M $CuSO_4$) of pH = 10.5 was added over galinstan (120 µL).

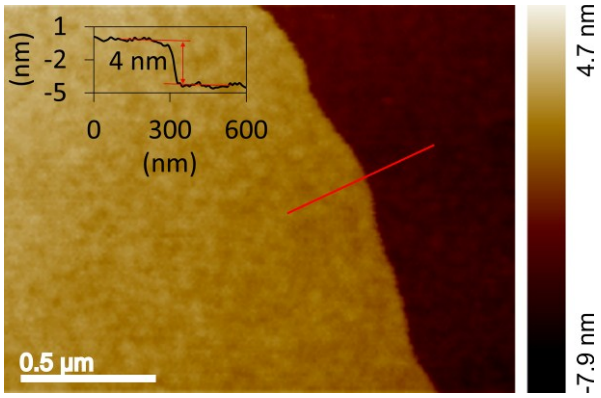

Fig. S4. AFM analysis of smooth and thin sheets exfoliated from the surface of the bulk LM. The sheet was obtained by limiting the reaction time to 1 sec. The sample was touch-printed on Si-SiO_2 wafer. Details of synthesis conditions are given in the caption of Fig. S3.

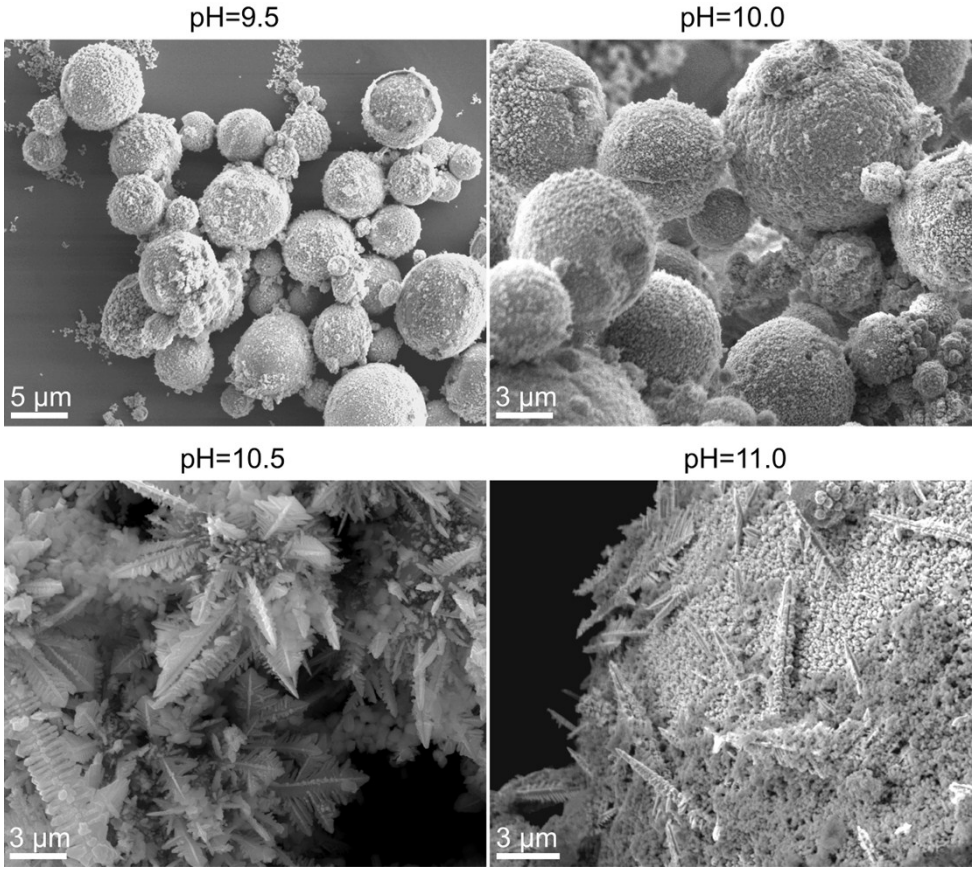

Fig. S5. SEM Images of Cu_xO-micronised LM composites synthesised at different pH.

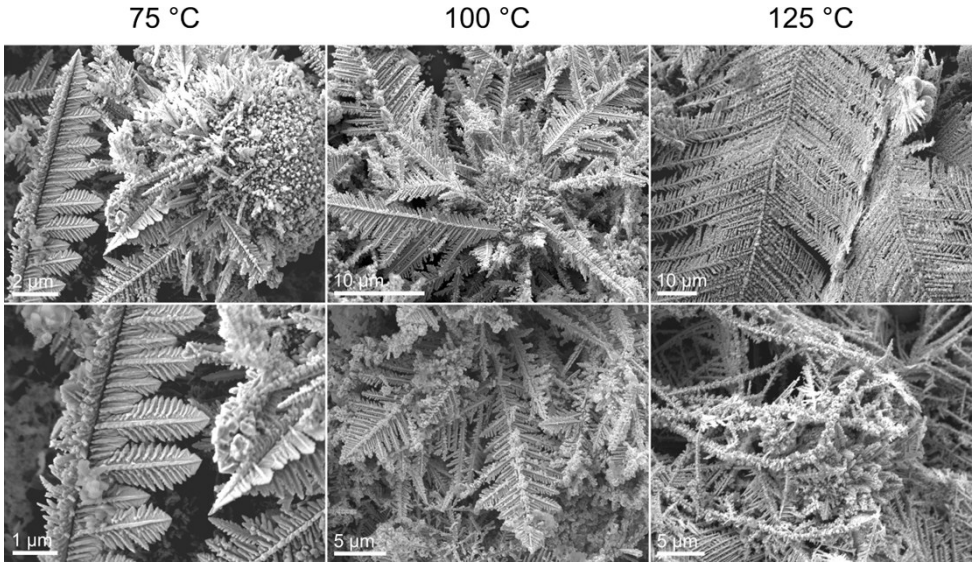

Fig. S6. SEM images of CuO-micronised LM composites obtained at different temperatures, pH of 10.5, and 45 min reaction time.

Table S1. Summary of previous research on the photocatalytic activity of CuO (single phase and composite).

Catalyst	Morphology of the catalyst	Catalyst loading (g/L)	Light source	Co-catalyst	Photocatalytical conversion after 120 min	References
CuO/LM	Dendritic	0.2	100 W xenon lamp	N/A	96%	This work
CuO/Cu_2O	Thin films	N/A	300 W xenon lamp	N/A	80%	[1]
Cu_2O/Cu	Nanowires	0.28	300 W xenon lamp	N/A	67%	[2]
CuO	Nano-clinoptilolites	0.2	75 W mercury lamp	N/A	30%	[3]
CuO/zeoliteX	Nanoparticles	0.1	75 W mercury lamp	N/A	4%	[4]
CuO/Graphene oxide	Nanoparticles	0.2	N/A	H_2O_2	70%	[5]
CuO/graphene/TiO_2	Frost-like	0.5	N/A	N/A	60%	[6]
CuO/CeO_2/Graphene oxide	Agglomerates	0.5	300 W xenon lamp	H_2O_2	95%	[7]
CuO/TiO_2/Graphene	Nano-sheets	0.6	100 W mercury lamp	N/A	44%	[8]

References

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