

Effect of Particle Size of $\text{La}_5\text{Ti}_2\text{CuS}_5\text{O}_7$ on Photoelectrochemical Properties in Solar Hydrogen Evolution

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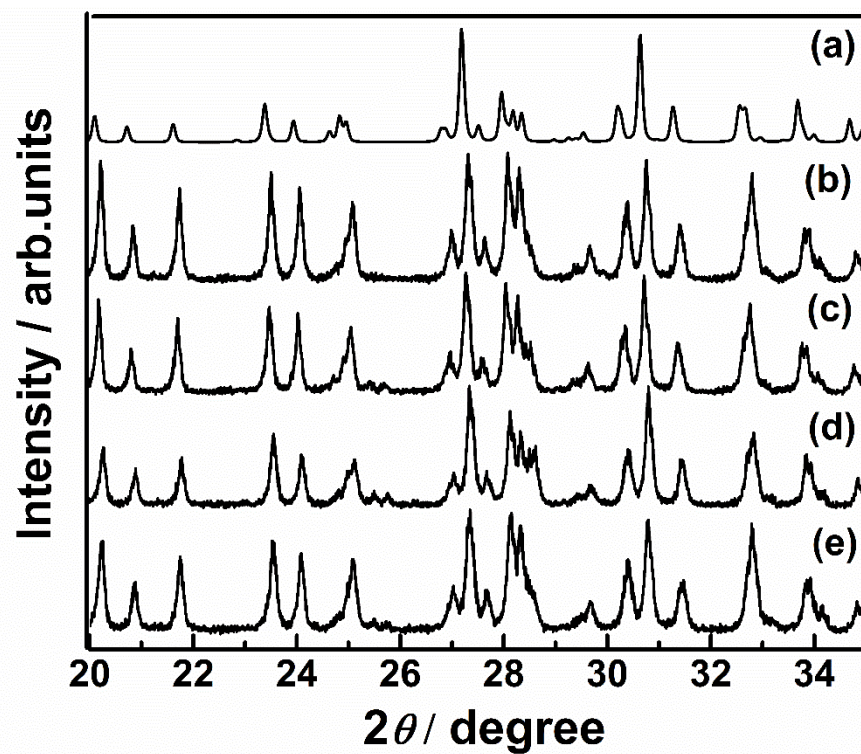


Figure S1. XRD patterns for (a) the reference LTC (ICSD #99612),^{S1} (b) undoped, (c) Sc-doped, (d) Mg-doped, and (e) Al-doped LTC.

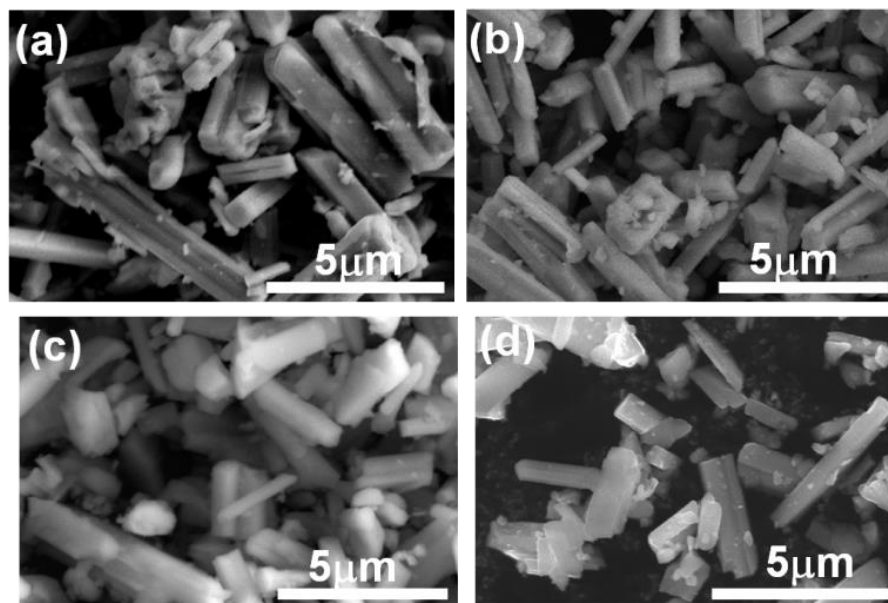


Figure S2. SEM images for (a) undoped, (b) Sc-doped (c) Mg-doped, and (d) Al-doped LTC.

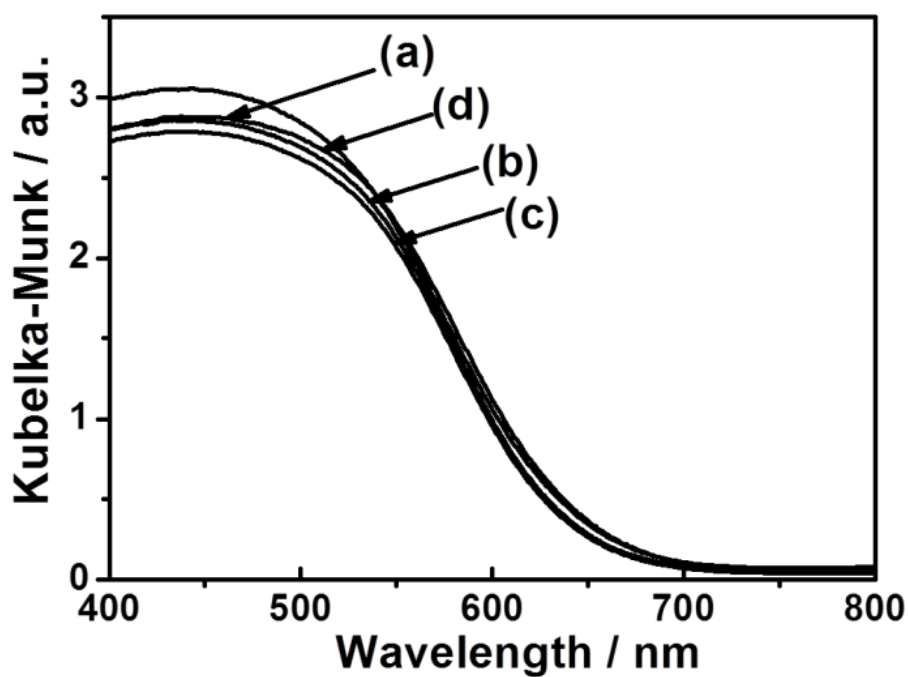


Figure S3. DRS for (a) undoped, (b) Sc-doped (c) Mg-doped, and (d) Al-doped LTC.

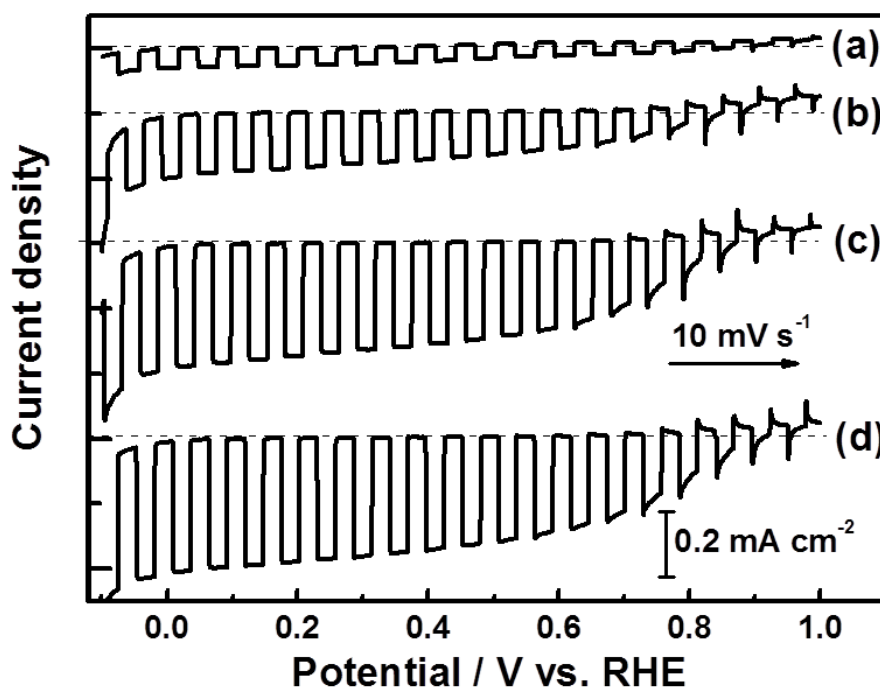


Figure S4. Current-potential curves for (a) undoped, (b) Sc-doped, (c) Mg-doped, and (d) Al-doped LTC photocathodes under chopped simulated sunlight illumination.

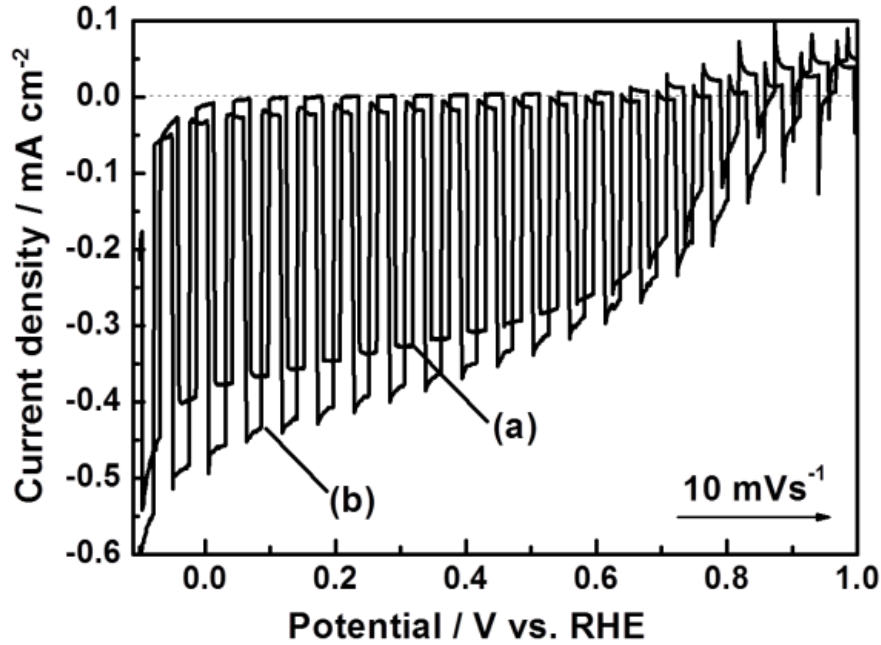


Figure S5. Current-potential curves for photocathodes of Mg-doped LTC powders synthesized with annealing durations of (a) 48 and (b) 96 h. The measurements were carried out in a 0.1 M Na₂SO₄ aqueous solution (pH 10) under chopped simulated sunlight irradiation. The photocathodes were modified with Pt by photodeposition.

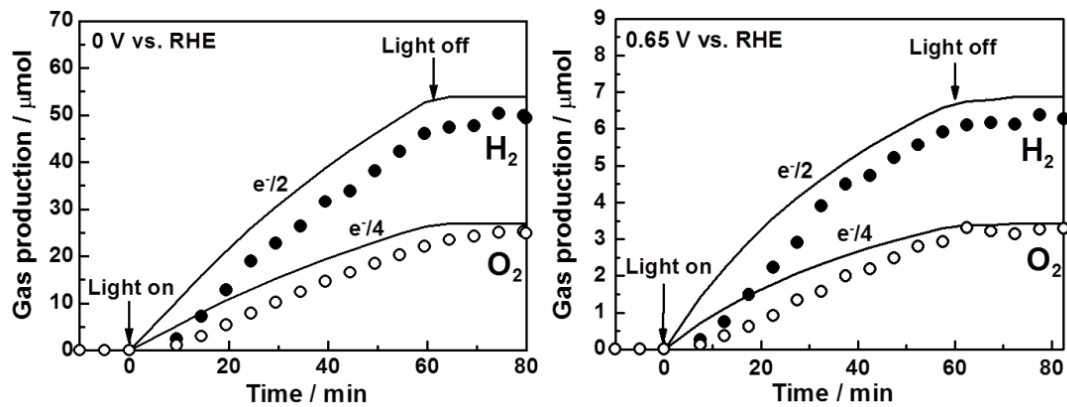


Figure S6. Time courses of hydrogen and oxygen evolution using a Mg-doped LTC photocathode (annealed for 96 h; projected area 2.0 cm²) in a three-electrode configuration under visible light irradiation ($\lambda > 420$ nm) by a 300 W Xe lamp equipped with a 420 nm long-pass cutoff filter and a dichroic mirror. The electrode potentials employed were 0 (left panel) and 0.65 V (right panel) vs. RHE. The solid

curves labelled $e^-/2$ and $e^-/4$ show the numbers of hydrogen and oxygen molecules that are generated at unity faradaic efficiency, respectively. The measurements were carried out in 0.1 M Na_2SO_4 aqueous solution adjusted to pH 10.

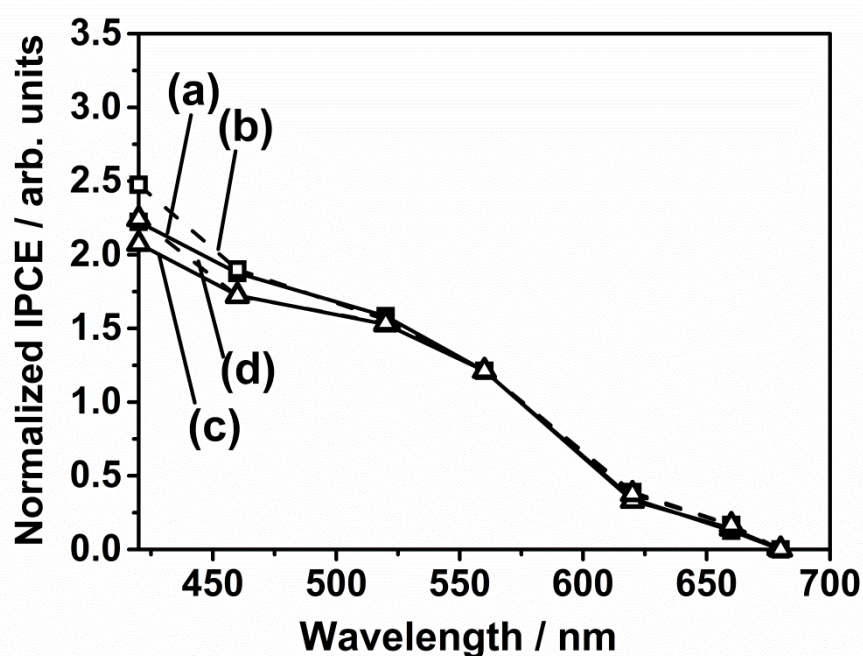


Figure S7. Normalized IPCE spectra of (a,b) large-sized Mg-doped LTC measured at (a) 0 and (b) 0.65 V vs. RHE and (c,d) small-sized Mg-doped LTC measured at (c) 0 and (d) 0.65 V vs. RHE in Na_2SO_4 aqueous solution adjusted to pH 10. The photocathodes were modified with Pt by photodeposition.

Reference

S1. V. Meignen, L. Cario, A. Lafond, Y. Moëlo, C. Guillot-Deudon, A. Meerschaut, *J. Solid State Chem.*, 2004, **177**, 2810.