

Supplementary Information

Liquid Phase Epitaxy of CuGaO₂ on GaN: P-N Heterostructure for Photocatalytic Water Splitting

Hadi Sena^{1,2*}, Sho Kitano³, Hiroki Habazaki³, Masayoshi Fuji^{1,2}

¹ Advanced Ceramic Research Center, Nagoya Institute of Technology, Tajimi 507-0033, Japan

² Department of Life Science and Applied Chemistry, Nagoya Institute of Technology, Tajimi 507-0071, Japan

³ Division of Applied Chemistry, Faculty of Engineering, Hokkaido University, 060-8628 Japan

Corresponding Author

[*sena.hadi@nitech.ac.jp](mailto:sena.hadi@nitech.ac.jp)

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Experimental procedure of CuGaO₂ synthesized by a hydrothermal method.

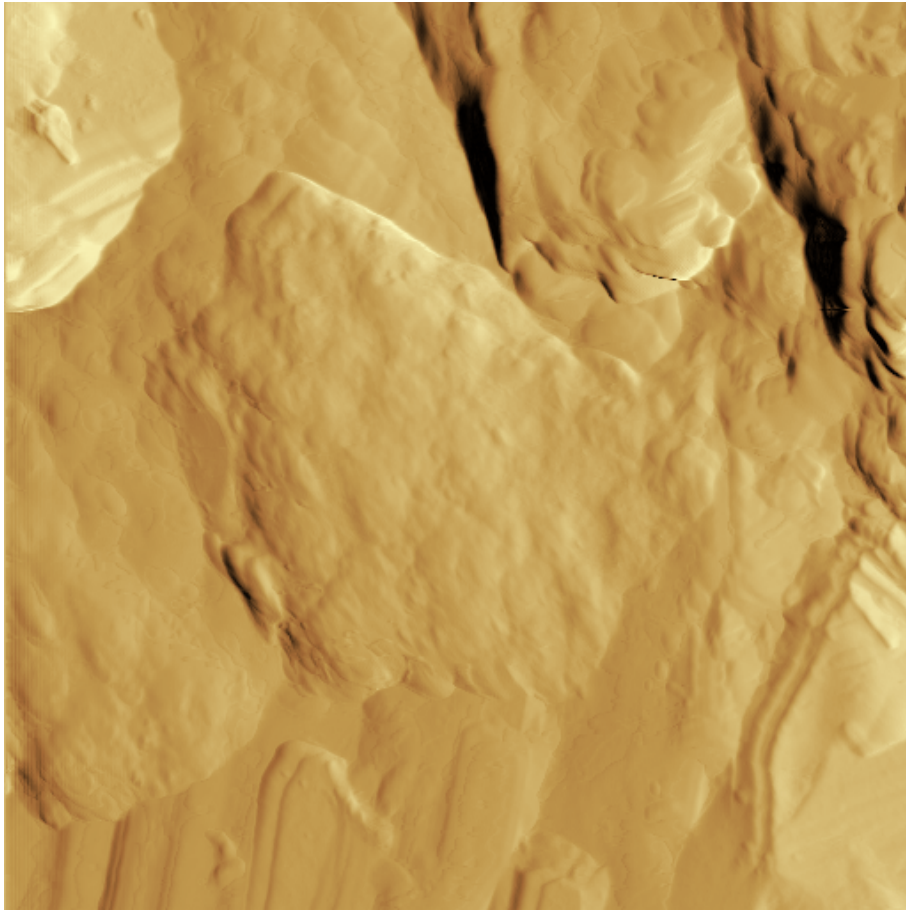


Figure S1. Atomic force microscopy image of the CuGaO₂ film on GaN substrate in the scan area of 2 μm x 2 μm .

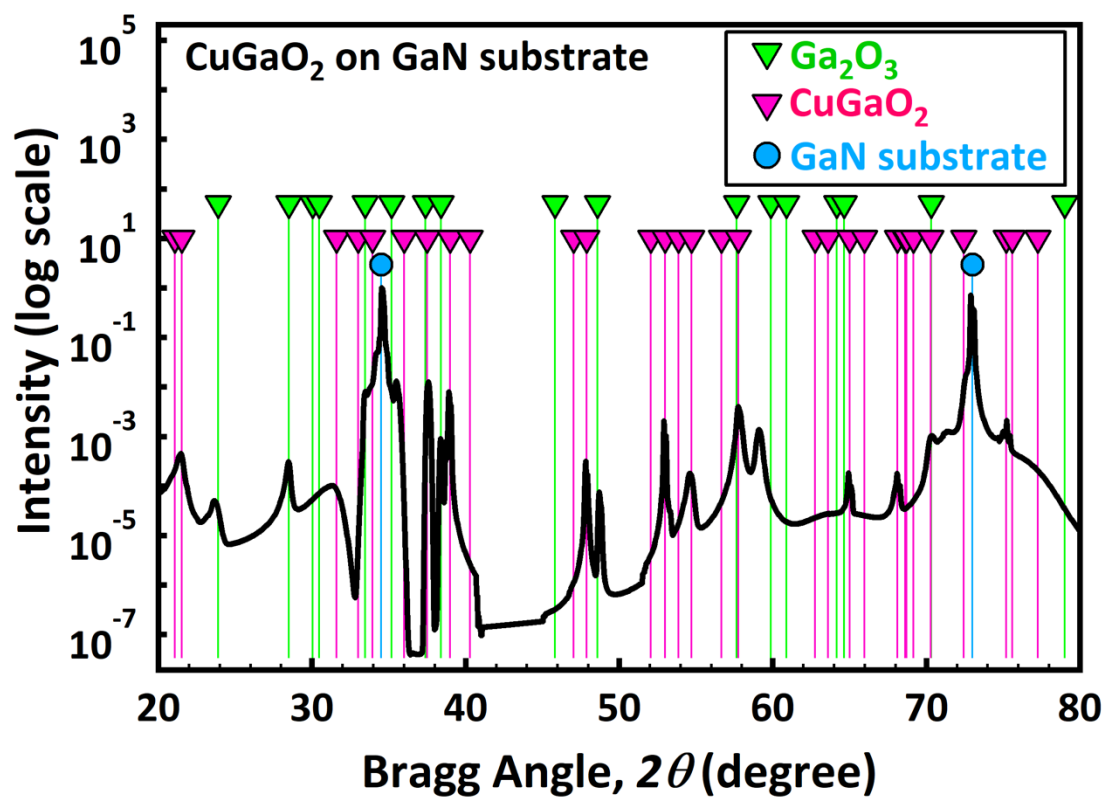


Figure S2. XRD profile of the CuGaO_2 film on GaN substrate. The intensity is in the log scale.

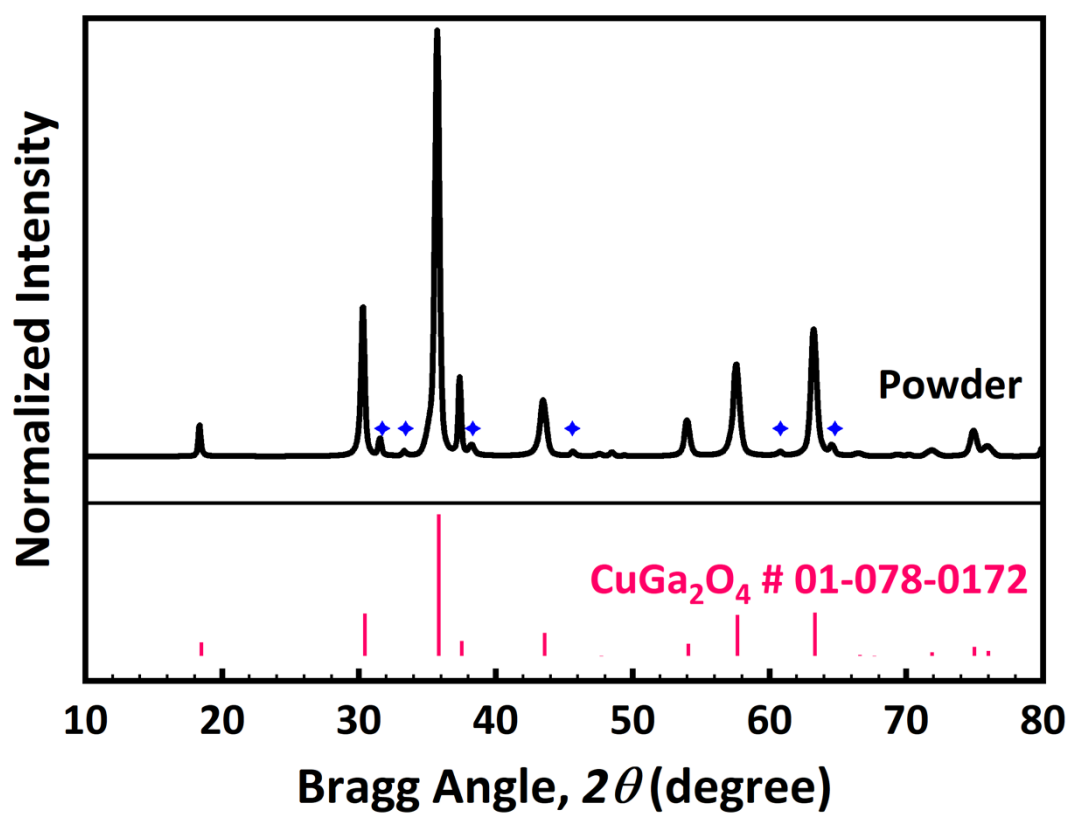


Figure S3. XRD profile of the powder synthesized inside the crucible. Star markers are related to Ga_2O_3 impurities.

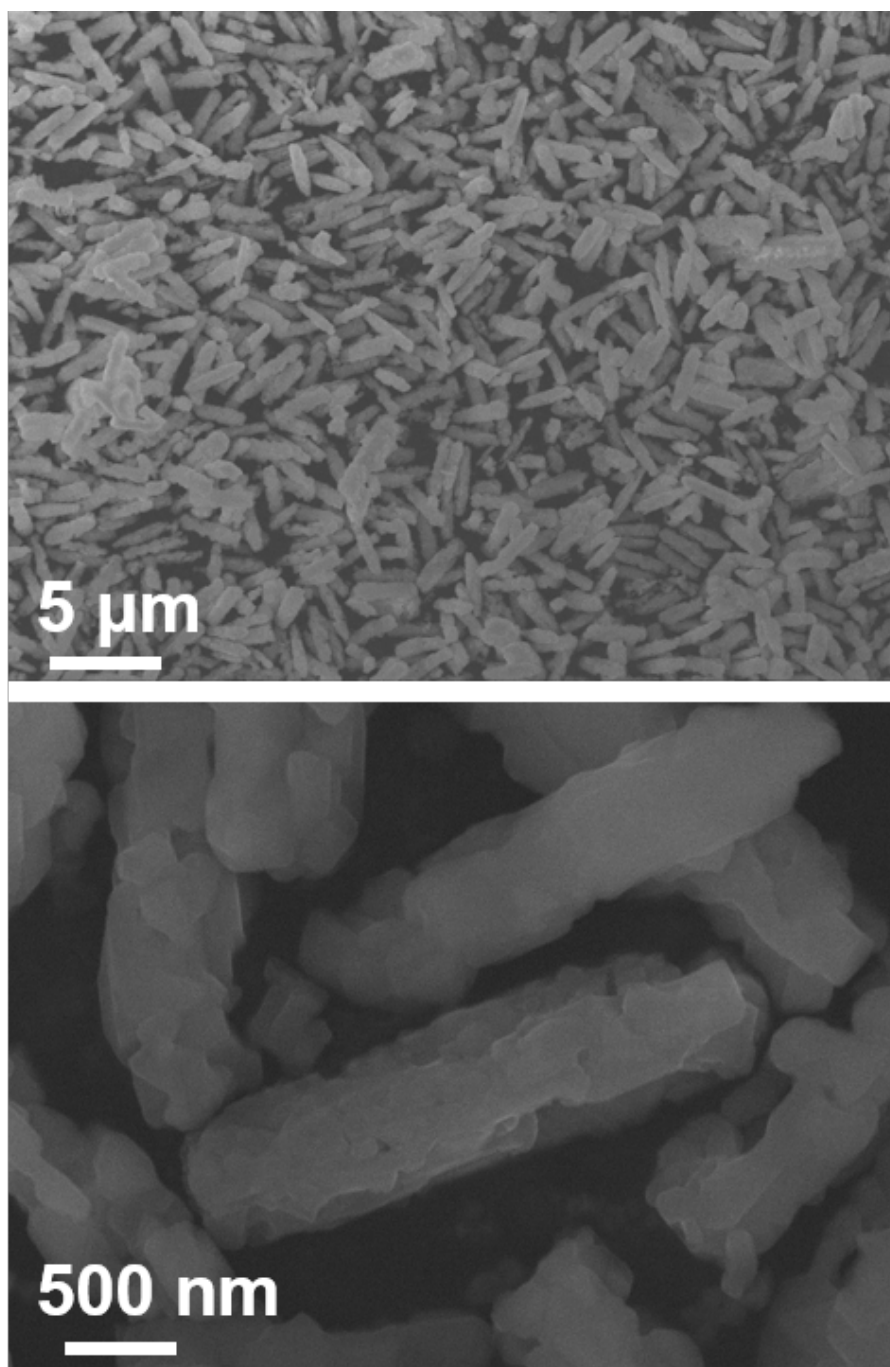


Figure S4. SEM micrographs of the powder synthesized inside the crucible. (upper): low-magnification, (lower): high-magnification.

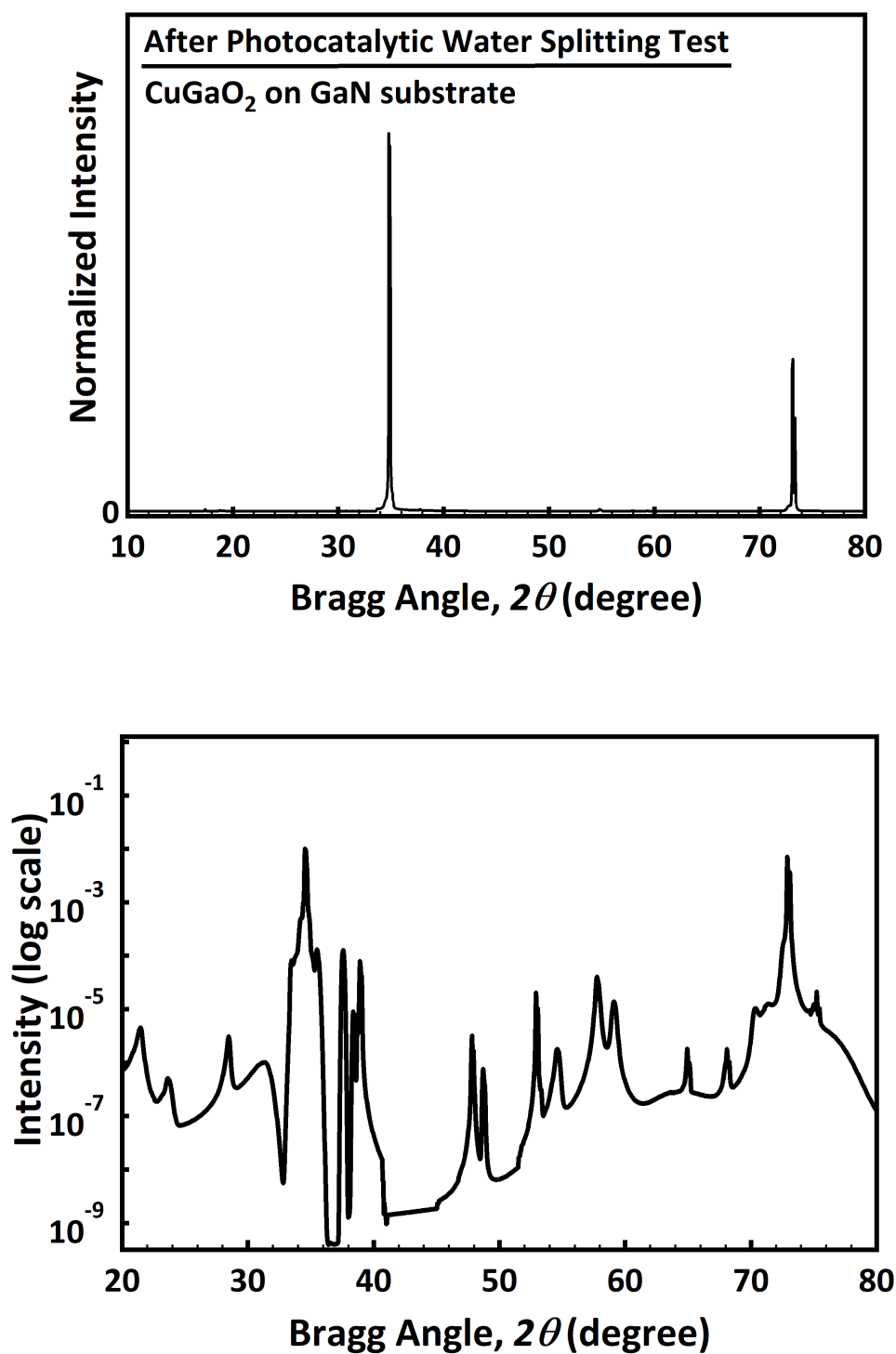


Figure S5. XRD profile of the CuGaO₂ film on GaN substrate after photocatalytic test for confirming the stability of the photocatalyst. (Upper): Normalized Intensity, (Lower): log scale.

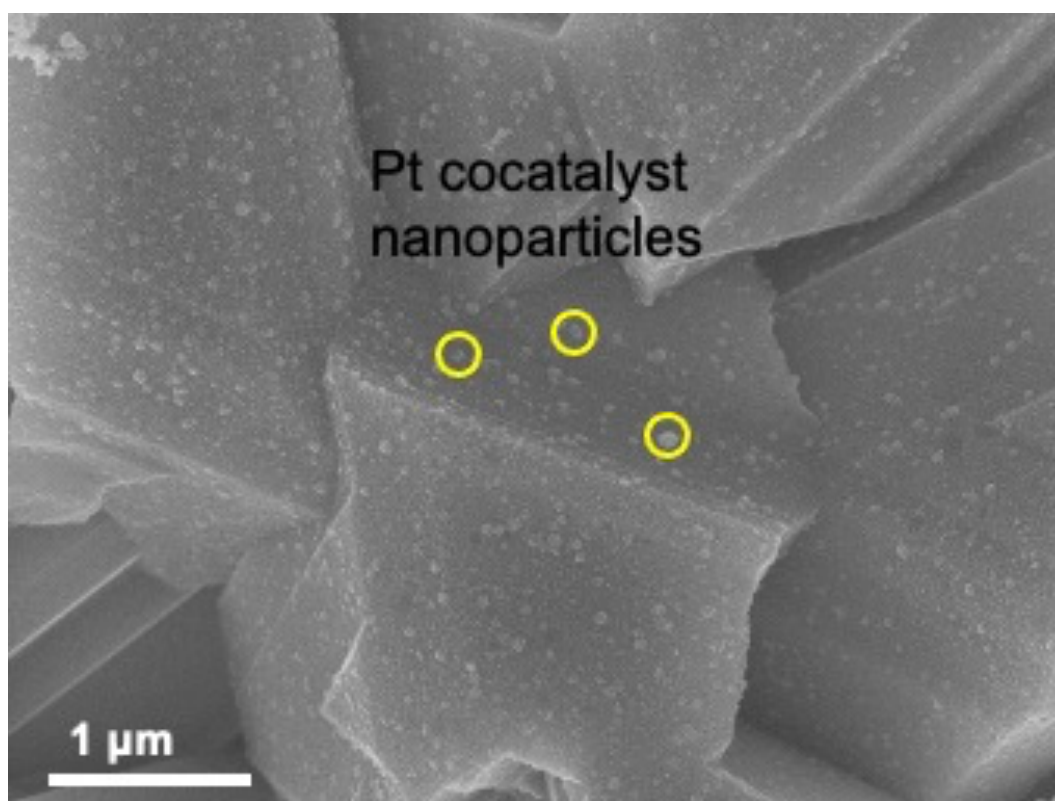


Figure S6. SEM micrograph of Pt cocatalyst nanoparticles on the surface of CuGaO₂ film on GaN substrate. Some representative Pt particles are shown with yellow circles.

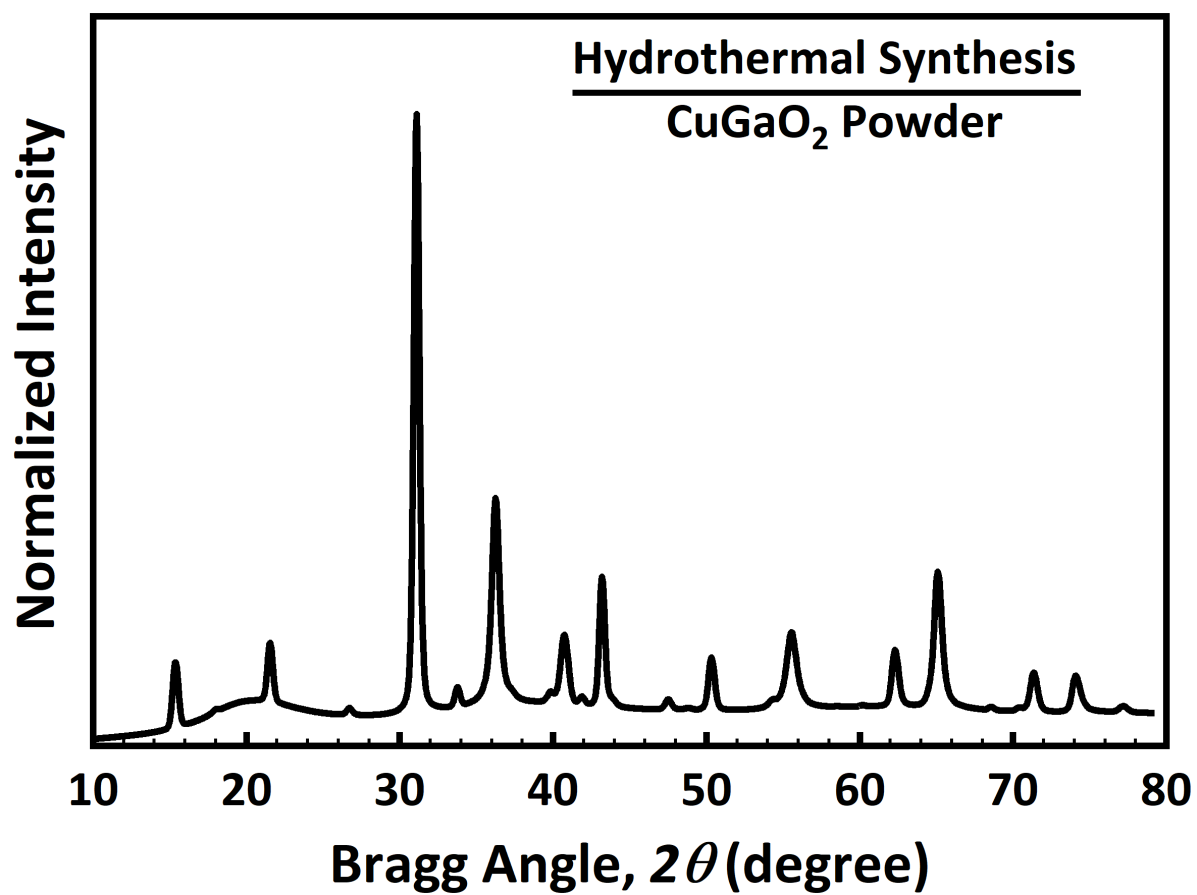


Figure S7. XRD profile of the hydrothermally synthesized CuGaO₂.

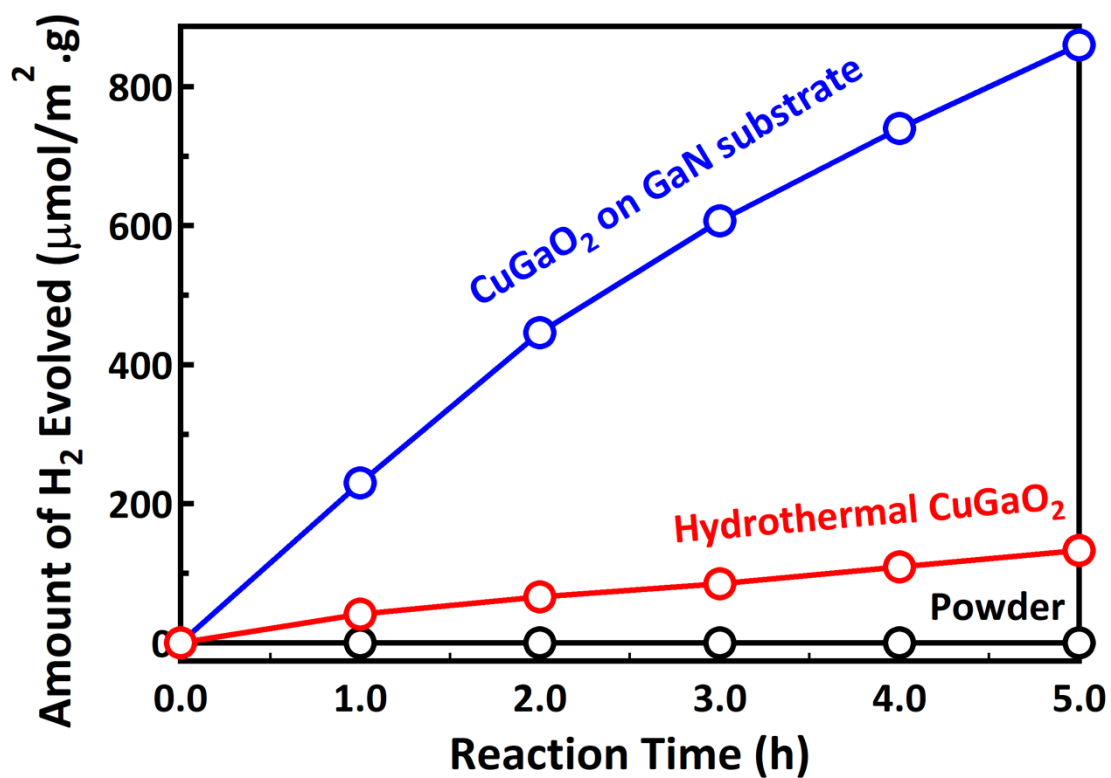


Figure S8. Photocatalytic hydrogen generation of the hydrothermally synthesized CuGaO₂.

Experimental procedure of CuGaO₂ synthesized by a hydrothermal method.

The CuGaO₂ was synthesized by the classical alcohol reduction method at low temperature. 5 mmol of Ga(NO₃)₃.xH₂O and 5 mmol of Cu(NO₃)₂·3H₂O were dissolved in 40 mL deionized water. Then, 1 M KOH water solution was slowly added to the mixture and the pH was adjusted to 7.5. After that, the hydrothermal precursor was transferred to a 150 mL container and reacted at 230°C for 3 h. After discarding the supernatant, the collected precipitates were washed with diluted ammonia (5 wt%), nitric acid solution (5 wt%) and deionized water 5 times. Finally, pure CuGaO₂ was obtained by washing the product with ethanol 3 times.