Electronic Supplementary Material (ESI) for Industrial Chemistry & Materials.

Triphase photocatalytic water-gas-shift reaction for hydrogen production with enhanced interfacial diffusion at gas-liquid-solid interfaces

Huige Chen,[ab] Zhenhua Li,[a] Chao Zhou,[a] Run Shi*[a] and Tierui Zhang*[ab]

[a] Key Laboratory of Photochemical Conversion and Optoelectronic Materials, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing 100190, China.

[b] Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing 100049, China.

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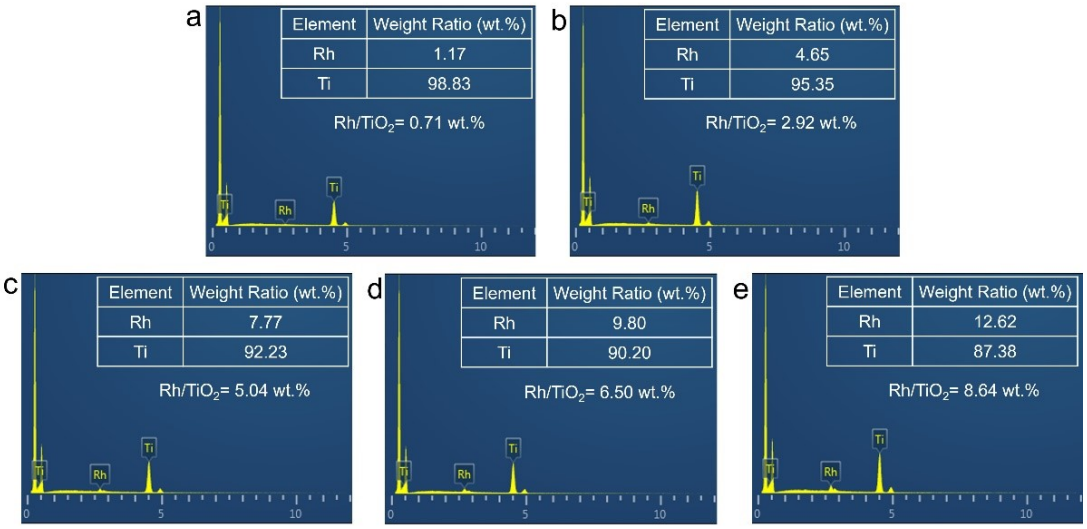

Fig. S1 EDS elemental analysis of the *x* wt.% Rh/TiO_2 (*x* = 1, 3, 5, 7, and 9).

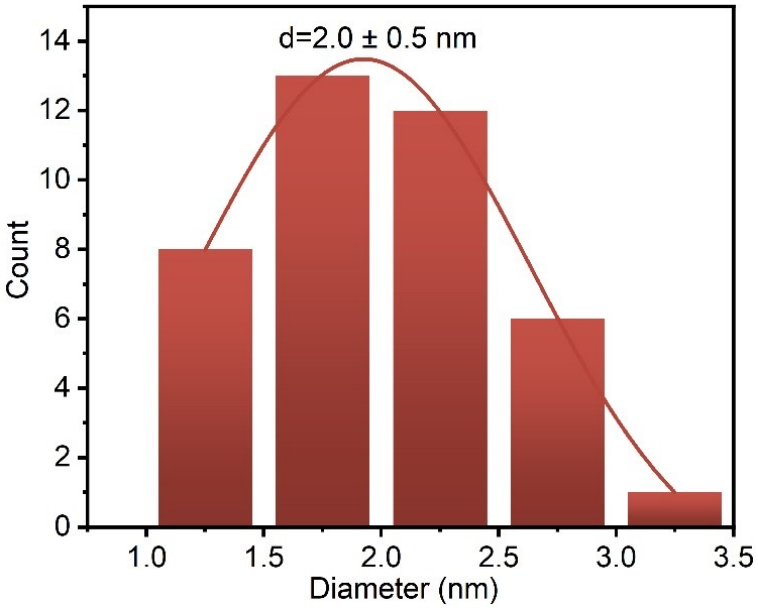

Fig. S2 Rh particle size distribution of Rh/TiO_2.

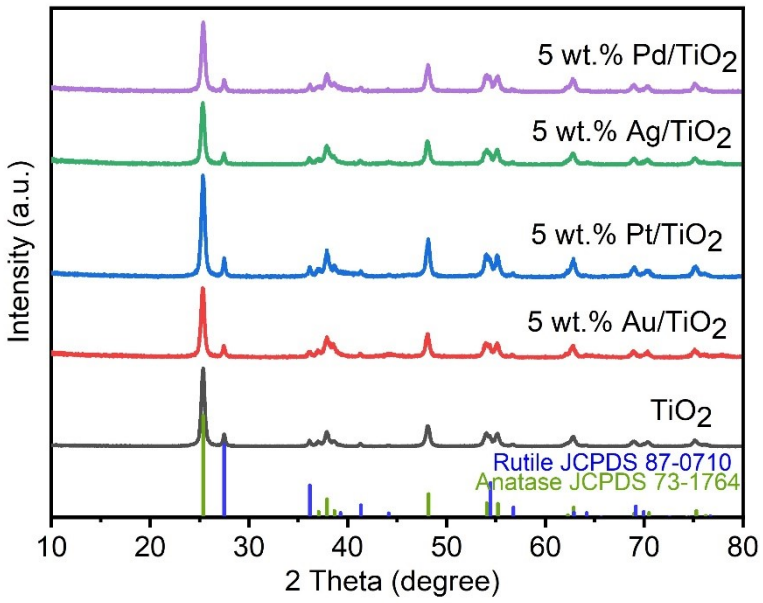

Fig. S3 XRD patterns of pristine TiO_2 and 5 wt.% M/TiO_2 (M = Au, Ag, Pt, and Pd) photocatalysts.

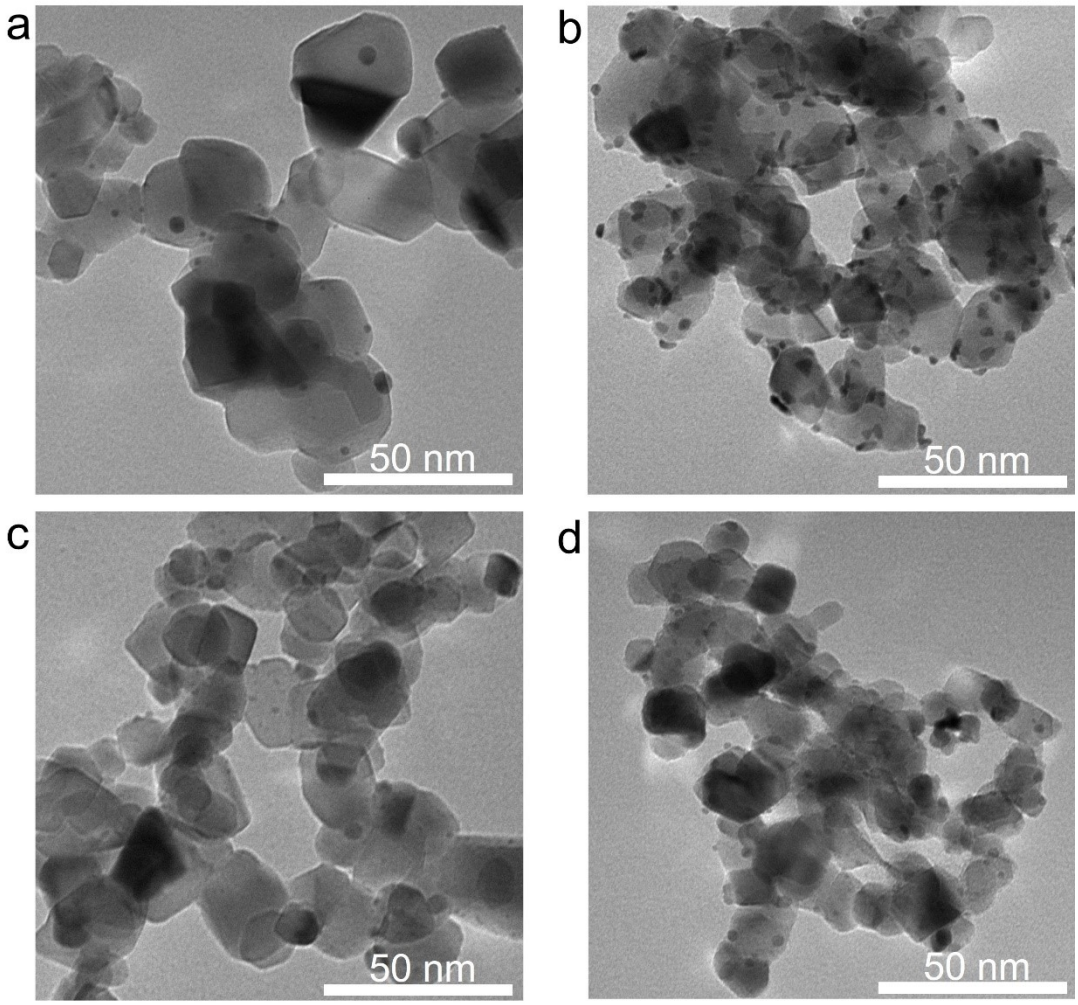

Fig. S4 TEM images of (a) 5 wt.% Au/TiO_2, (b) 5 wt.% Pt/TiO_2, (c) 5 wt.% Ag/TiO_2, and (d) 5 wt.% Pd/TiO_2.

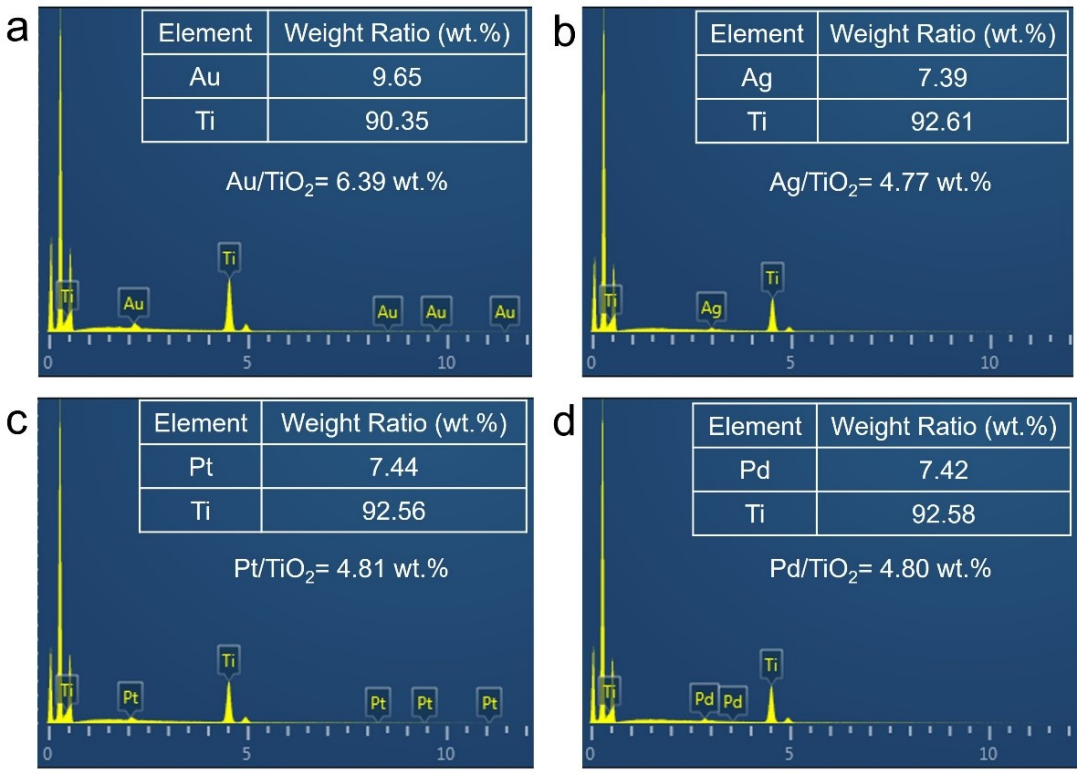

Fig. S5 EDS elemental analysis of the 5 wt.% Au/TiO_2 (a), 5 wt.% Ag/TiO_2 (b), 5 wt.% Pt/TiO_2 (c), 5 wt.% Pd/TiO_2 (d).

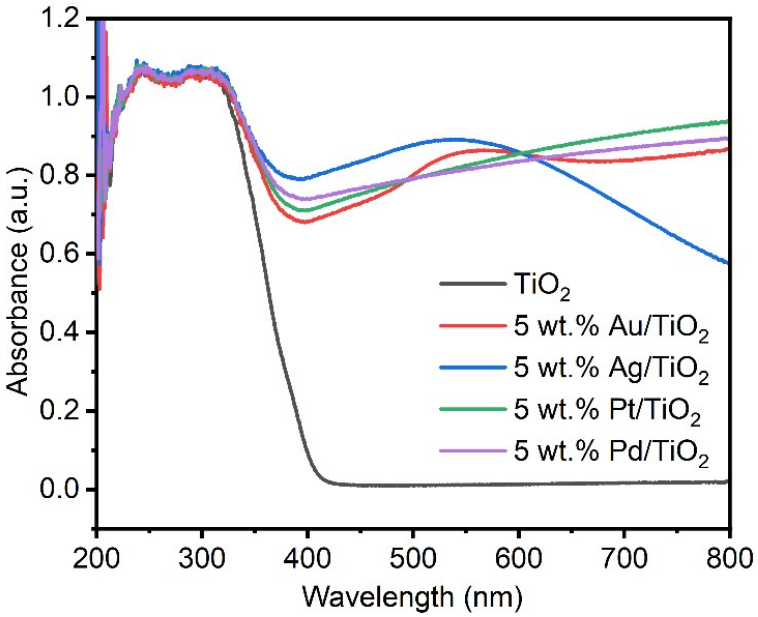

Fig. S6 Absorption spectra for 5 wt.% M/TiO_2 (M = Au, Ag, Pt, and Pd).

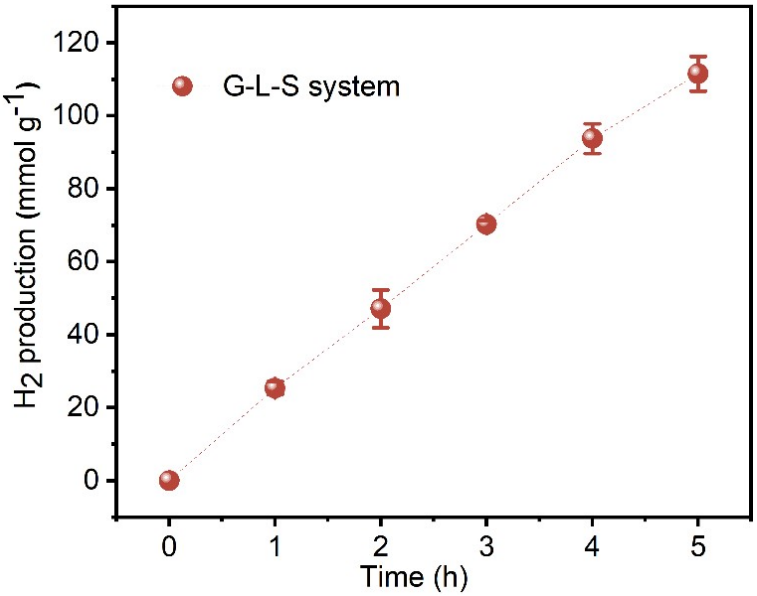

Fig. S7 Time-dependent H_2 production for Rh/TiO_2. Error bars represent the standard deviation from at least three independent measurements.

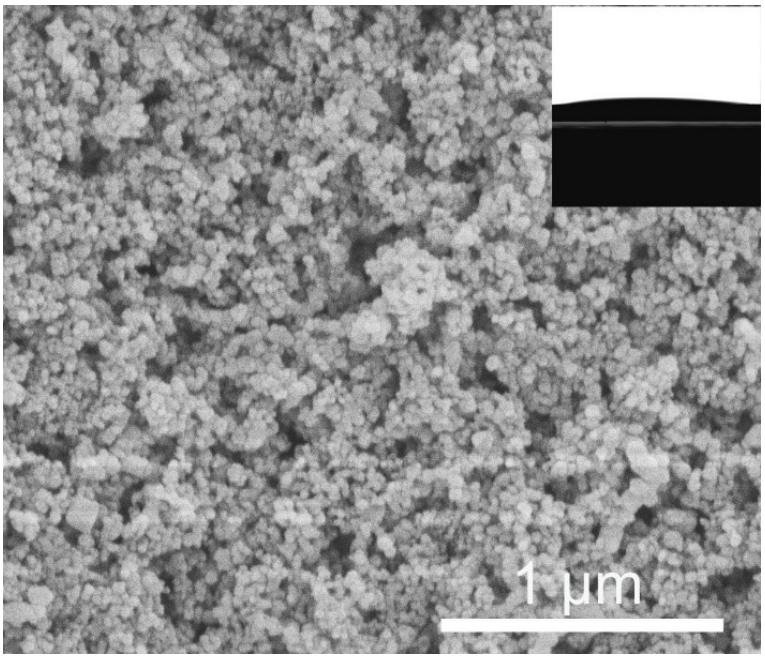

Fig. S8 Top-view SEM image of Rh/TiO_2-GDL after photocatalytic WGS reaction for 10 cycles. Insert shows photographs of a water droplet on the sample.

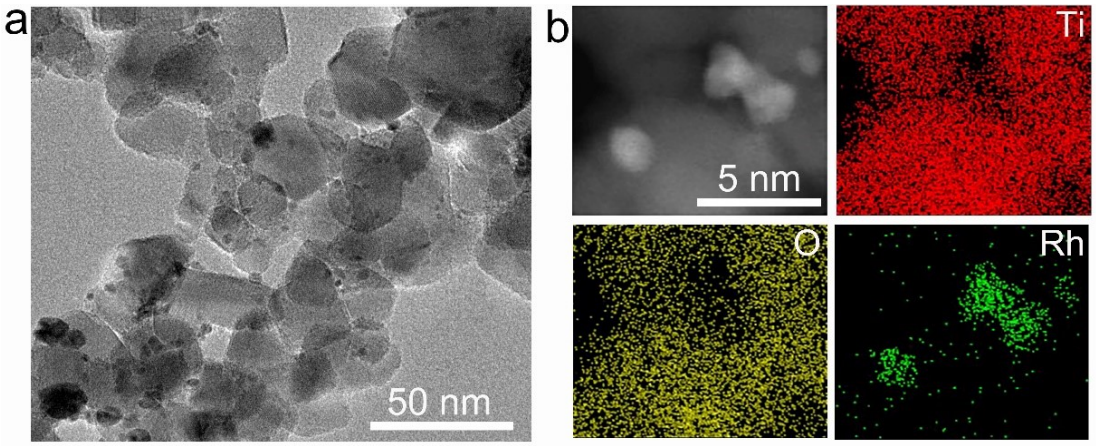

Fig. S9 (a) TEM image and (b) HAADF-STEM image and corresponding EDS element maps of Rh/TiO_2 after photocatalytic WGS reaction for 10 cycles.

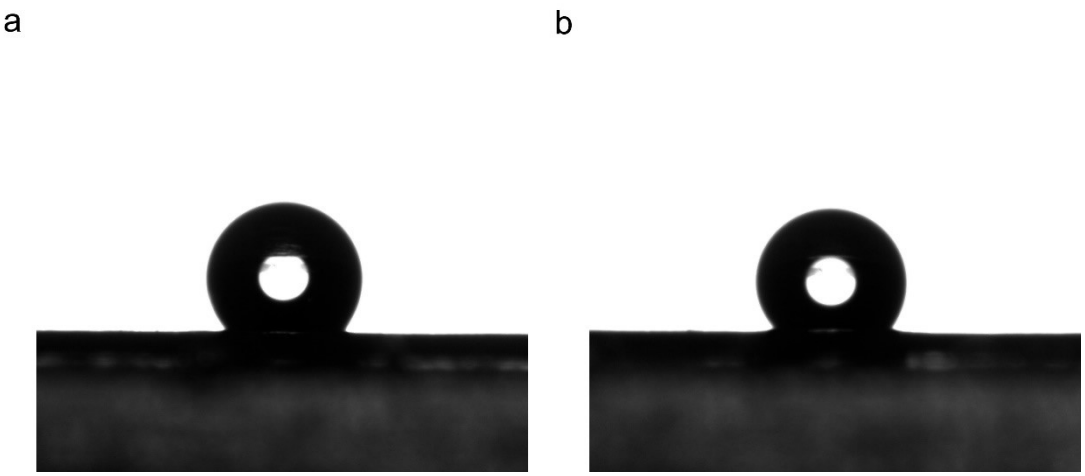

Fig. S10 Photographs of a water droplet on the GDL porous substrate before (a) and after (b) photocatalytic WGS reaction for 10 cycles.

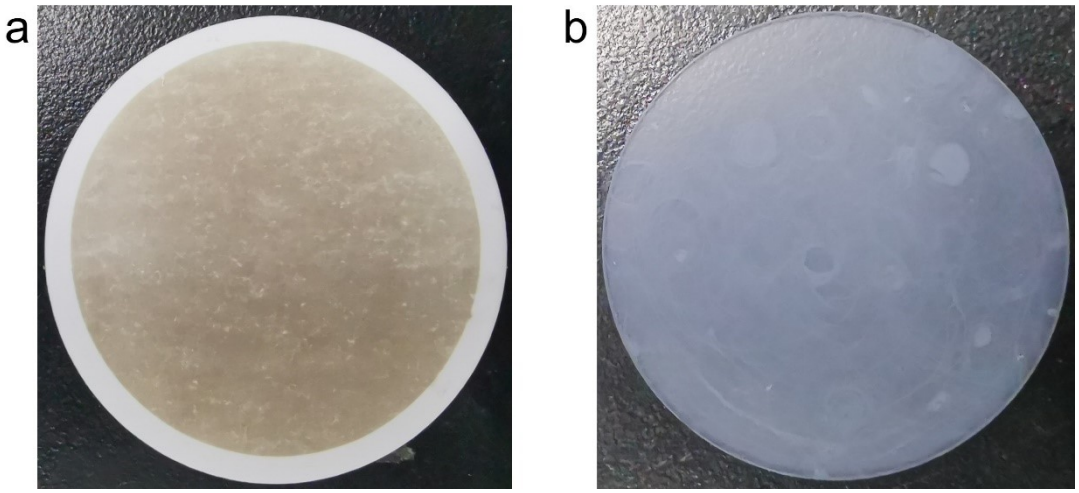

Fig. S11 Photographs of (a) Rh/TiO_2-GDL for the G-L-S and G-S systems and (b) Rh/TiO_2-immobilized quartz plate for the L-S system.

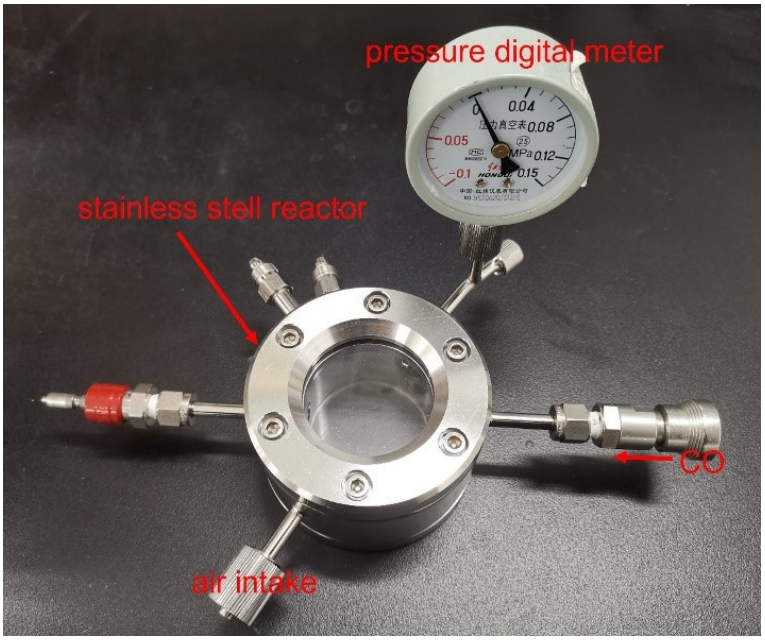

Fig. S12 Photograph of the photocatalytic reactor.

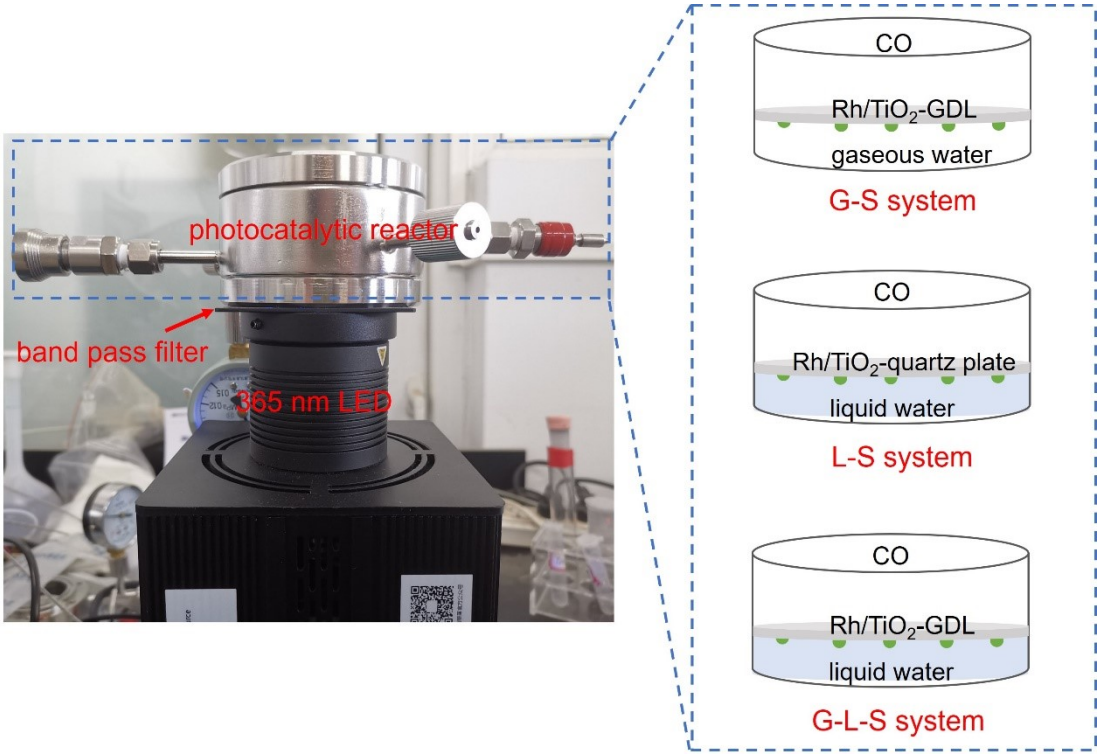

Fig. S13 Reactor setup and configurations for the three photocatalytic WGS reaction systems.

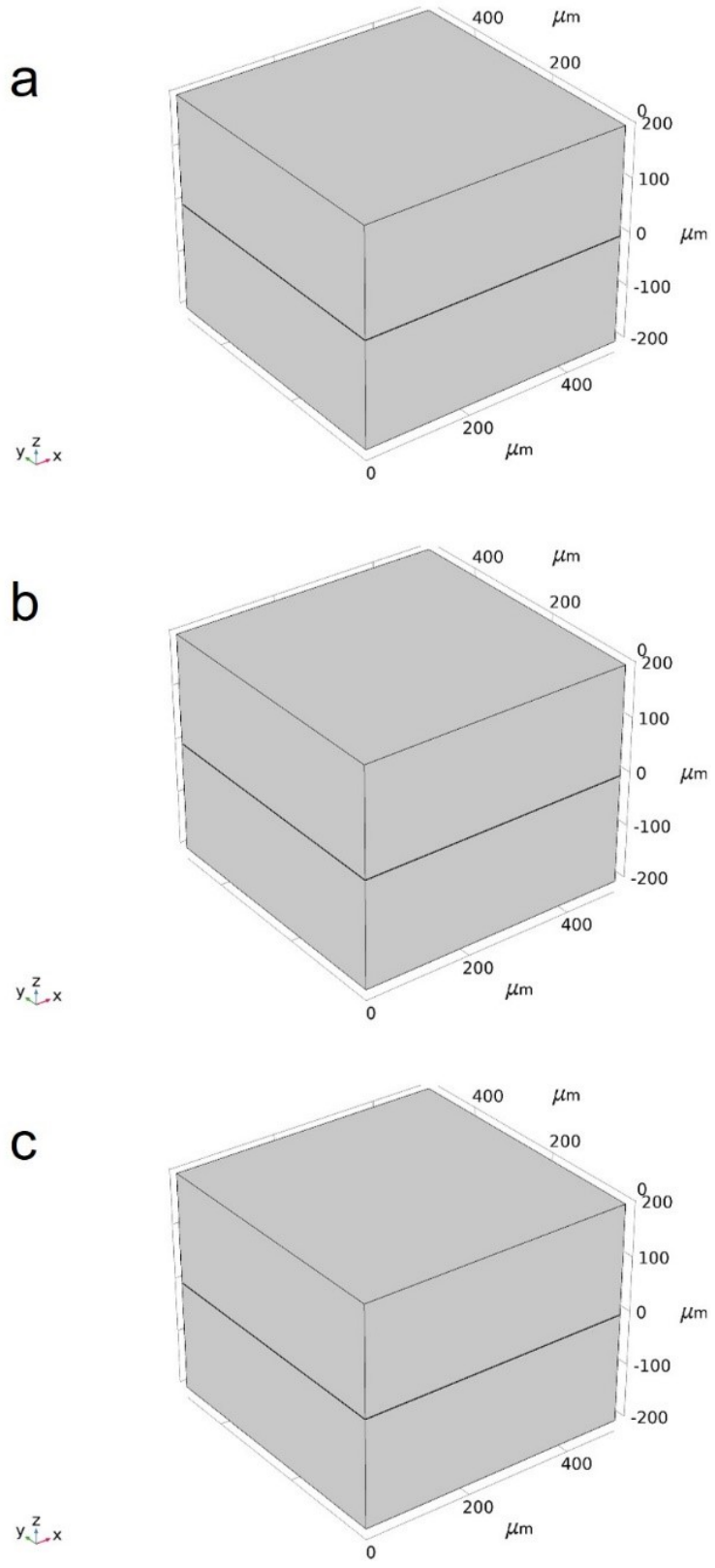

Fig. S14 Three-dimensional geometric models used for the FEM simulation of (a) G-S, (b) L-S, and (c) G-L-S systems.