

Electronic Supplementary Information

Solar Hydrogen Production over Novel Metal Sulfide Photocatalysts of $\text{AGa}_2\text{In}_3\text{S}_8$ (A=Cu or Ag) with Layered Structures

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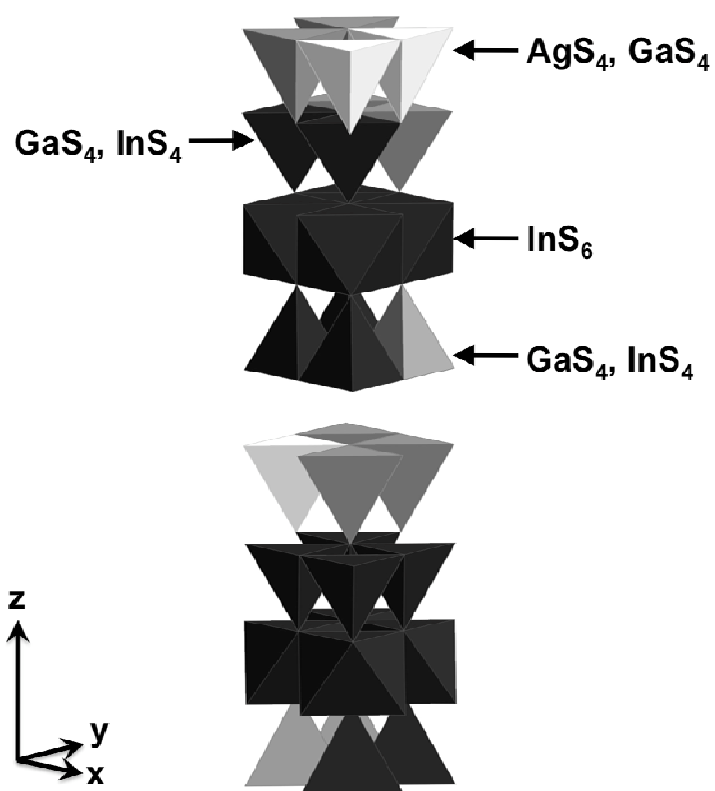


Fig. S1 Crystal structure of $\text{Ag}_{1.12}\text{Ga}_{2.68}\text{In}_{3.7}\text{S}_{10}$.¹³

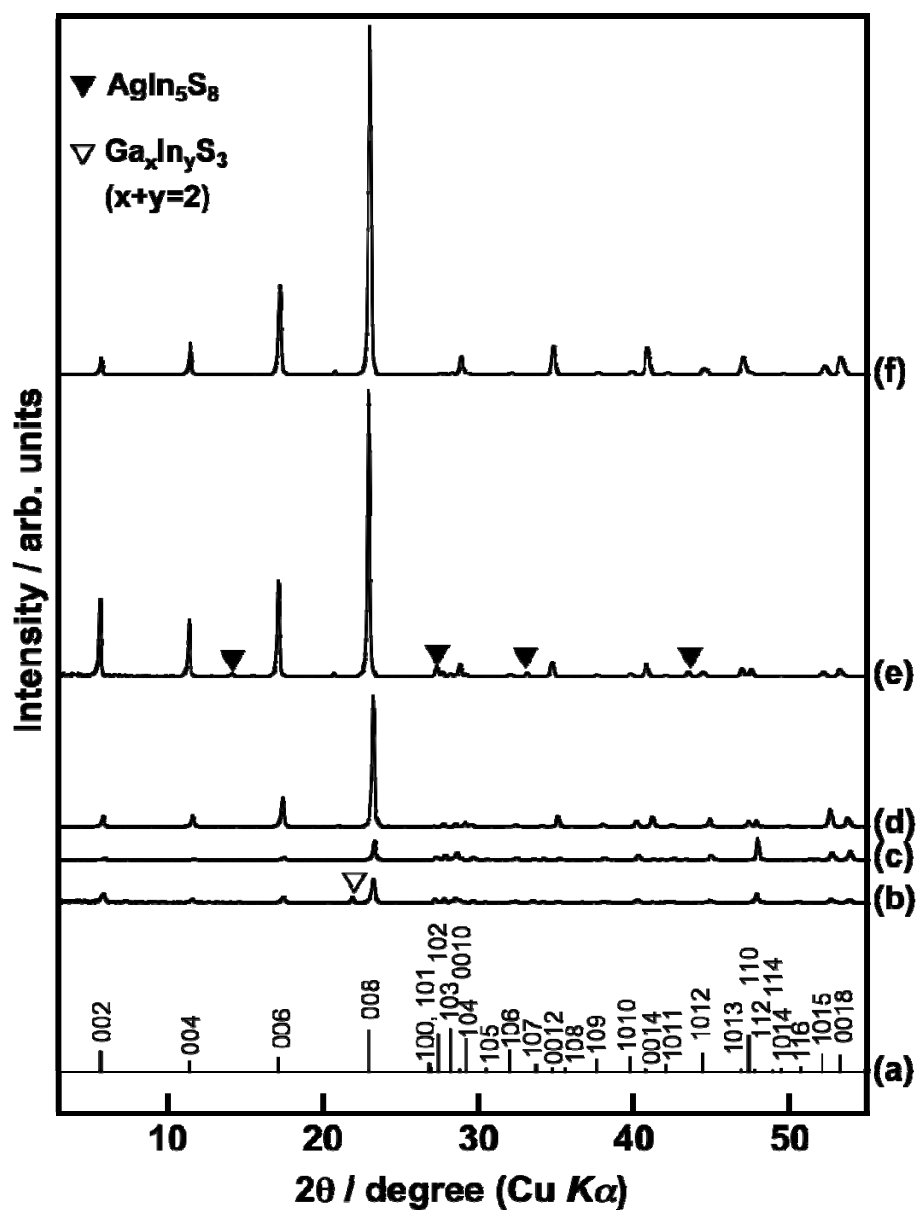


Fig. S2 X-ray diffraction patterns of (a) $\text{Ag}_{1.12}\text{Ga}_{2.68}\text{In}_{3.7}\text{S}_{10}$ (PDF 01-070-8366), (b) $\text{CuGa}_2\text{In}_3\text{S}_8$ prepared at 1023 K, (c) $\text{CuGa}_2\text{In}_3\text{S}_8$ prepared at 1123K, (d) $\text{CuGa}_2\text{In}_3\text{S}_8$ prepared at 1273 K, (e) $\text{AgGa}_2\text{In}_3\text{S}_8$ prepared at 1223 K and (f) $\text{AgGa}_2\text{In}_3\text{S}_8$ prepared with 40%-excess Ga_2S_3 at 1223 K. Samples (b)-(e) were prepared without excess Ga_2S_3 .

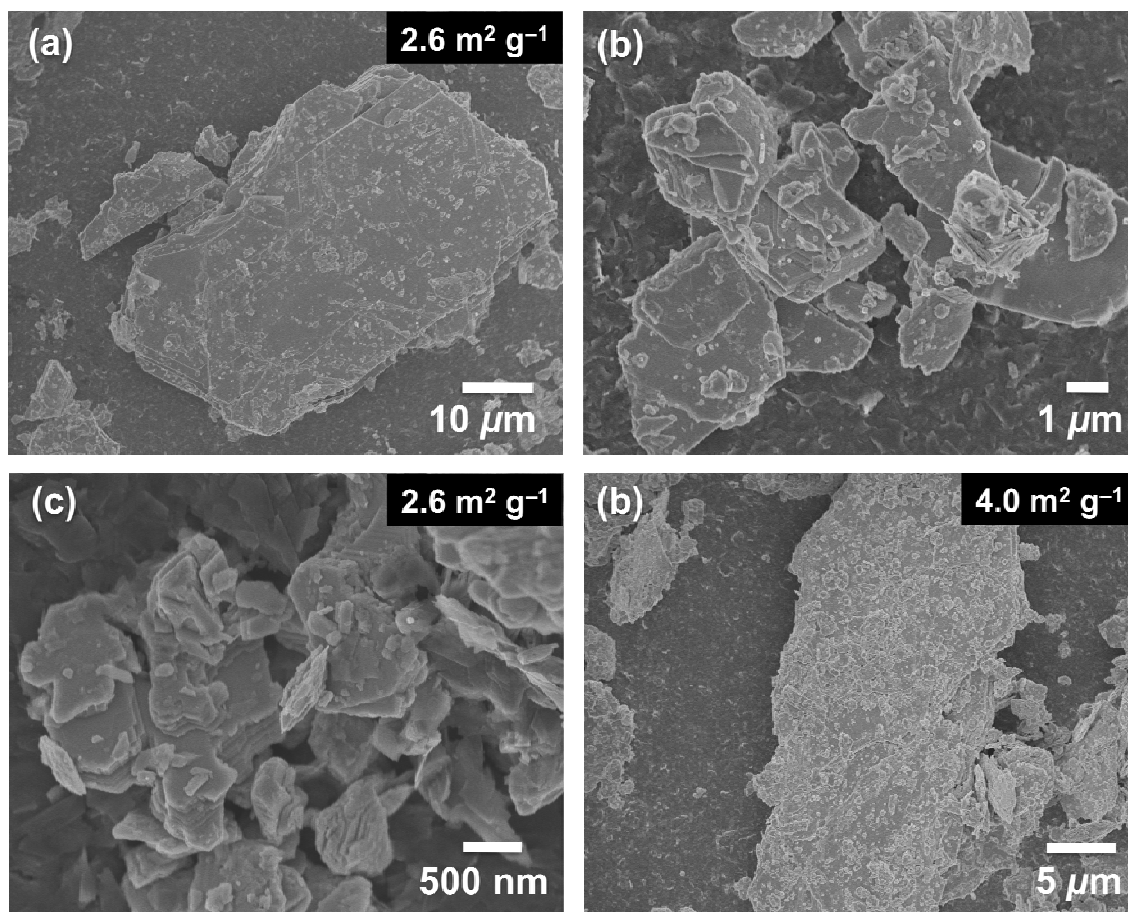


Fig. S3 Scanning electron microscope images and surface areas of (a), (b) $\text{CuGa}_2\text{In}_3\text{S}_8$ prepared at 1273 K, (c) $\text{CuGa}_2\text{In}_3\text{S}_8$ prepared at 1123K and (d) $\text{AgGa}_2\text{In}_3\text{S}_8$ prepared at 1223 K with 40%-excess Ga_2S_3 . Samples (a)-(c) were prepared without excess Ga_2S_3 .

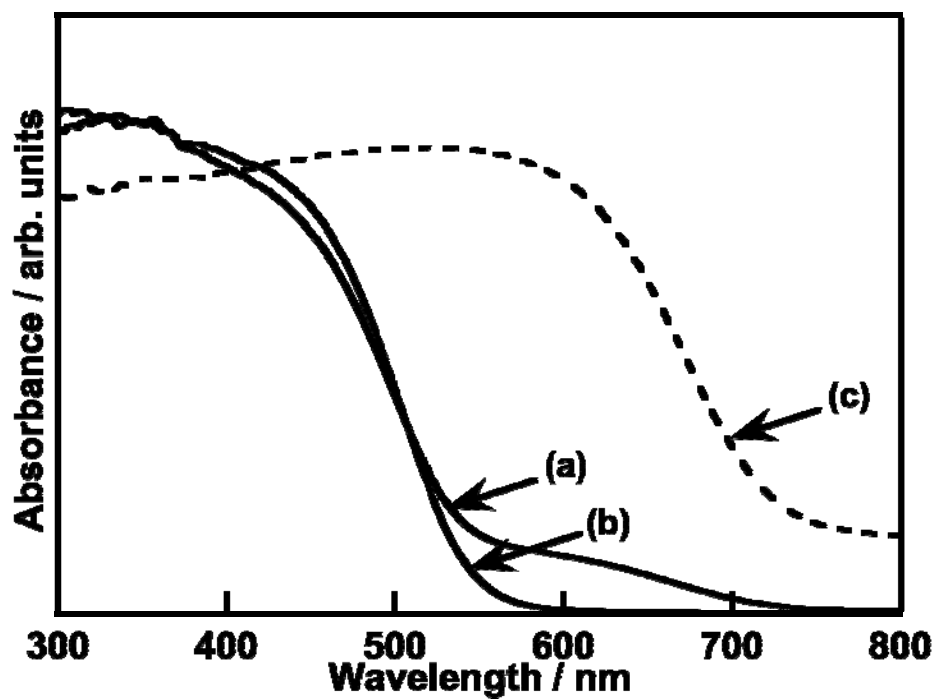


Fig. S4 Diffuse reflectance spectra of (a) $\text{AgGa}_2\text{In}_3\text{S}_8$ prepared at 1223 K without excess Ga_2S_3 , (b) $\text{AgGa}_2\text{In}_3\text{S}_8$ prepared at 1223 K with 40%-excess Ga_2S_3 and (c) AgIn_5S_8 prepared at 1273 K.