

Supplementary information for:

Photocatalytic activities of $\text{Cu}_{3x}\text{La}_{1-x}\text{Ta}_7\text{O}_{19}$ solid solutions for H_2 evolution under visible light irradiation

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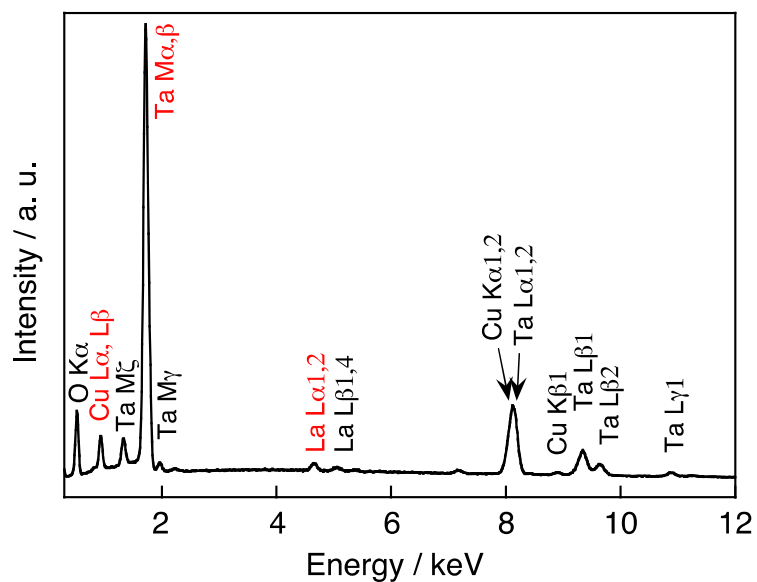


Fig. S1 Energy dispersive spectrum for $\text{Cu}_{1.2}\text{La}_{0.6}\text{Ta}_7\text{O}_{19}$ ($x = 0.4$). The $K\alpha$ of the strongest line for Cu overlapped with the Ta $L\alpha$ line. Therefore, lines of Ta $M\alpha,\beta$, Cu $L\alpha$ and La $L\alpha$ were chosen as regions of interest to take reliable element mapping images.

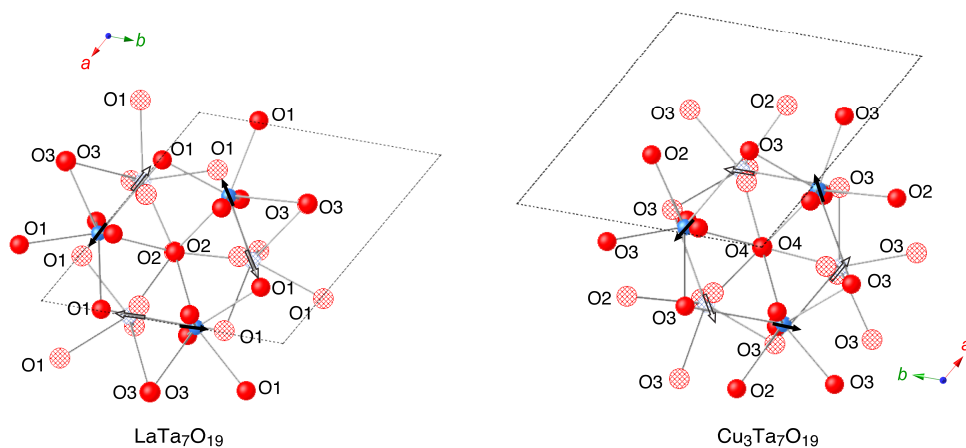


Fig. S2 Dipole moments at TaO₇ pentagonal bipyramids in LaTa₇O₁₉ and Cu₃Ta₇O₁₉. Red and blue balls represent O and Ta atoms, respectively. Filled balls: atoms in the TaO₇-layer I, hatched balls: atoms in the TaO₇-layer II. Black and white arrows represent dipole moments at TaO₇ polyhedra in the TaO₇-layers I and II, respectively. The arrows are drawn with the same length because the difference in the strength of dipole moments between LaTa₇O₁₉ and Cu₃Ta₇O₁₉ is only 2%.

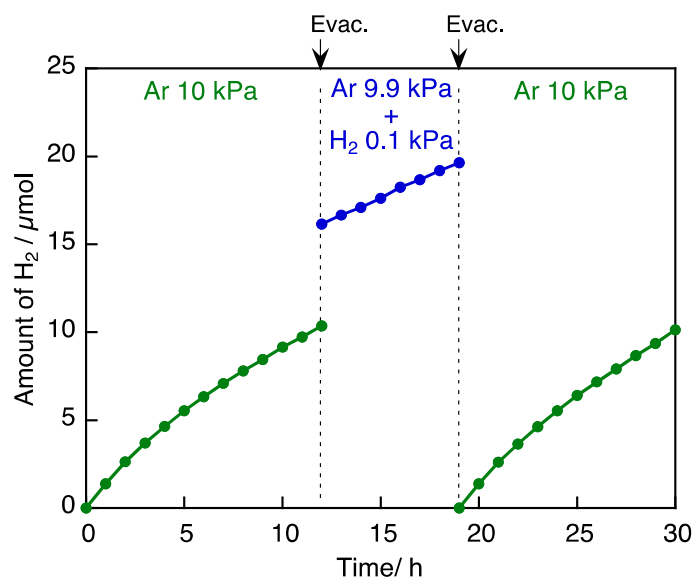


Fig. S3 Influence of the reaction atmosphere on photocatalytic activity of Pt(0.5 wt%)-loaded $\text{Cu}_{1.2}\text{La}_{0.6}\text{Ta}_7\text{O}_{19}$ for H_2 evolution. Catalyst: 0.3 g; reactant solution: 10 vol% methanol, pH = 4; light source: 300-W Xe lamp ($\lambda > 420$ nm). The second run was conducted with introduction of 0.1 kPa of H_2 and 9.9 kPa of Ar into the reaction system following the evacuation of gaseous products for the first run. The third run was conducted under 10 kPa of Ar after the evacuation of gaseous products for the second run.