Supplementary Information

Hydrothermal Synthesis of Size- and Shape-Controlled CaTiO$_3$ Fine Particles and their Photocatalytic Activity

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<H₂ evolution reaction>
CaTiO₃ (100 mg)
50 vol% aqueous methanol solution (10 mL)
H₂PtCl₆·6H₂O (0.50 wt% Pt for CaTiO₃)

<CO₂ evolution reaction>
CaTiO₃ (100 mg)
5.0 vol% acetic acid in water (10 mL)

**Figure S1.** Schematic illustration for H₂ and CO₂ evolution reaction.
Figure S2. TEM images and XRD patterns of particles obtained at the same condition as CT4 except for aging time. The aging time was varied from 30 to 360 min.
Figure S3. SEM images of fine particles CT10.
The optical indirect band gap was estimated by use of Tauc plot and can be estimated following formula.¹

\[(h \nu F(R))^{1/2} = A(h \nu - E_g)\]

\(h\): Planck’s constant, \(\nu\): frequency, \(F(R)\): Kubelka munk function, 
\(A\): proportional constant, \(E_g\): band gap.

The intercept of the linear fit line with the photon energy (\(h \nu\)) axis yield the value of the optical band gap.

Figure S5. TEM images of Pt-loaded (a, b) concave cubic-, (c) cubic-, and (d) rod-shaped particles after H$_2$ evolution reaction.