Supplementary information for

Mineralization of organic acids in aqueous suspensions of gold nanoparticles supported on cerium(IV) oxide powder under visible light irradiation

Results

Stability test of 1.0 wt%Au/CeO_2

To evaluate the stability of 1.0 wt%Au/CeO_2 in mineralization of formic acid, 1.0 wt%Au/CeO_2 was used repeatedly, indicating that it continuously decomposed formic acid under visible light irradiation without losing its activity (**Fig. S1**).

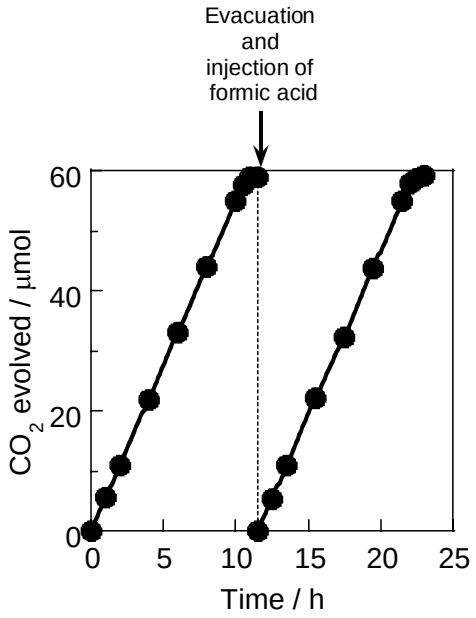

Fig. S1 Time course of evolution of CO_2 from formic acid (60 μmol) in an aqueous suspension of 1.0 wt%Au/CeO_2 under irradiation of visible light. After 12-h irradiation and evacuation, additional formic acid (60 μmol) was injected and the suspension was irradiated again.

Mineralization of formic acid by various Au-loaded CeO_2 samples

Four other CeO_2 powders (JRC-CEO-1, -2, -3, -4) were supplied by the Catalysis Society of Japan and were used for decomposition of formic acid in aqueous suspensions under irradiation of visible light after loading 1 wt% Au. Some physical properties of these CeO_2 powders are summarized in **Table S1**. As in the case of Au-loaded CeO_2(Nanotech), CO_2 was evolved linearly with irradiation time for all Au/CeO_2 samples (**Fig. S2**).

Table S1 Some physical properties of CeO_2 powders

JRC-CEO	Crystallite size/nm	Specific surface area/m^2g^{-1}
-1	7.4	157
-2	8.7	123
-3	11.0	81
-4	12.6	65

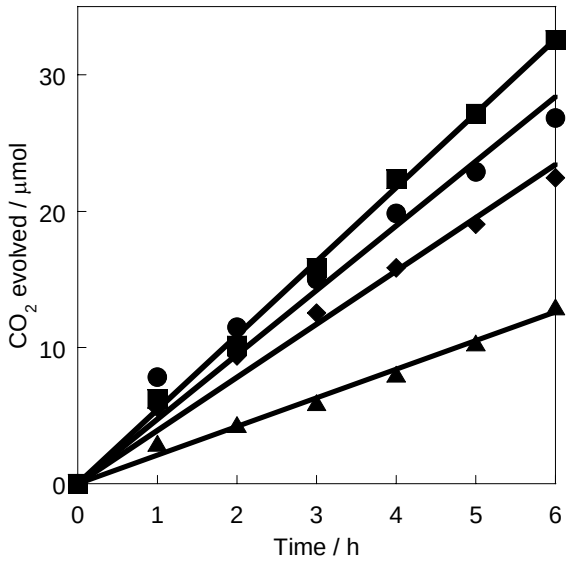

Fig. S2 Time courses of evolution of CO_2 from aqueous solutions of formic acid in the presence of Au/CeO_2(1) (circles), Au/CeO_2(2) (squares), Au/CeO_2(3) (triangles) and Au/CeO_2(4) (diamonds). The number in parentheses after CeO_2 corresponds to JRC-CEO-n (n = 1-4) supplied by the Catalysis Society of Japan.