

## Electronic Supplementary Information

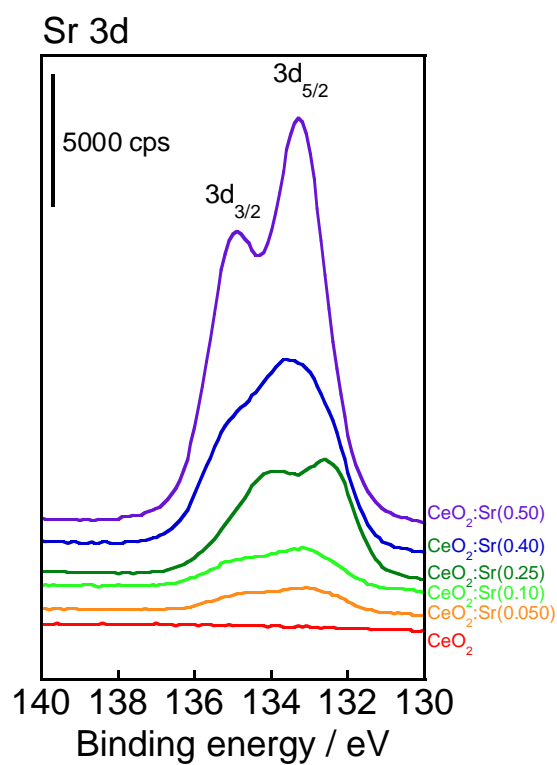
### **Effect of conduction band potential on cocatalyst-free plasmonic H<sub>2</sub> evolution over Au loaded on Sr<sup>2+</sup>-doped CeO<sub>2</sub>**

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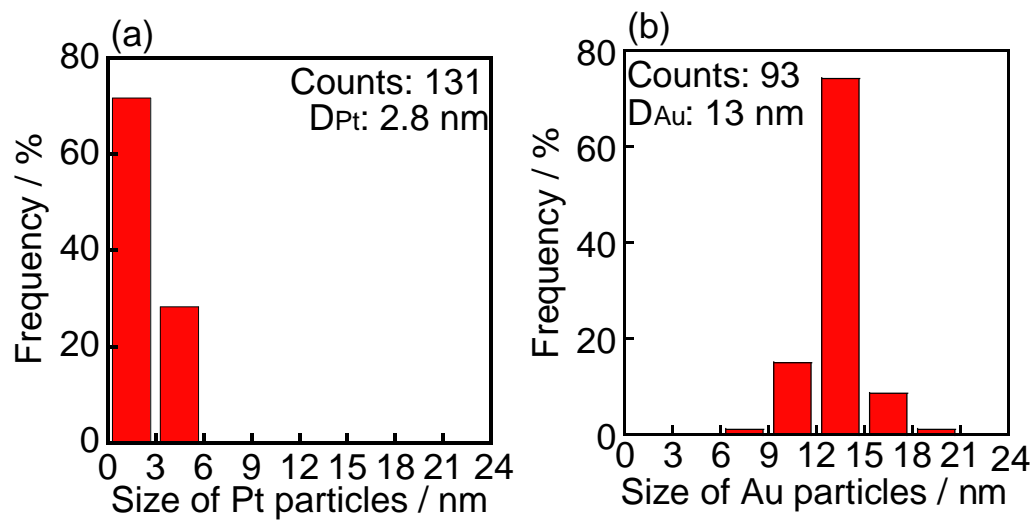
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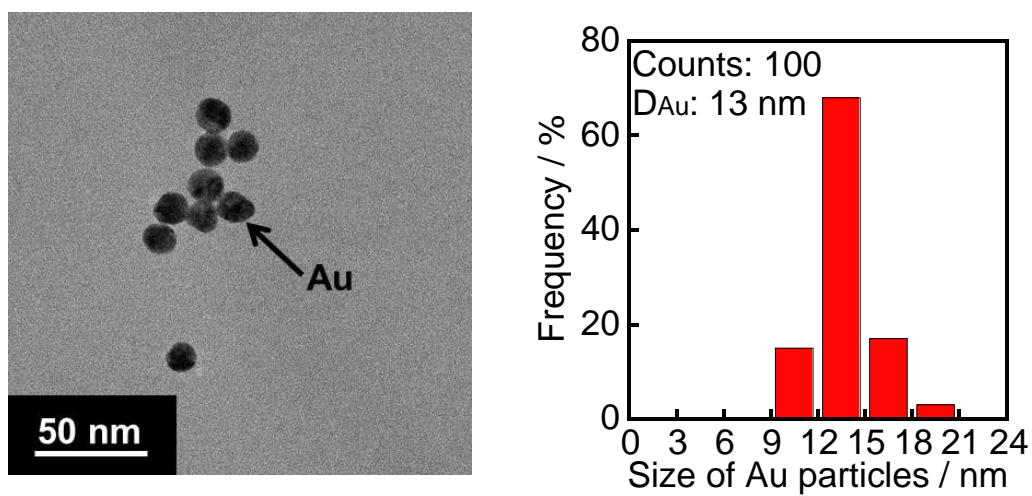
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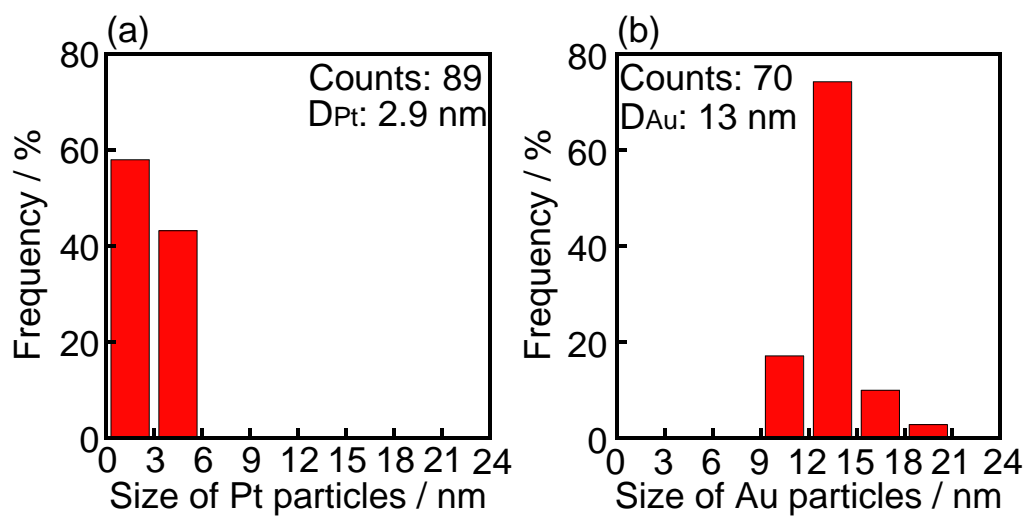
**Figure S1** XPS spectra of  $\text{CeO}_2$  (undoped,  $x=0$ ) and  $\text{CeO}_2:\text{Sr}(x)$  with different mole fractions ( $x=0.050, 0.10, 0.25, 0.40$  and  $0.50$ ) around Sr 3d components.



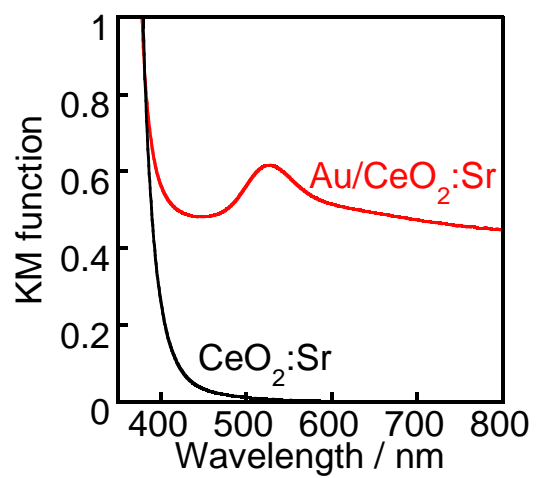
**Figure S2** Size distributions of (a) Pt nanoparticles on  $\text{CeO}_2\text{:Sr}(0.25)\text{-Pt}(0.5)$  and (b) Au nanoparticles on  $\text{Au}(1.0)/\text{CeO}_2\text{:Sr}(0.25)$ .



**Figure S3** TEM photographs (left) and size distributions (right) of colloidal Au nanoparticles



**Figure S4** Size distributions of (a) Pt nanoparticles on Au/CeO<sub>2</sub>:Sr(0.25)-Pt(0.5) and (b) colloidal Au nanoparticles on Au/CeO<sub>2</sub>:Sr(0.25)-Pt(0.5).



**Figure S5** Photoabsorption spectra of CeO<sub>2</sub>:Sr(0.25) (black line) and Au(1.0)/CeO<sub>2</sub>:Sr(0.25) (red line).

**Table S1** Rates of formation of H<sub>2</sub> from 2-propanol in aqueous suspensions of various photocatalysts under irradiation of visible light from a Xe lamp with a Y-48 cut-filter.

Entry	<sup>a</sup> Light	Photocatalyst	<sup>b</sup> H <sub>2</sub> formation rate / μmol h <sup>-1</sup>
1	On	Au/CeO <sub>2</sub> :Sr-Pt	5.6
2	On	CeO <sub>2</sub> :Sr-Pt	N.D.
3	On	CeO <sub>2</sub> :Sr	N.D.
4	-	Au/CeO <sub>2</sub> :Sr-Pt	N.D.
5	On	-	N.D.

<sup>a</sup>Light: irradiation of visible light from Xe lamp with a Y48 filter

<sup>b</sup>Reaction conditions: catalyst, 50 mg; 10 vol% 2-propanol, 5 cm<sup>3</sup>, reaction vessel, Pyrex side irradiation type.