

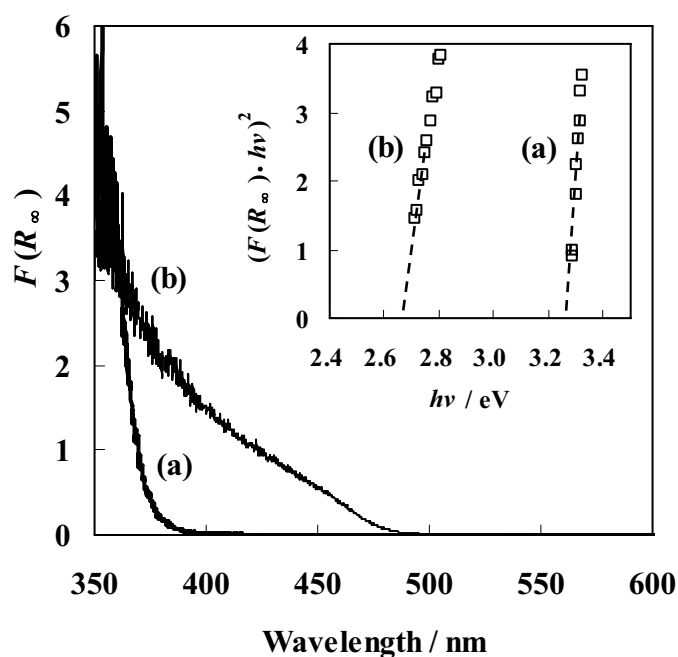
# Au nanoparticle electrocatalysis in a photoelectrochemical solar cell using CdS quantum dot-sensitized TiO<sub>2</sub> photoelectrodes

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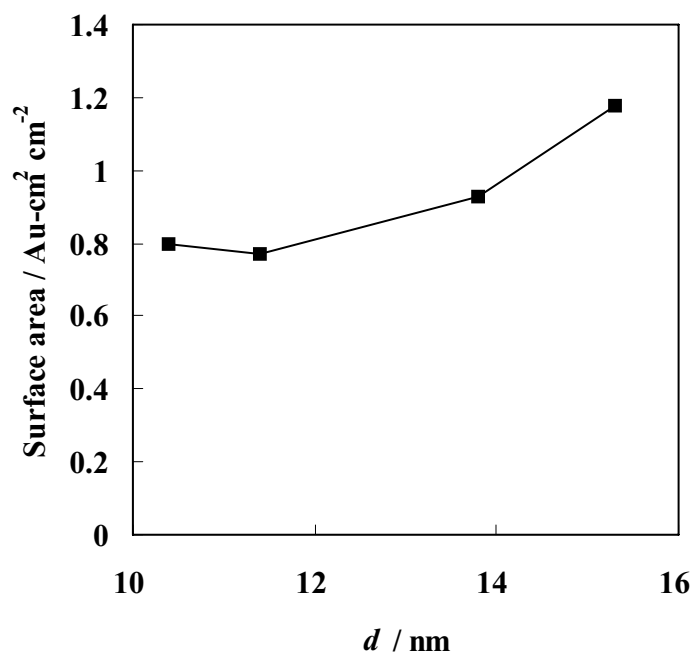
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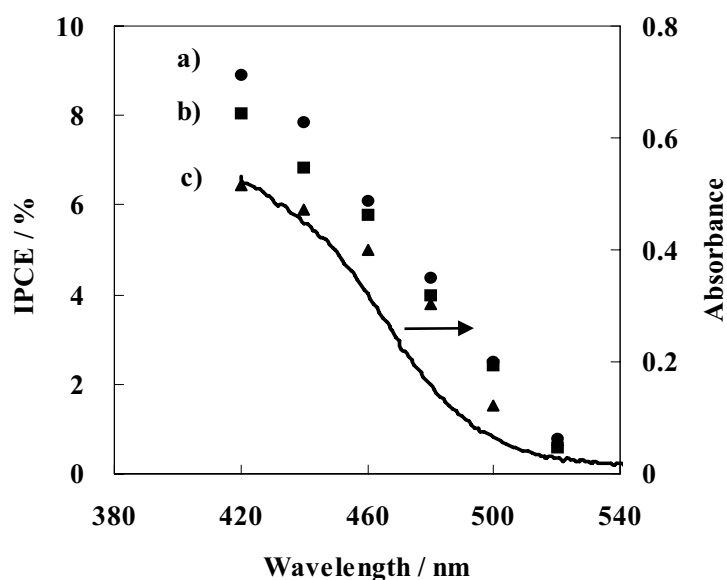
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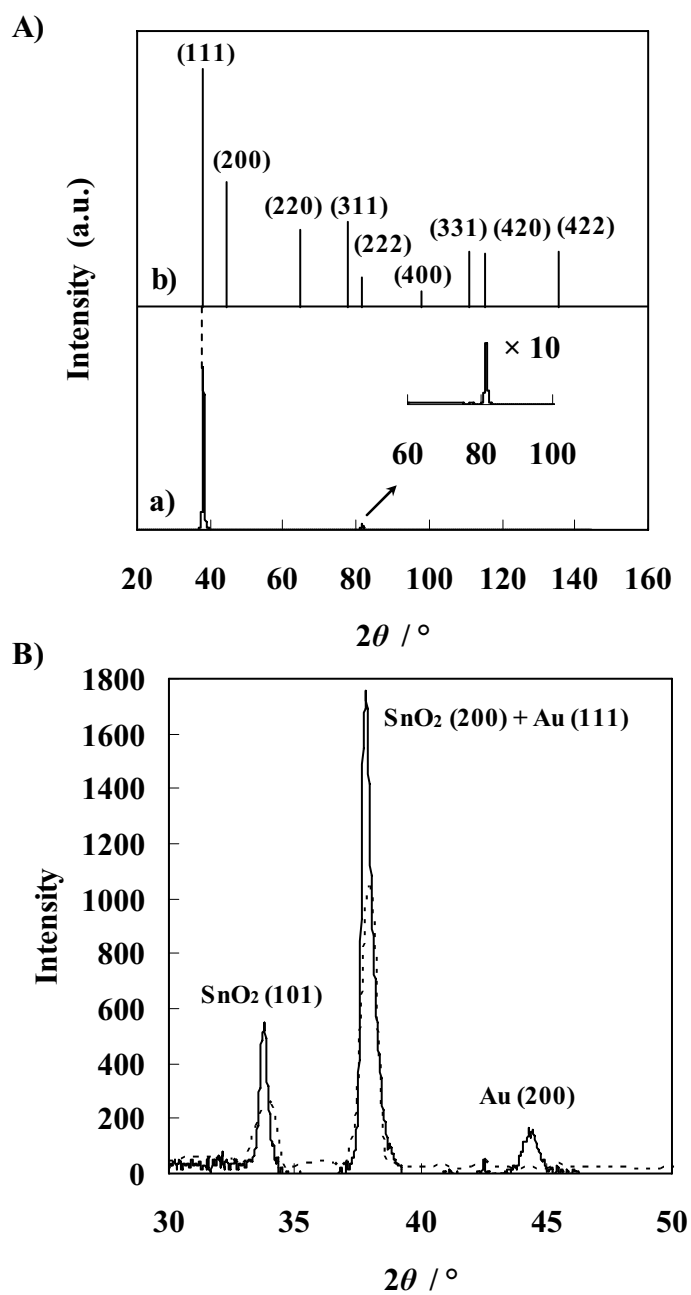
**Fig. S1:** Electronic absorption spectra of mp-TiO<sub>2</sub> (a) and CdS/mp-TiO<sub>2</sub> (b):  $F(R_{\infty})$  expresses the Kubelka-Munk function. The inset shows the corresponding Tauc's plots.



**Fig. S2:** Au surface area of Au/SnO<sub>2</sub> as a function of  $d$ . The surface area of Au NPs was calculated from their loading amount and  $d$  value by assuming that Au particle is hemisphere.



**Fig. S3:** IPCE action spectra of the CdS/mp-TiO<sub>2</sub>[S<sub>x</sub><sup>2-</sup>/S<sup>2-</sup>]CE and electronic absorption spectrum (solid line) of the CdS/mp-TiO<sub>2</sub> (right). The CEs are Pt ( $d = 6.9 \text{ nm}$ )/SnO<sub>2</sub> (a), Pt ( $d = 10.7 \text{ nm}$ )/SnO<sub>2</sub> (b), Pt ( $d = 15.2 \text{ nm}$ )/SnO<sub>2</sub> (c).



**Fig. S4:** A, XRD patterns of Au thin film (a) and random oriented Au (b). B, XRD patterns of SnO<sub>2</sub> (dotted curve) and Au/SnO<sub>2</sub> (solid curve).