

# Functionalized Silicate Sol-Gel Supported TiO<sub>2</sub>-Au Core-Shell Nanomaterials and Their Photoelectrocatalytic Activity

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## SUPPORTING INFORMATION

FIGURE S1.

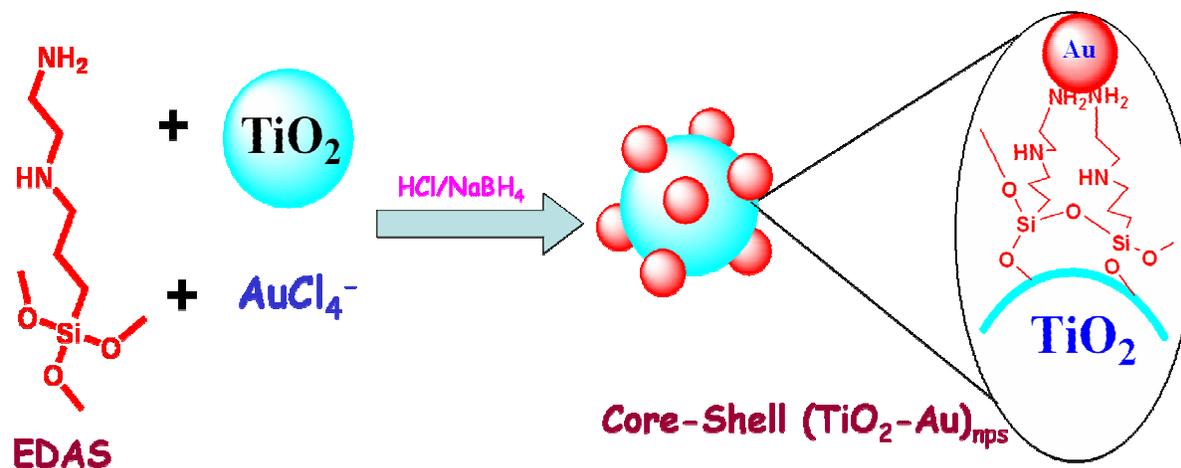
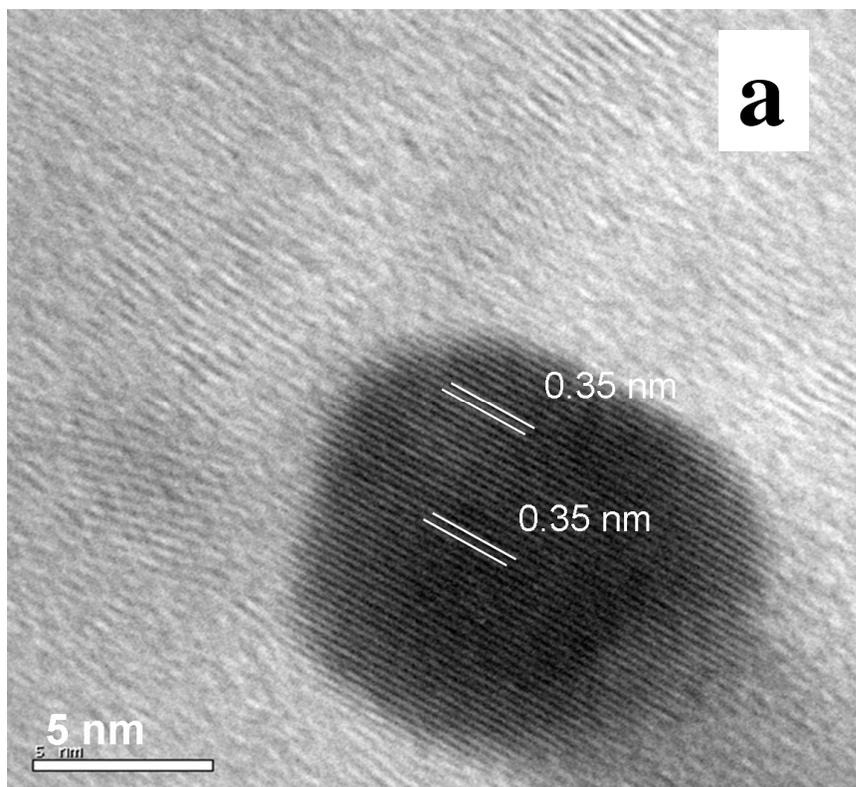
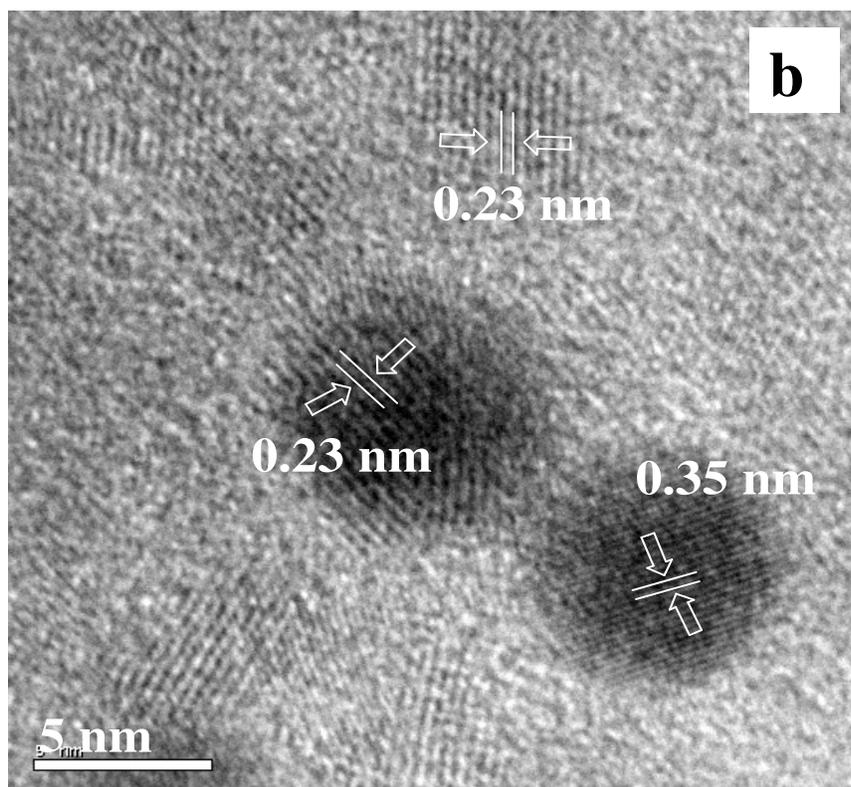


FIGURE S1. Schematic representation of synthesis of aminosilicate supported (TiO<sub>2</sub>-Au)<sub>nps</sub> core-shell nanomaterials.

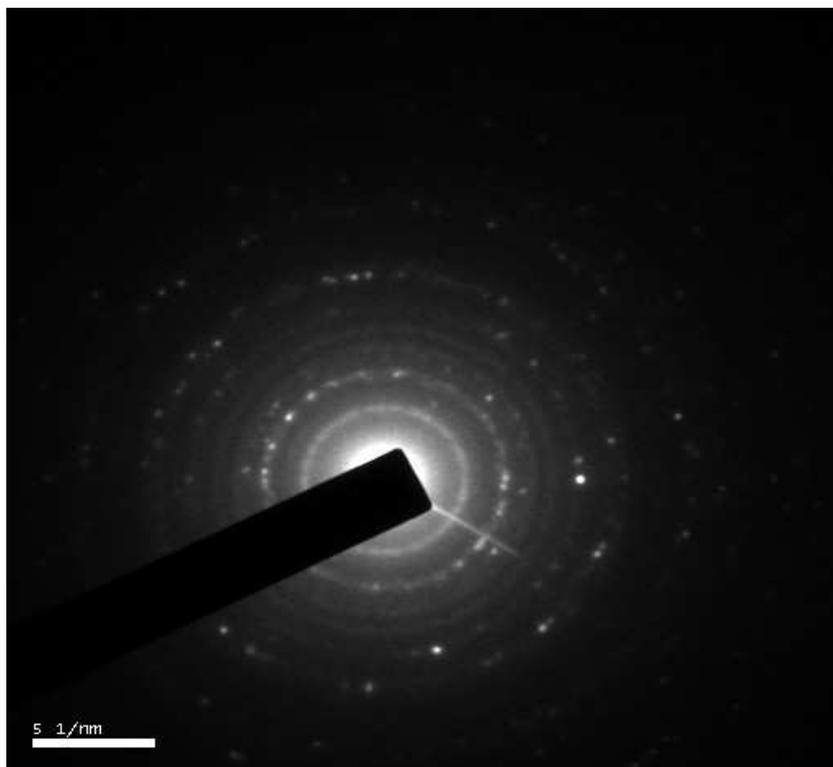
**FIGURE S2.**





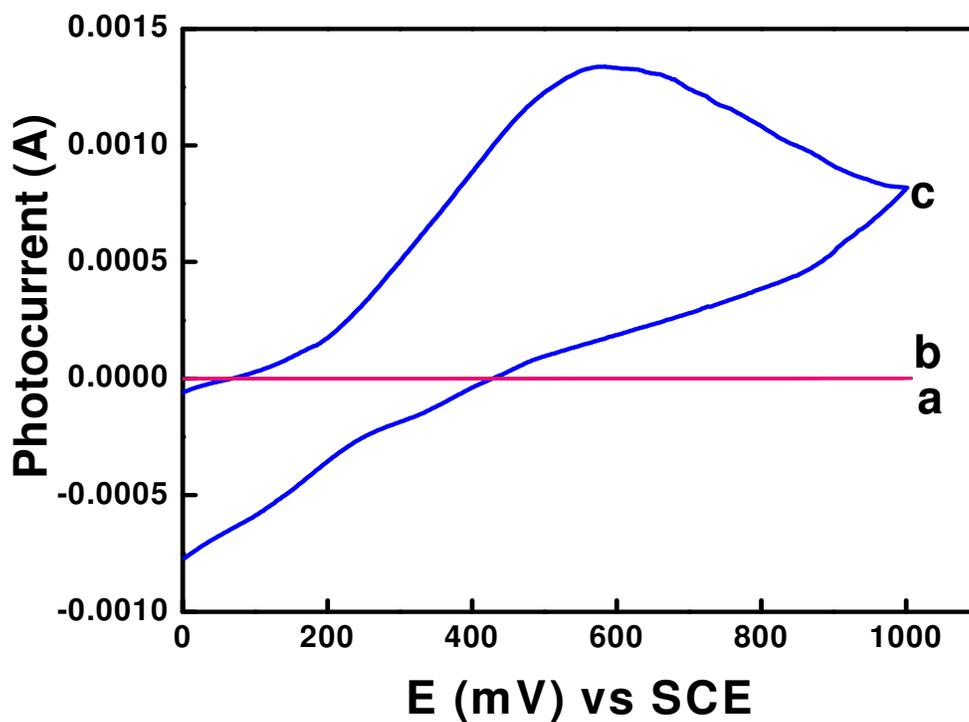
**FIGURE S2.** HRTEM and lattice resolved images of  $\text{TiO}_2$  (a) and  $\text{EDAS}/(\text{TiO}_2\text{-Au})_{\text{nps}}$  (b) ( $\text{TiO}_2\text{:Au} = 100\text{:1}$  molar ratio). The high resolution transmission electron microscopic (HRTEM) images of  $\text{TiO}_2$  and  $\text{EDAS}/(\text{TiO}_2\text{-Au})_{\text{nps}}$  were recorded using a JEOL 3010 High resolution transmission electron microscope operating at an accelerating voltage of 300 kV. One drop of the sample was blotted on a carbon-coated copper grid for imaging and blotted to remove excess liquid.

**FIGURE S3.**



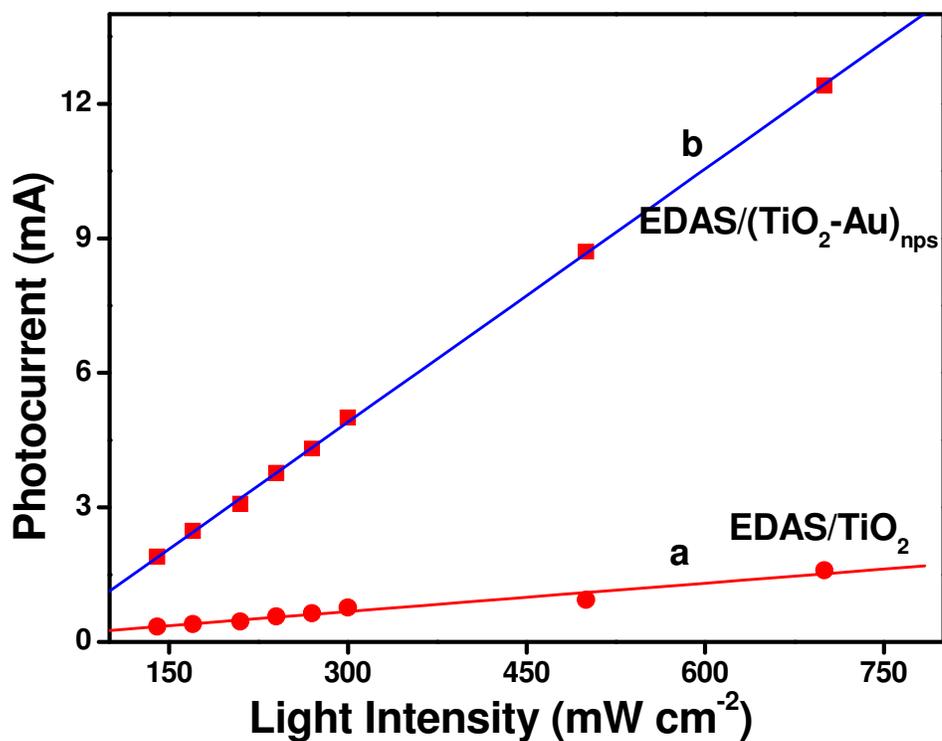
**FIGURE S3.** Selected area electron diffraction (SAED) analysis of EDAS/(TiO<sub>2</sub>-Au)<sub>np</sub> core-shell particles (TiO<sub>2</sub>:Au = 100:1 molar ratio).

**FIGURE S4.**



**FIGURE S4.** Cyclic voltammograms obtained for the EDAS/TiO<sub>2</sub> modified electrode in the presence of (a) 0.5 M Na<sub>2</sub>SO<sub>4</sub> and (b) a mixture of 0.5 M Na<sub>2</sub>SO<sub>4</sub> and 0.1 M CH<sub>3</sub>OH in dark and (c) a mixture of 0.5 M Na<sub>2</sub>SO<sub>4</sub> and 0.1 M CH<sub>3</sub>OH under illumination using 700 mW cm<sup>-2</sup> light intensity. A 450 W Xenon lamp was used as a light source with water filter to study the photoelectrochemical properties. Light intensity was measured using Oriel-70260 power intensity meter, Newport, USA.

FIGURE S5.



**FIGURE S5.** Dependence of photocurrent on the light intensity observed at (a) EDAS/TiO<sub>2</sub> and (b) EDAS/(TiO<sub>2</sub>-Au)<sub>nps</sub> (TiO<sub>2</sub>:Au = 100:1) modified electrodes dipped in a mixture of 0.5 M Na<sub>2</sub>SO<sub>4</sub> and 0.1 M methanol under irradiation. The  $E_{app}$  was 0.65 V. A 450 W Xenon lamp was used as a light source with water filter to study the photoelectrochemical properties. Light intensity was measured using Oriol-70260 power intensity meter, Newport, USA.