Supporting Information

Enhanced photoelectrochemical water oxidation performance of hematite photoanode by decorating with Au-Pt core-shell nanoparticles

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Preparation of the Au/α-Fe₂O₃ photoanodes

The same spin-coating process was utilized to integrate the Au nanoparticles with α-Fe₂O₃ photoanodes. Briefly, 0.2 mL of Au sol was dipped onto the α-Fe₂O₃ photoanodes, and spin coated at 3000 rpm for 10 s, followed by drying at 60 °C to evaporate water. The spin-coating and drying process were duplicated 25 times, followed by roasting at 120 °C 20 min to increase the adhesion between the Au nanoparticles and α-Fe₂O₃ photoanodes.

Preparation of the Pt/α-Fe₂O₃ photoanodes

The Pt/Fe₂O₃ photoanodes were synthesized by in-situ reduction method. Typically, 0.3 mL 9.7 mM H₂PtCl₆ solution was dropped to the Fe₂O₃ photoanodes surface, then 0.3 mL 0.1 M ascorbic acid solution was added, followed by drying at 60 °C to evaporate water. This process was duplicated 5 times. The Pt/Fe₂O₃ photoanodes were rinsed several times with ethanol and deionized water.
Fig S1. The XRD patterns of the as-prepared samples.
Fig S2. The TEM image of Au-Pt core-shell nanoparticles.
Fig. S3 Current–potential ($I$–$V$) characteristic curves of the pristine Fe$_2$O$_3$, Au/Fe$_2$O$_3$, Pt/Fe$_2$O$_3$.

Fig. S4. EIS spectra of as-prepared samples.
Fig. S5 Incident photonto-current efficiency (IPCE) at 1.23 V vs. RHE under monochromatic irradiation (300 -600 nm) for as-prepared photoanode.