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ACCEPTED MANUSCRIPT

Self-Surface-Passivation of Titanium Doped Hematite Photoanode for Efficient Solar Water and Formaldehyde Oxidation

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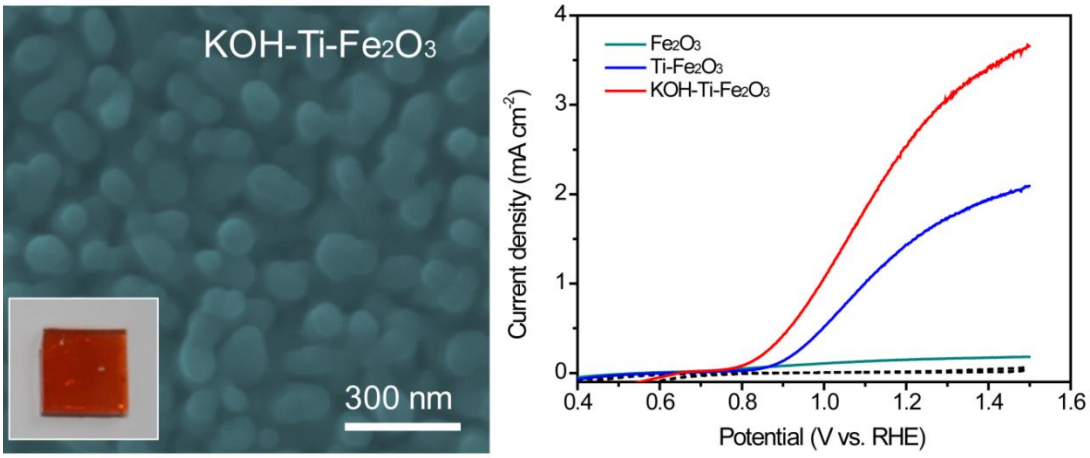
Graphical Abstract



Highlights

- Ti-doped Fe_2O_3 photoanode was activated by a surface passivation method.
- This photoanode shows excellent performance toward water and HCHO oxidation.
- A remarkable photocurrent of 3.7 mA cm^{-2} at 1.5 V vs. RHE was achieved.

Abstract: Herein, we present a new and available Ti doping and surface self-passivation strategy to significantly boost the PEC performance of the Fe_2O_3 nanorods for both solar water splitting and formaldehyde (HCHO) oxidation. Upon Ti doping and surface passivation with KOH treatment, the self-passived Ti^{4+} doped Fe_2O_3 nanorods exhibit substantially higher PEC performance compared to the pristine Fe_2O_3 and Ti^{4+} doped Fe_2O_3 nanorods, achieving a remarkable photocurrent of 3.7 mA cm^{-2} at 1.5

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