Insights into the Interfacial Carrier Behaviour of Copper Ferrite ($CuFe_2O_4$) Photoanodes for Solar Water Oxidation

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List of Figures

Morphology

SEM images of nanostructured $CuFe_2O_4$ photoanode are shown in the left panel of Figure S1. SEM setup (Zeiss Merlin) for these images are 2 kV electron high tension (EHT), 100 pA probe current, 3 mm working distance (WD) and annular secondary electrons detector (In-Lens).

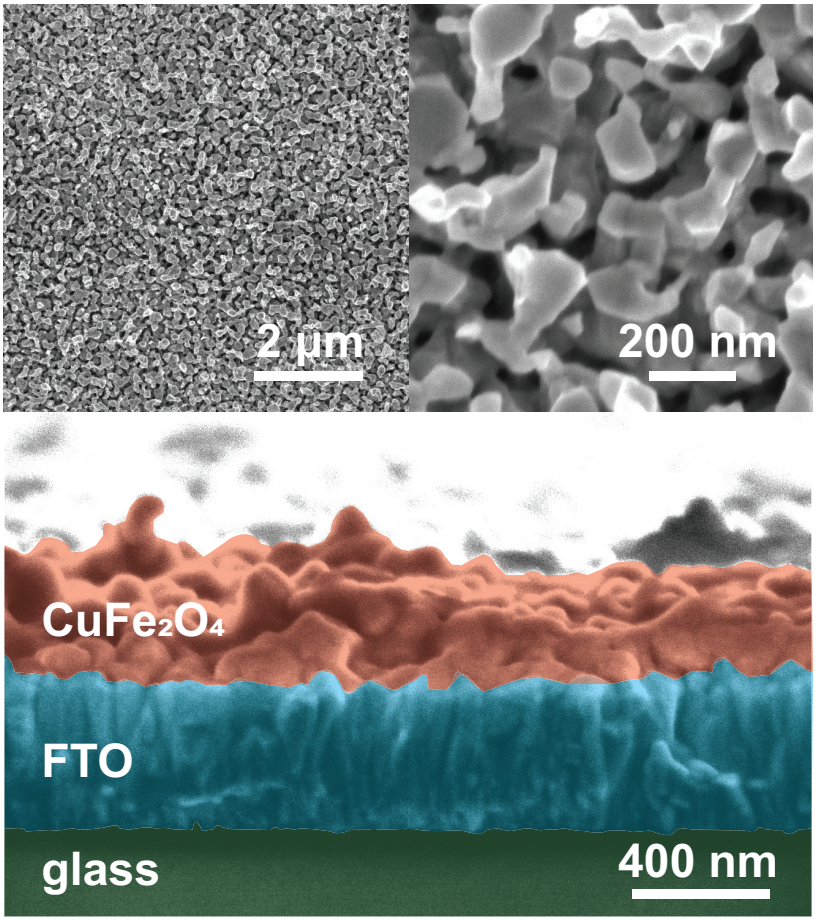

Figure S1: Top-view and cross-sectional SEM image of $CuFe_2O_4$ photoanode.

Raman spectrum

Raman spectroscopy was performed with a Raman microscopy (HORIBA Jobin Yvon XploRA PLUS) coupled with an optical microscope (Olympus BX41). The assignment of Raman peaks is displayed in Table S1.[s1−s4]

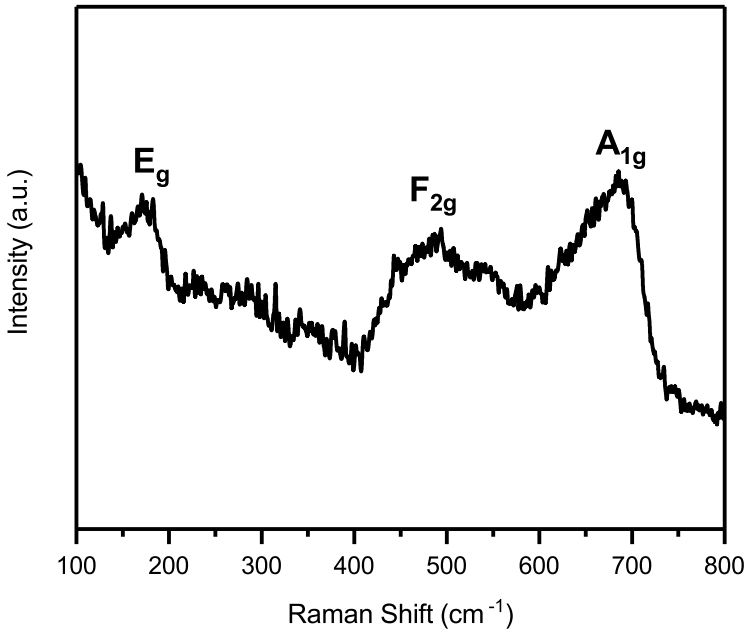

Figure S2: Raman spectrum of $CuFe_2O_4$ photoanode.

Table S1: Assignment of Raman peaks on $CuFe_2O_4$.

Assignment	Raman Shift (cm^{-1})
E_g	168
F_{2g}	483
A_{1g}	674

UV-Vis absorption spectrum

The UV-Vis absorption spectrum was recorded by a UV-Vis spectrophotometer (Shimadzu UV-3600).

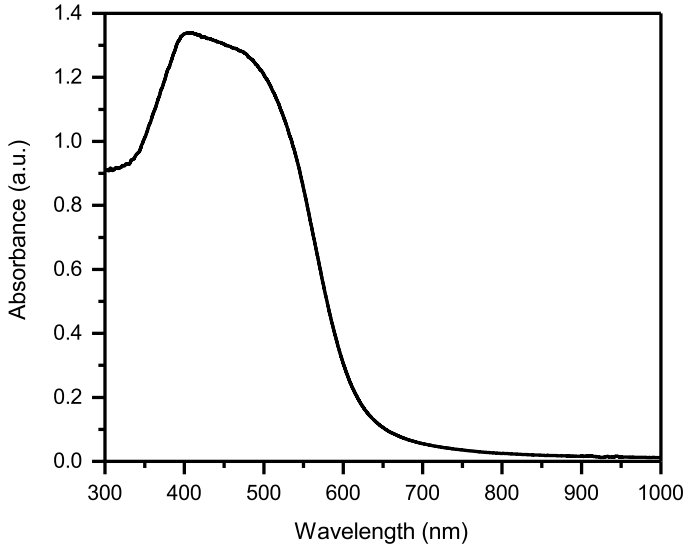

Figure S3: UV-Vis absorption spectrum of $CuFe_2O_4$ photoanode.

Photocurrent under LED illumination

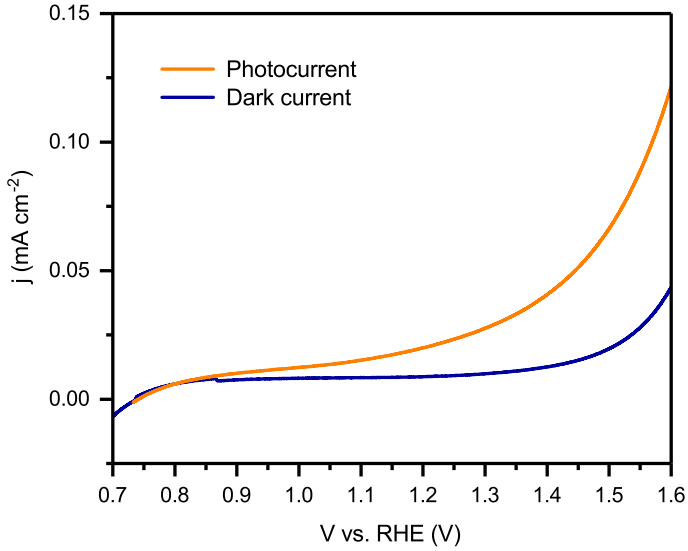

Figure S4: Current-voltage characteristics of $CuFe_2O_4$ photoanode measured under LED irradiation and dark condition in 1 M NaOH electrolyte.

Mean transit time for photogenerated electrons (τ_d)

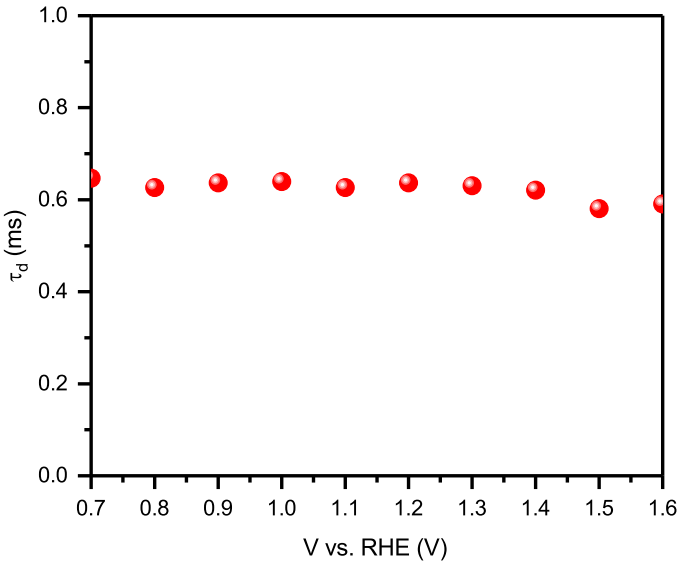

Figure S5: Mean transit time for photogenerated electrons (τ_d) as a function of applied potential.

Substrate-side illumination and electrolyte-side illumination

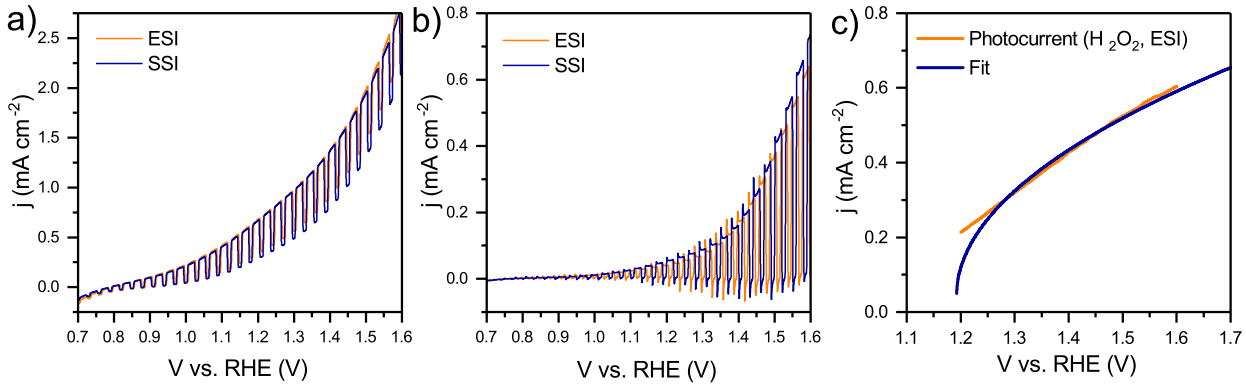

Figure S6: The effect of substrate-side illumination (SSI) and electrolyte-side illumination (ESI) on the photocurrent of $CuFe_2O_4$ photoanode measured under 452 nm monochromatic illumination (a) with and (b) without H_2O_2. (c) Gärtner model fitting of photocurrent.

in situ UV-Vis spectra

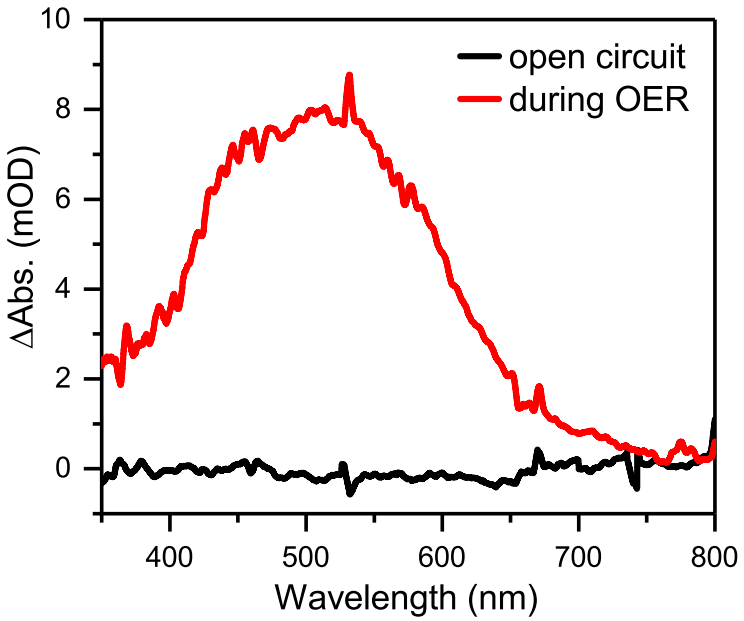

Figure S7: *in situ* UV-Vis absorption spectra of a $CuFe_2O_4$ photoanode measured under open circuit conditions and during OER under an applied bias of 1.8 V vs RHE.

References

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