Supplementary Information

Nanoscale assembly of $BiVO_4/CdS/CoO_x$ core-shell heterojunction for enhanced photoelectrochemical water splitting

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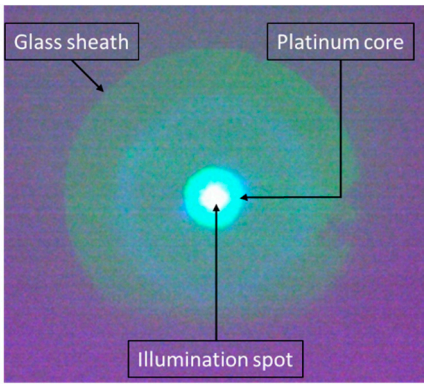


Figure S1. Optical image with the inverse microscope of the alignment of microelectrode and illumination spot. r_{spot} = 2.5 µm, r_T = 5 µm and RG = 5.7.

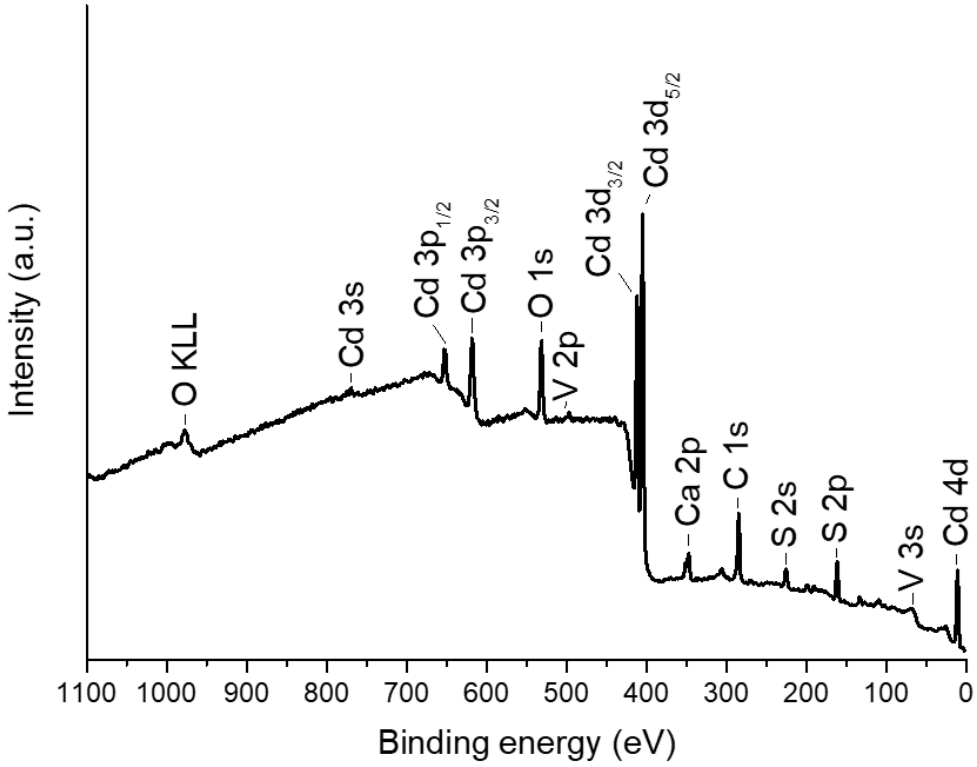


Figure S2. XPS survey of $BiVO_4$/CdS photoanode.

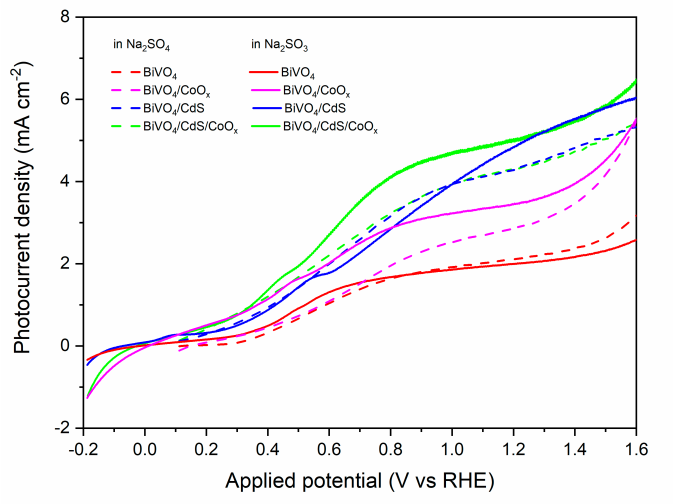


Figure S3. LSV scans under AM 1.5G illumination with (Na_2SO_3) and without (Na_2SO_4) hole scavenger for bare $BiVO_4$, $BiVO_4$/CdS, $BiVO_4/CoO_x$ and $BiVO_4$/CdS/CoOx photoanodes

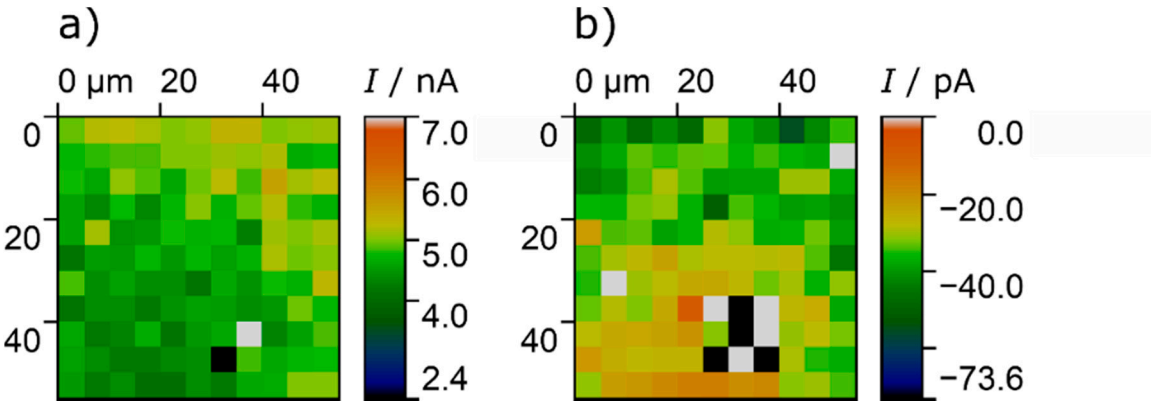


Figure S4. Photocurrent (a) and ORR current maps at the microelectrode (b) at 340 nm on a 50x50 µm² matrix map at bare $BiVO_4$.

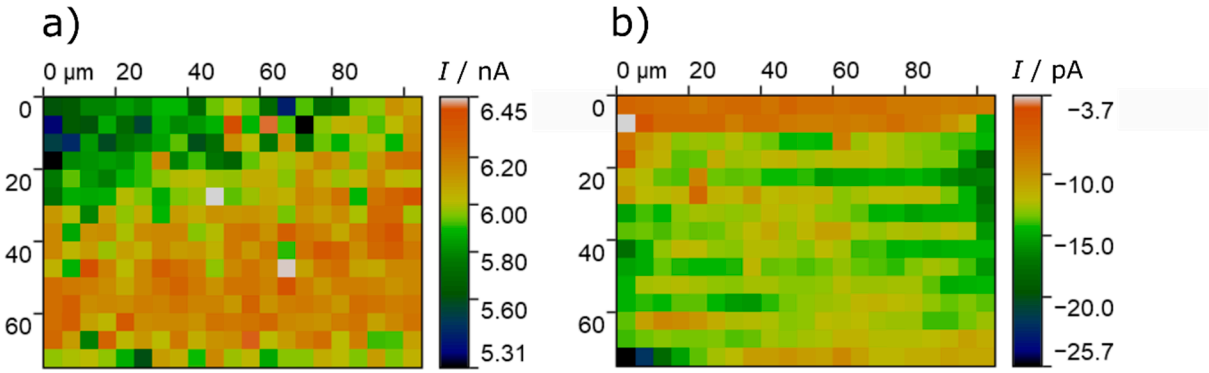


Figure S5. Figure S5: Photocurrent (a) and ORR current maps at the microelectrode (b) at 340 nm on a 100 × 75 µm² matrix map at BiVO4/CdS photoanode

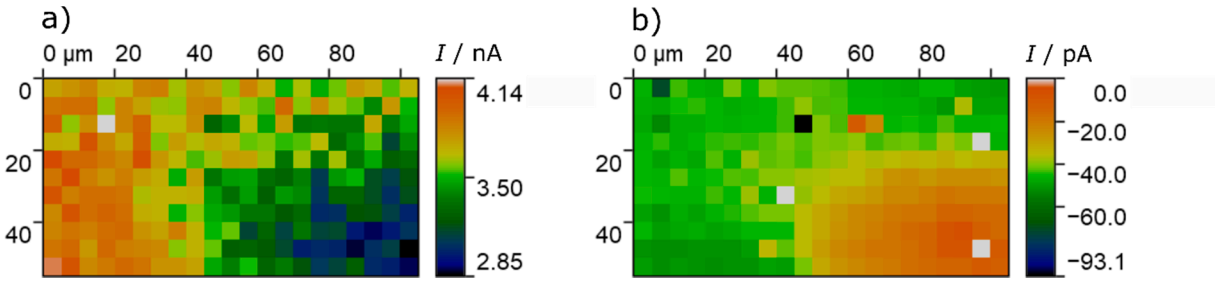


Figure S6. Photocurrent (a) and ORR current maps at the microelectrode (b) at 340 nm on a 100x50 µm² matrix map at BiVO4/CoO_x photoanode.

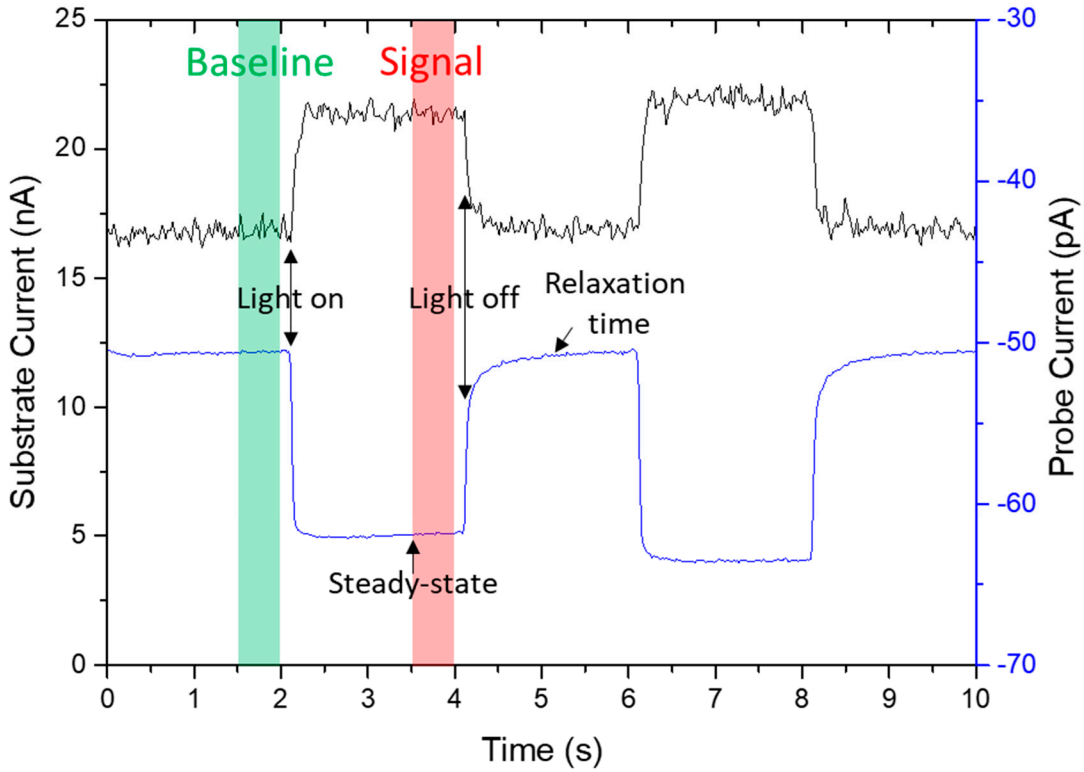


Figure S7. Example of a simultaneous measurement at one point of the matrix, showing the photocurrent at the substrate (sample) and the ORR current at the probe (microelectrode) upon illumination of the sample for 340 and 387 nm with a 2 s delay between the on/off light switch.

The light delay is decided to obtain a steady-state at the baseline and signal acquisition parts (green and red areas, respectively). The baseline is subtracted to the signal acquired to obtain the photoactivity induced during the measurement both at the substrate (from the measured photocurrent) and the probe (from the ORR measured current).