

**Optimal construction of $\text{Co}_3\text{O}_4/\text{Cu}_2\text{O}$ photo-assisted electrode for aqueous Zn-
ion hybrid capacitor: performance and mechanism**

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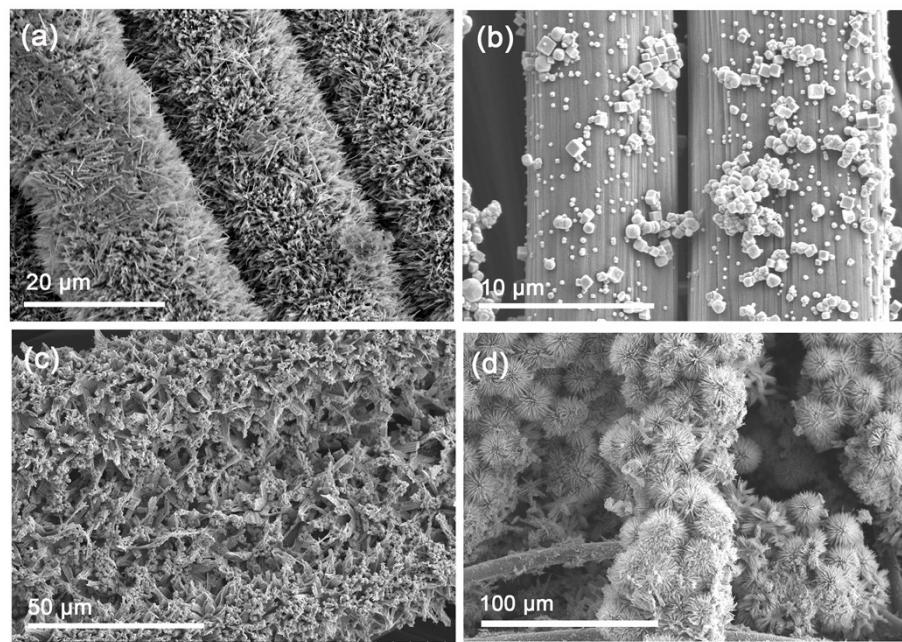


Fig.S1 SEM images of (a) Co_3O_4 , (b) Cu_2O , (c) OC2, and (d) UC2

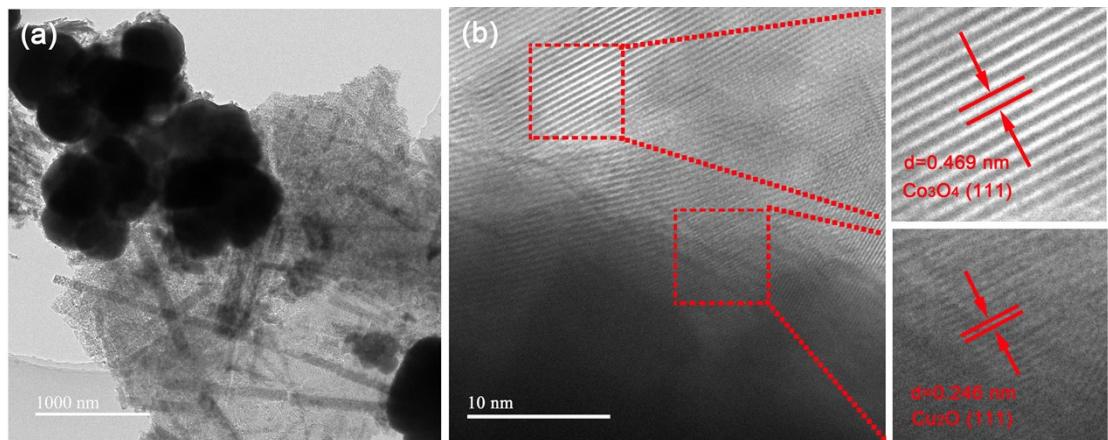


Fig.S2 (a) TEM image and (b) HRTEM image of UC2

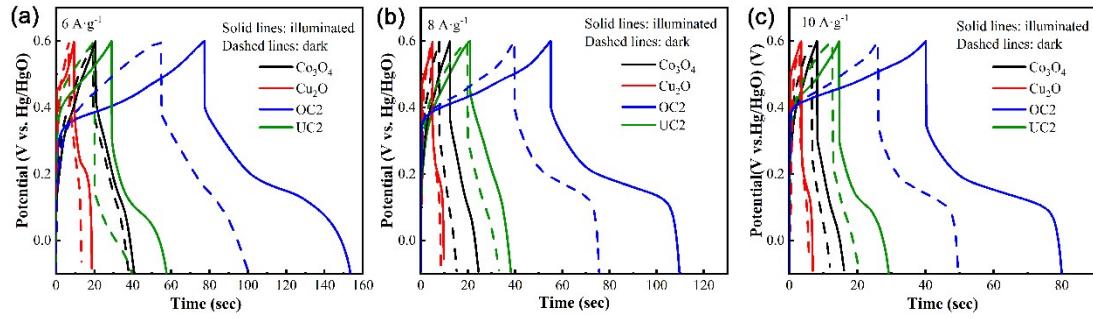


Fig.S3 GCD profiles of the electrodes measured in dark and under illumination at (a) $6 \text{ A}\cdot\text{g}^{-1}$, (b) $8 \text{ A}\cdot\text{g}^{-1}$, and (c) $10 \text{ A}\cdot\text{g}^{-1}$.

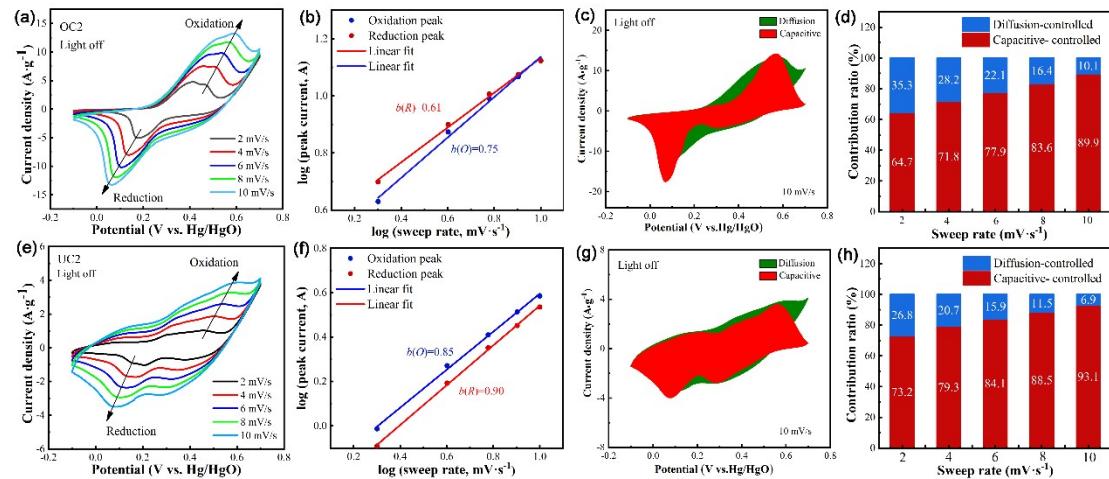


Fig.S4 CV curves at 2~10 mV/s (a, e), plots of $\log i_p$ vs. $\log v$ (b, f), the capacitive contribution at 10 $\text{mV}\cdot\text{s}^{-1}$ (c, g), and the quantitative surface and diffusion contributions at various scan rates (d, h) for OC2 and UC2 in dark, respectively.

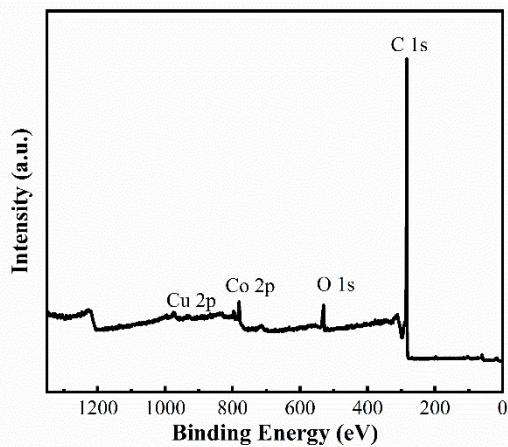


Fig.S5 XPS fully scanned spectra of charged OC2

Table S1 The fitted data of TRPL decay curves

Sample	τ (ns)	B	τ_{ave} (ns)	R_0
Co_3O_4	$\tau_1=24.44949$ $\tau_1=160.45183$	$B_1=0.29387$ $B_2=0.45895$	148.3671	0.25739
Cu_2O	$\tau_1=26.45876$ $\tau_2=208.47588$	$B_1=0.29319$ $B_2=0.32545$	189.8003	0.34643
UC2	$\tau_1=0.64907$ $\tau_2=95.78667$	$B_1=8.20768$ $B_2=0.26581$	79.32489	0.13986
OC2	$\tau_1=0.54287$ $\tau_2=95.14085$	$B_1=15.35492$ $B_2=0.27022$	71.97886	0.0632