

SUPPORTING INFORMATION



Figure S 1. Real anodization device, including rotating disk electrode and hot plate stirrer.

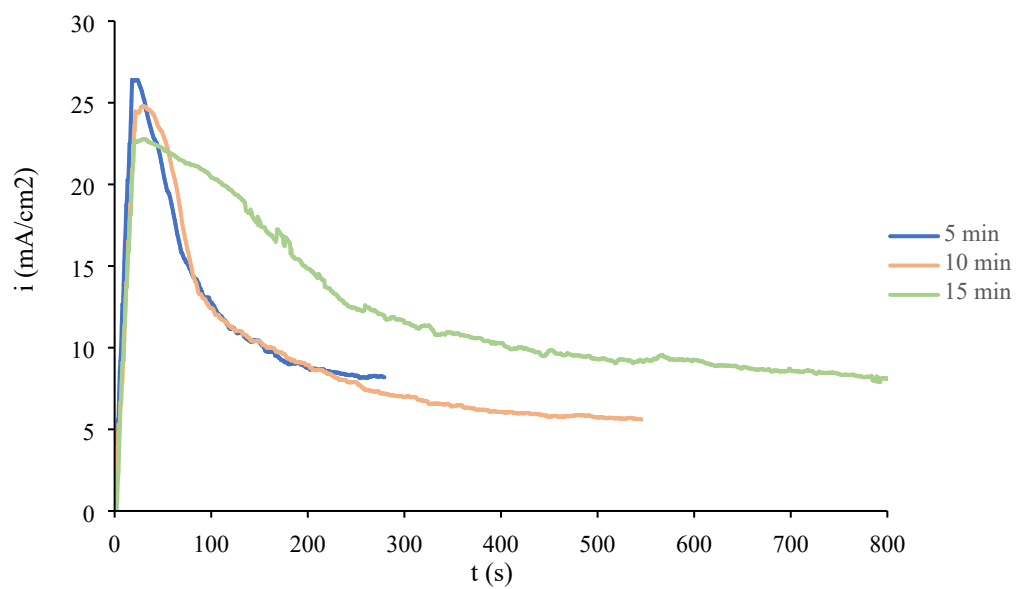


Figure S2. Current density curves registered during electrochemical anodization in 70% (v/v) EG with 0.05M oxalic acid at 0 rpm and at different times: 5, 10 and 15 minutes.

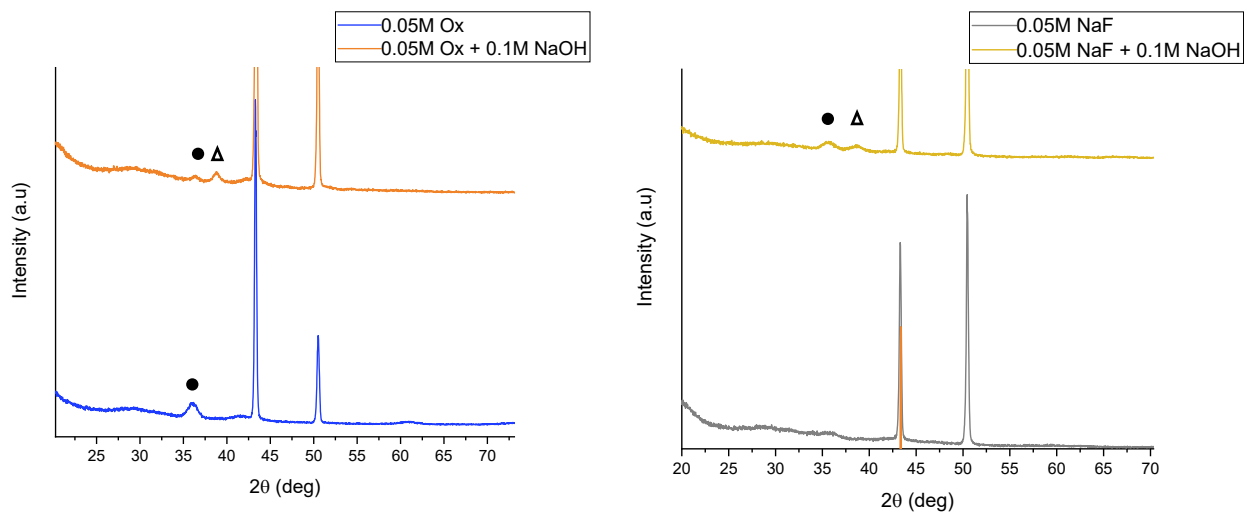


Figure S3. Magnification of Figure 5: XRD patterns of copper oxide nanostructures after anodization using different electrolytes in 70% (v/v) EG at 0 rpm.

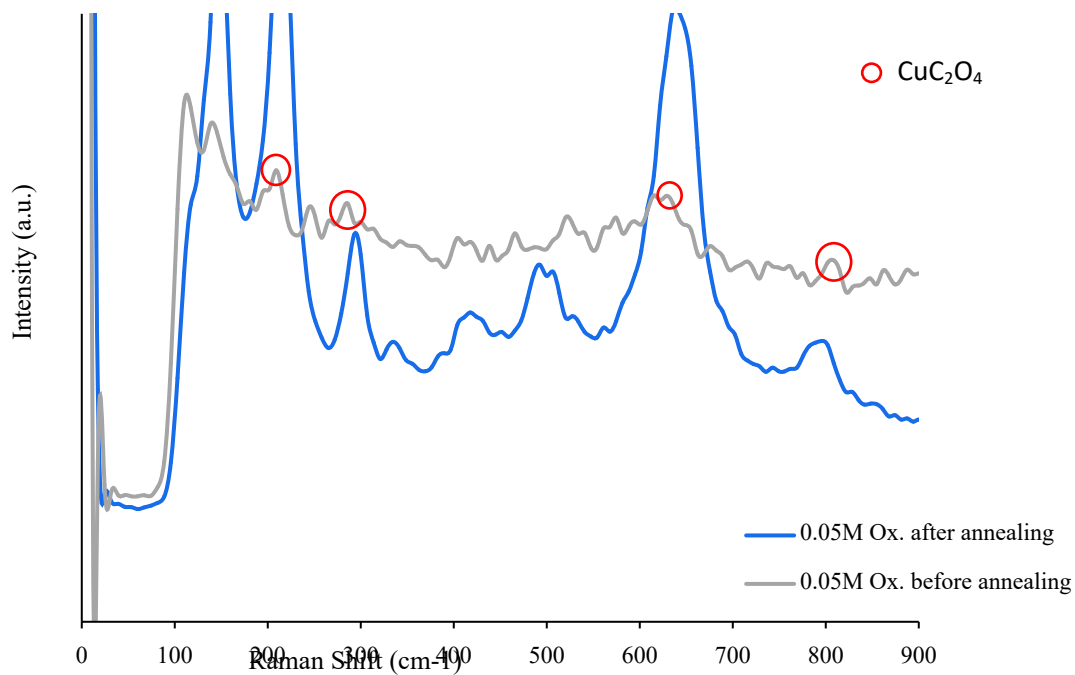


Figure S4. Raman spectra of the sample anodized in 70% (v/v) EG with 0.05M oxalic acid at 250 rpm before and after annealing. Red circles highlight the Raman peaks associated with copper oxalate (CuC_2O_4).

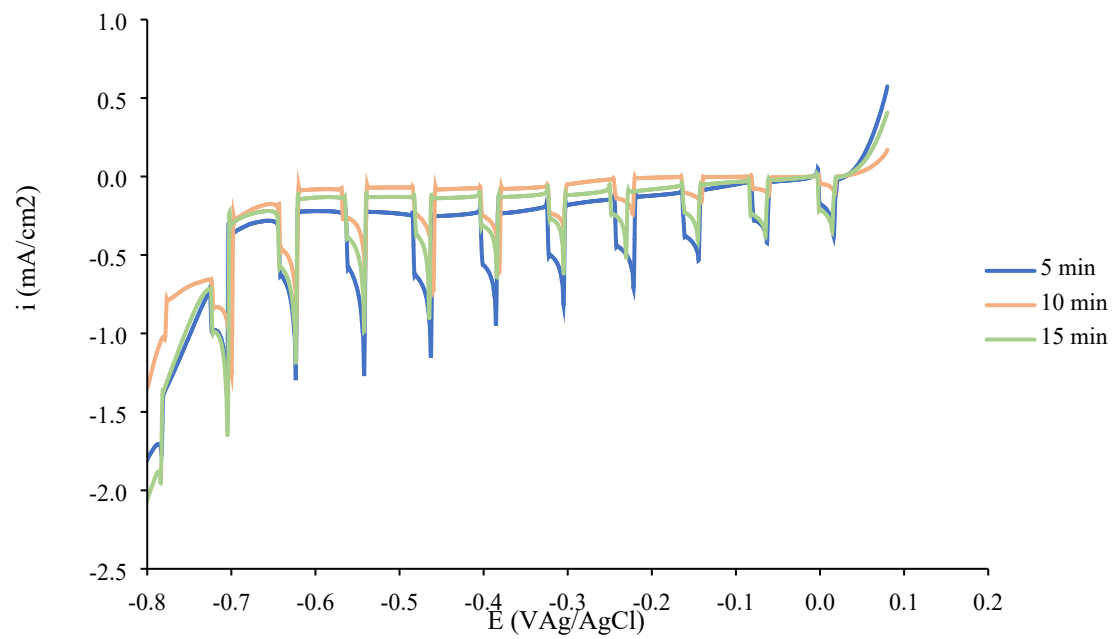


Figure S5. Photocurrent transient vs. potential for the copper oxide nanostructures anodized in 70% (v/v) EG with 0.05M oxalic acid at 0 rpm and different times: 5, 10 and 15 minutes.

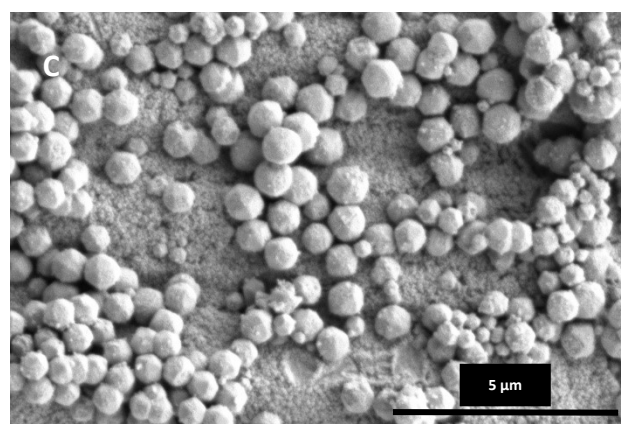
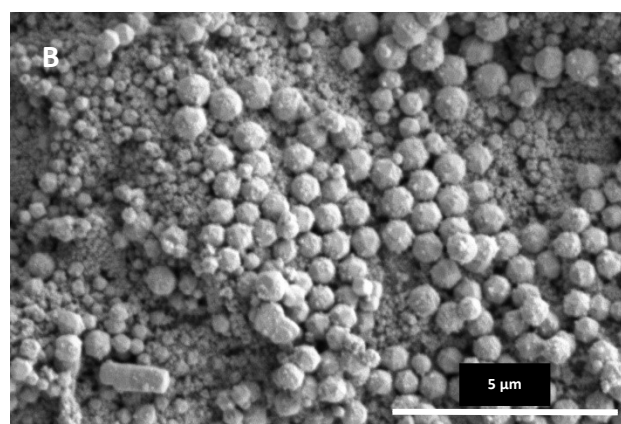
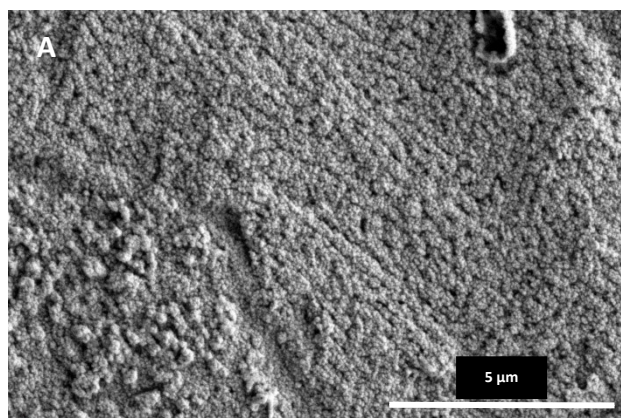


Figure S6. FE-SEM images of the copper oxide nanostructures synthesized by electrochemical anodization in 70% (v/v) EG with 0.05M oxalic acid at 0 rpm and different times: (a) 5 minutes, (b) 10 minutes, (c) 15 minutes.

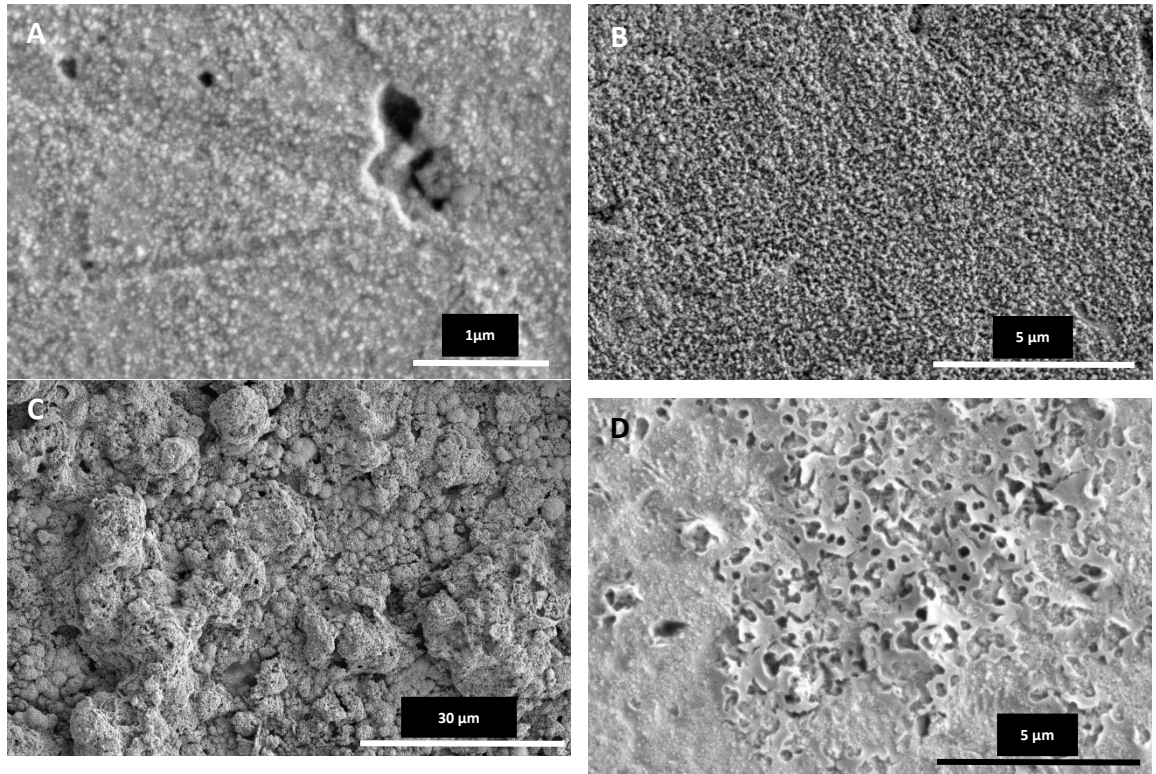


Figure S7. FE-SEM images of copper oxide nanostructures synthesized by electrochemical anodization with 0.05M oxalic acid at 0 rpm in different electrolyte organic bases: (a) 50% ethylene glycol, (b) 90% ethylene glycol, (c) 70% ethanol, (d) 70% formamide.

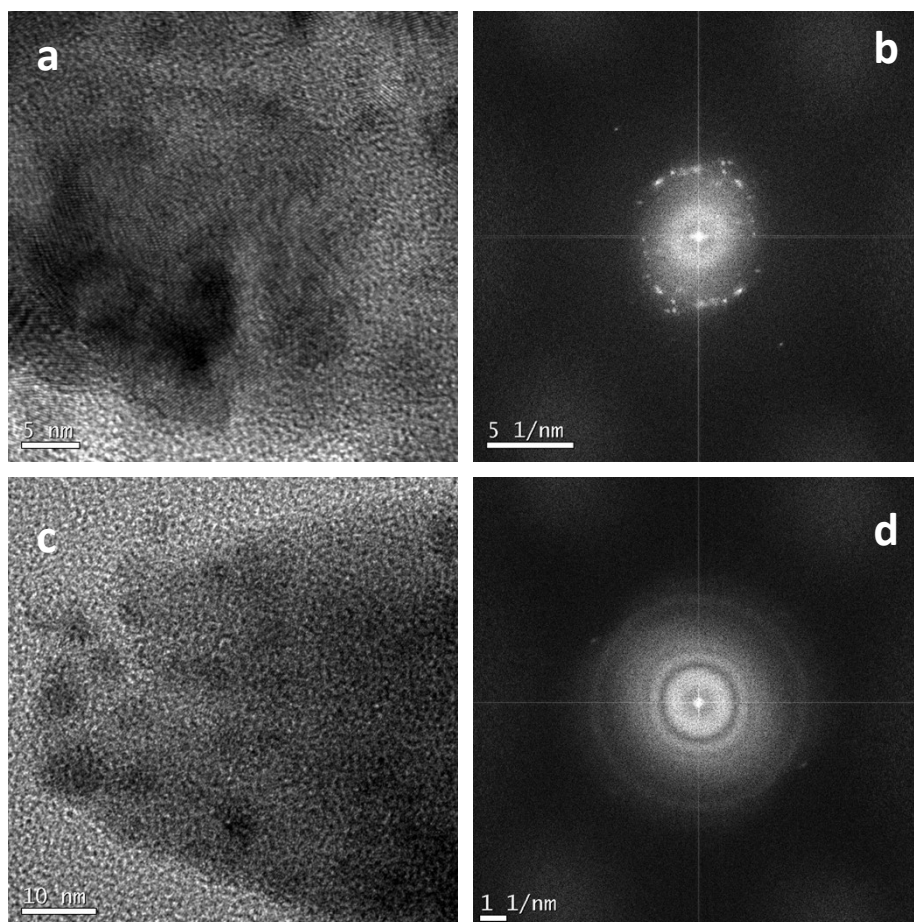


Figure S 8. Sample with oxalic acid prepared in static conditions: TEM image (a) and FFT from the SAED pattern corresponding to the Figure a (b). Sample with oxalic acid prepared at 500 rpm: TEM image (c) and FFT from the SAED pattern corresponding to the Figure c (d).

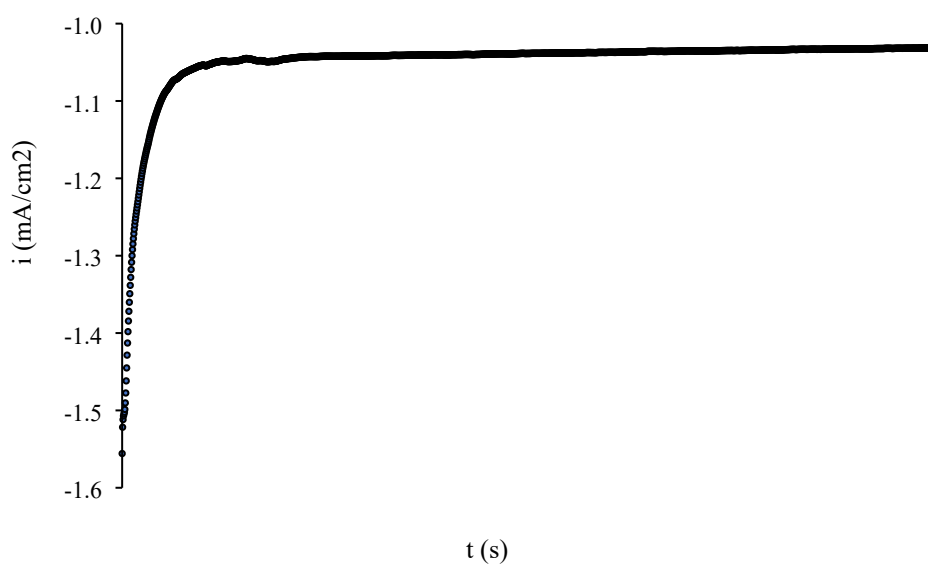


Figure S 9. Stability test run for 1h of the copper oxide nanostructure anodized in 0.05M oxalic acid at 250 rpm. Test conditions: 0.1M Na_2SO_4 electrolyte, applied potential of $-0.2V_{\text{Ag}/\text{AgCl}}$.

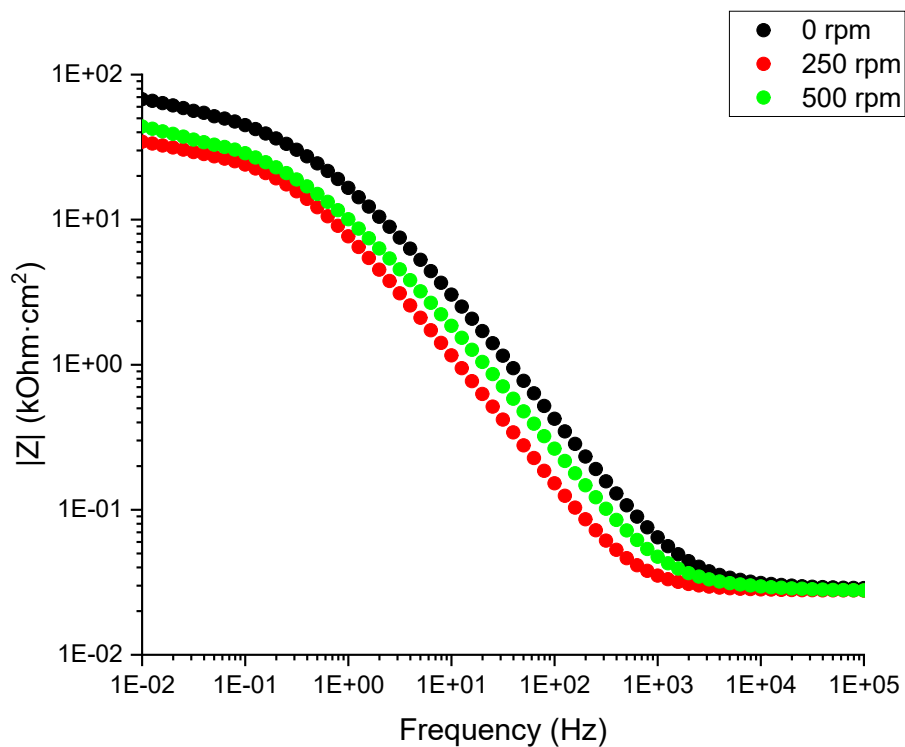


Figure S 10. Bode-module plots for the copper oxide nanostructures formed at different hydrodynamic conditions in 0.05M oxalic acid and 70% ethylene glycol electrolyte.

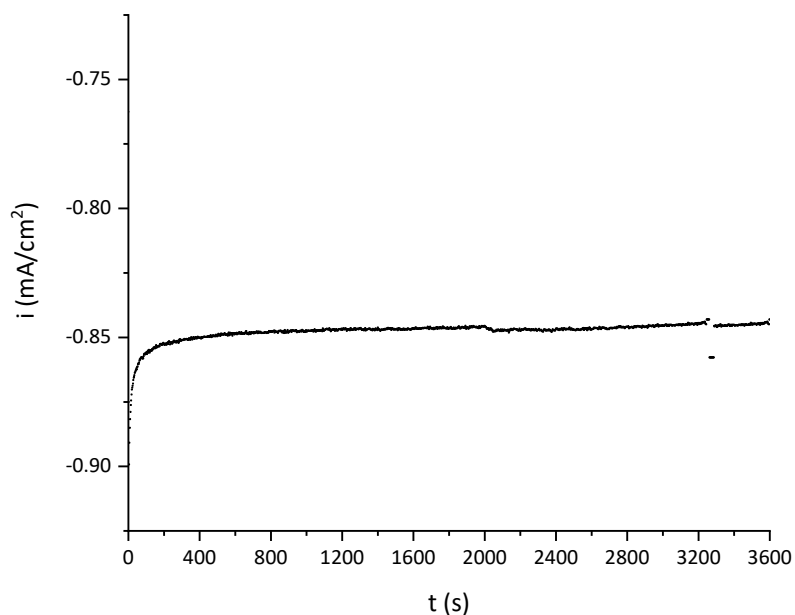


Figure S 11. i-t curve during the first hour of N_2O photoelectroreduction with the copper oxide nanostructure anodized in 0.05M oxalic acid at 250 rpm. Test conditions: 0.1M Na_2SO_4 electrolyte, applied potential of $-0.2V_{Ag/AgCl}$.