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Supporting Information

Thiol-Amine-Based Solution Processing of Cu_2S Thin Films for Photoelectrochemical Water Splitting

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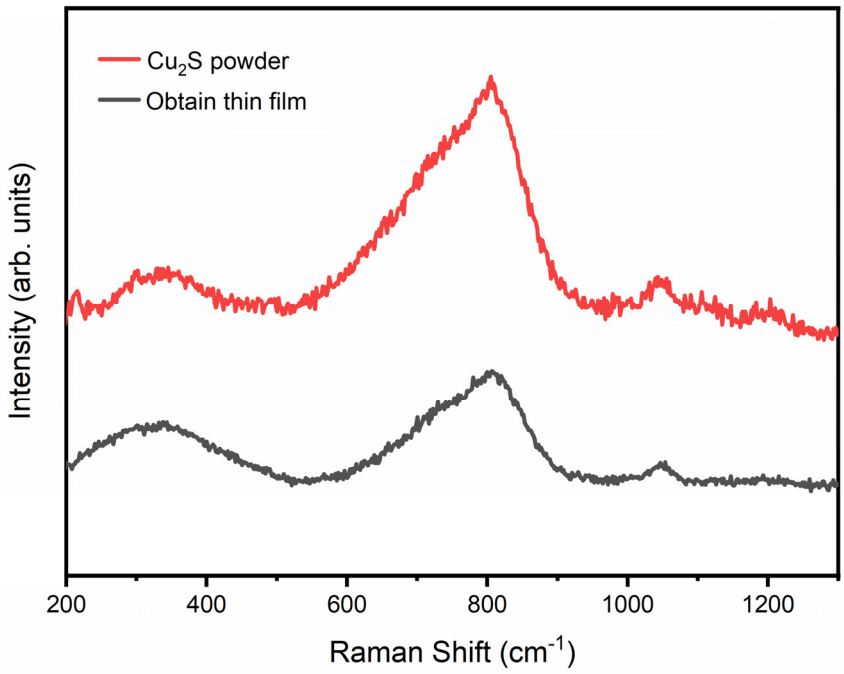

Figure S1. Raman spectra of Cu_2S powder and the obtained thin film.

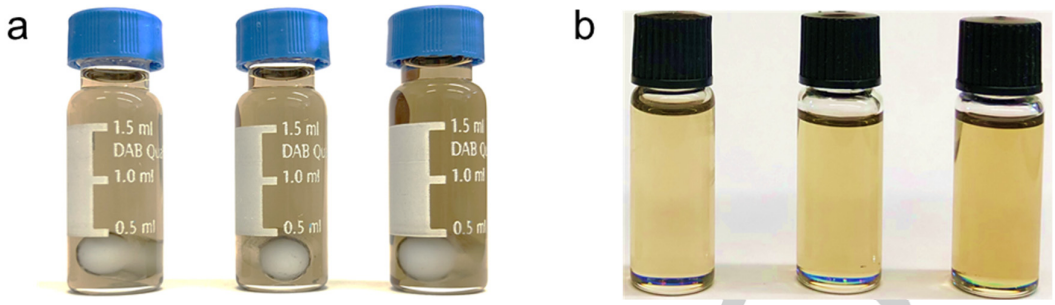

Figure S2. Optical images of 0.6, 0.8 and 1.0 M Cu-S molecular inks (a) before and (b) after filtering with 0.2 μm PTFE filters.

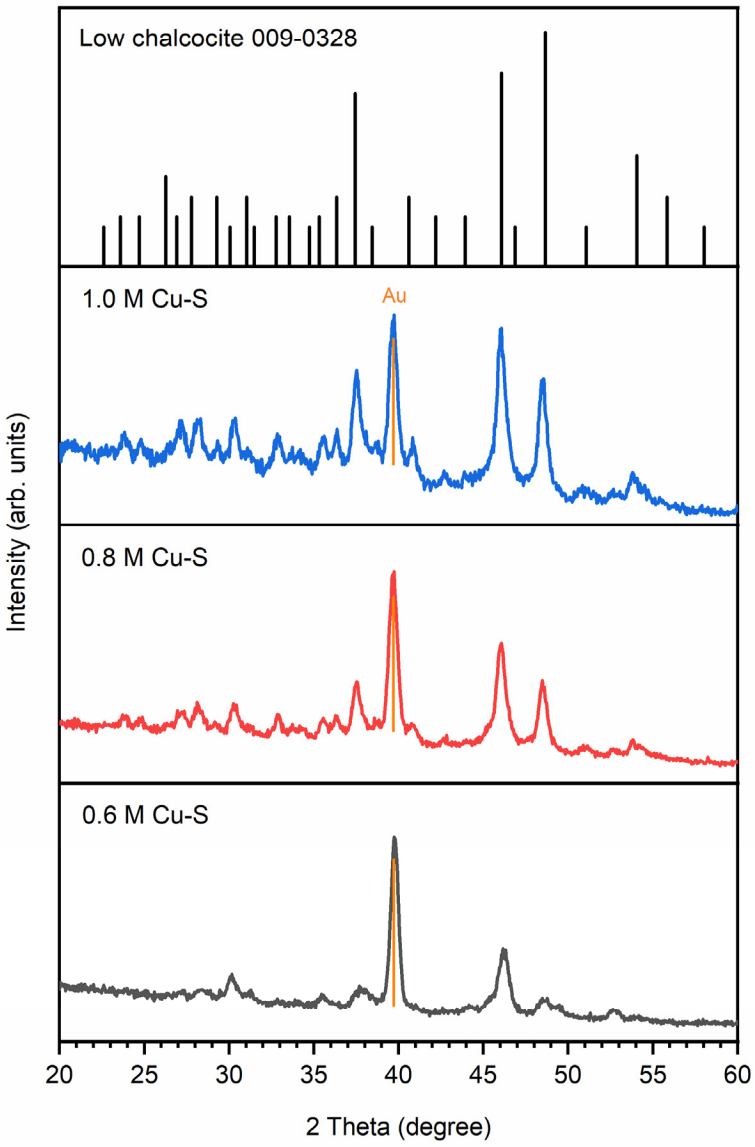

Figure S3. Grazing incidence XRD patterns of 3 coats-Cu_2S thin films prepared from 0.6 M, 0.8 M and 1.0 M Cu-S molecular inks and low chalcocite JCPDS 009-0328.

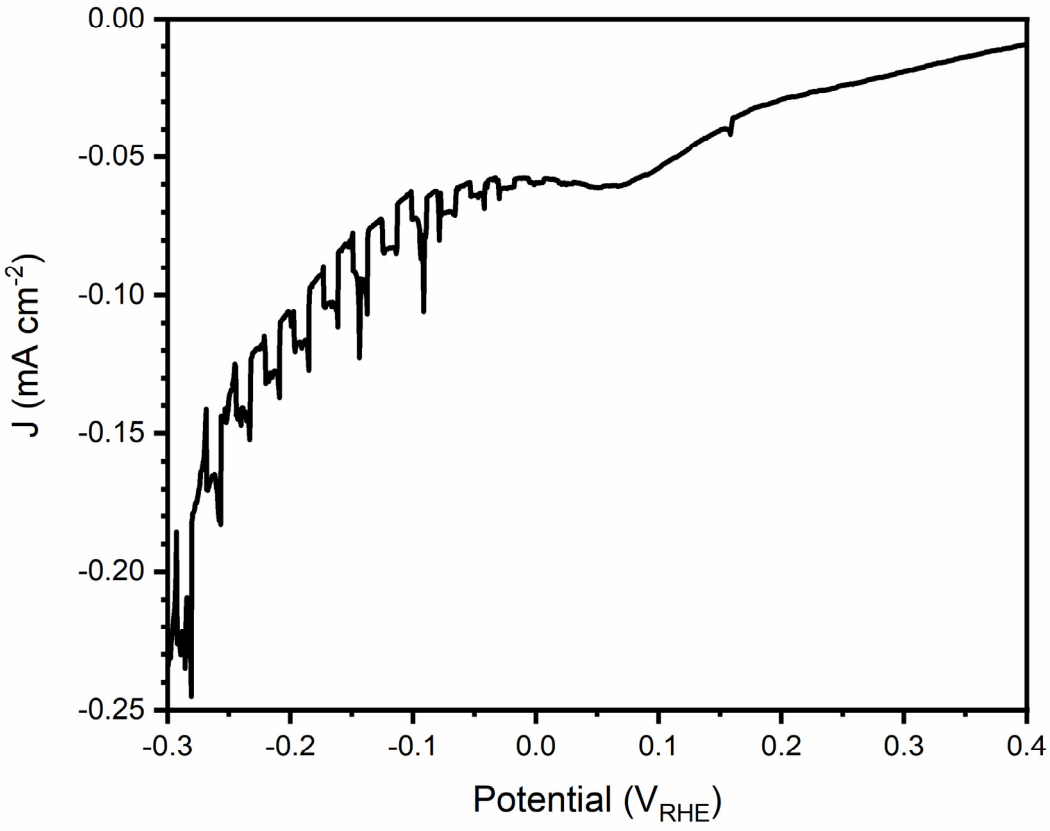

Figure S4. *J*-E curve of the bare Cu_2S thin film prepared from 0.8 M Cu-S molecular ink under simulated chopped AM 1.5 G illumination (100 mW cm^{-2}).

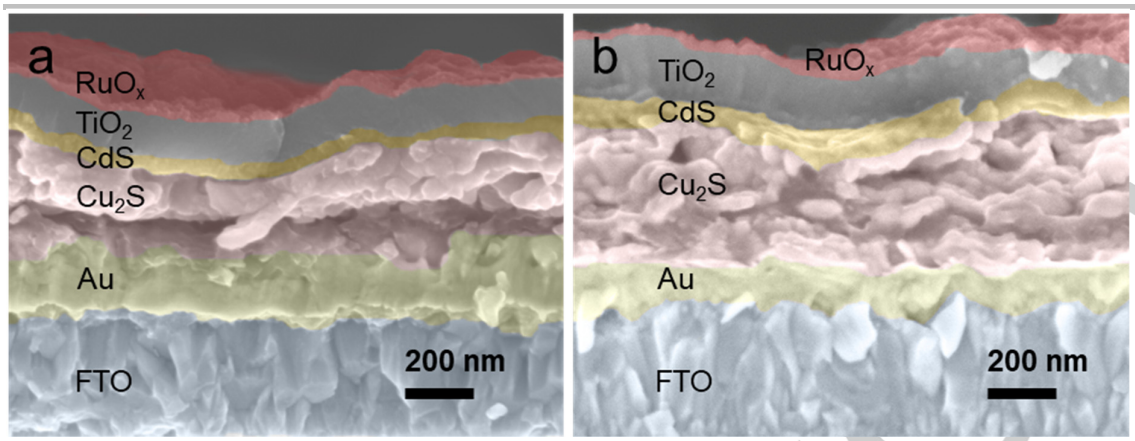

Figure S5. Cross-sectional false-colored SEM images of Cu_2S photocathodes based on Cu_2S thin films prepared from (a) 0.6 M and (b) 1.0 M Cu-S molecular inks.

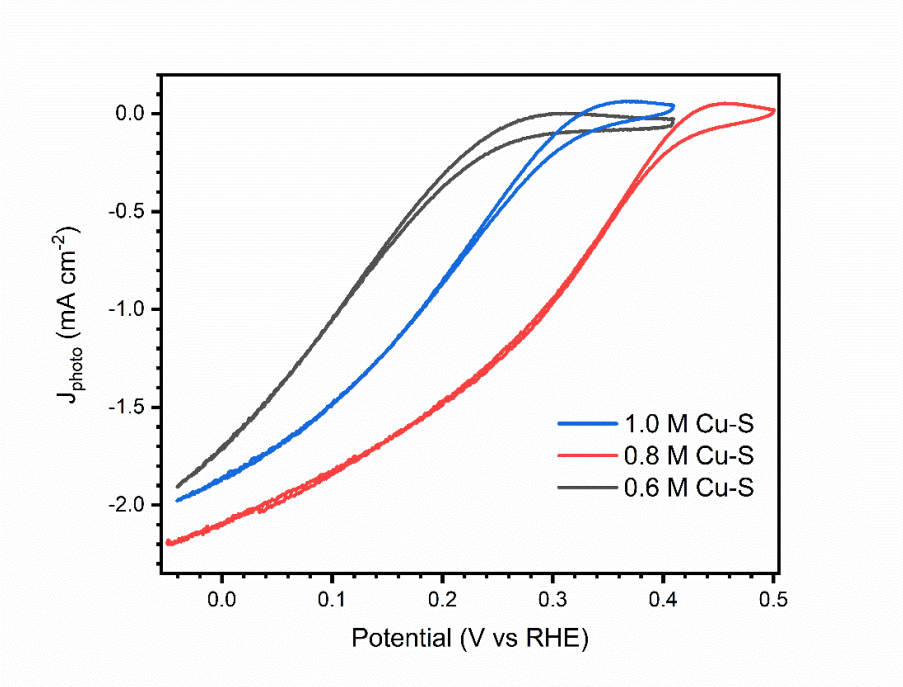

Figure S6. Cyclic voltametry (CV) scans of Cu_2S photocathodes based on Cu_2S thin films prepared from 0.6 M, 0.8 M and 1.0 M Cu-S molecular inks.

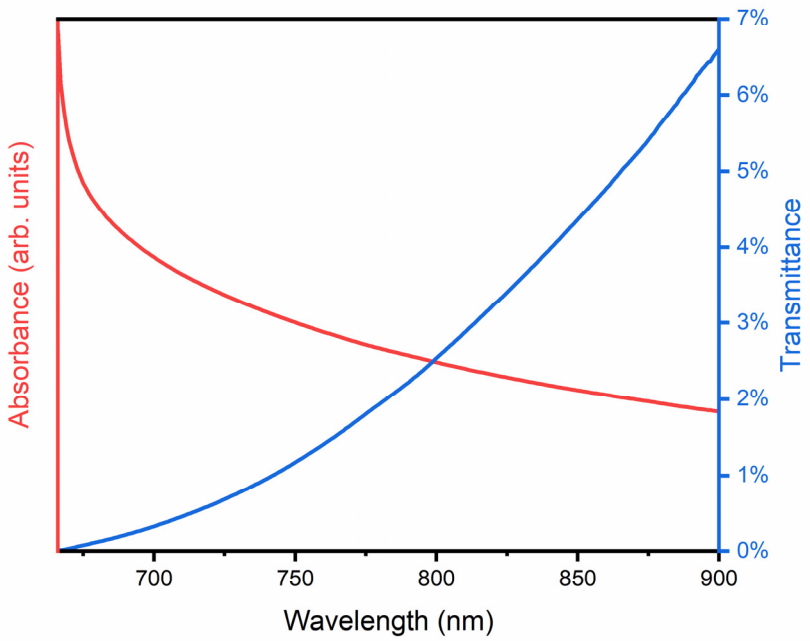

Figure S7. UV-Vis absorbance and transmittance spectra of the Cu_2S thin film prepared from 0.8 M Cu-S molecular ink measured in transmission mode.