

Electronic supplementary information

## Electrodeposition of $\text{Cu}_2\text{O}$ Films and their Photoelectrochemical Properties

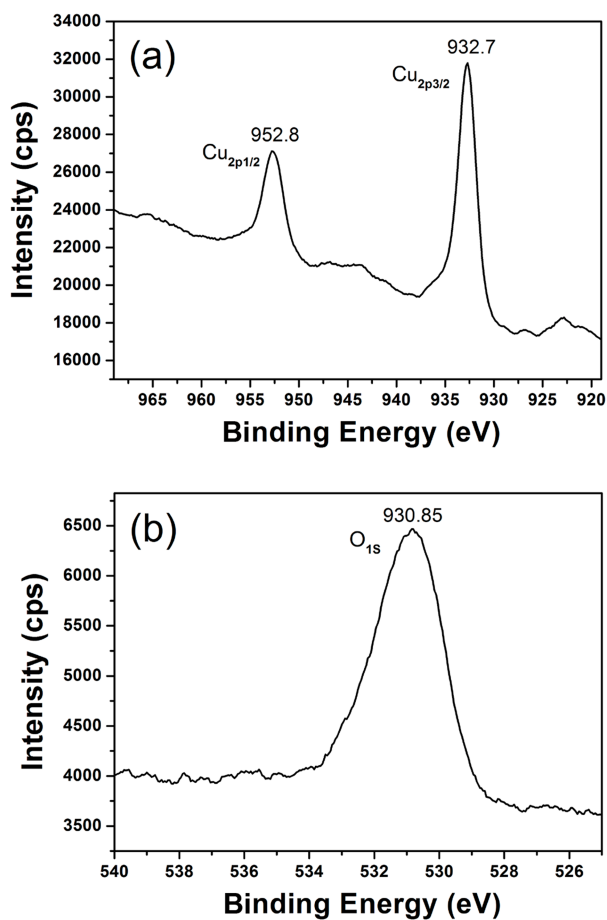
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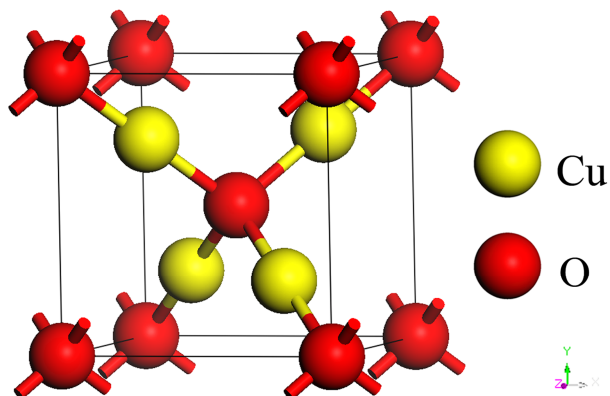
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**Figure S1.** X-ray photoelectron spectra of the sample a) Cu<sub>2p</sub><sup>I</sup>; b) O<sub>1s</sub>.

Figure S1 shows the high resolution XPS spectrum for the Cu<sub>2p</sub> of the prepared Cu<sub>2</sub>O films. The high resolution XPS spectrum of Cu<sub>2p</sub> can be fitted into two peaks (Figure S1a), which is attributed to the Cu<sup>+</sup> of Cu<sub>2</sub>O.<sup>1</sup> Moreover, the main peak at 932.7 eV, which is corrected with reference to C<sub>1s</sub> (284.6 eV), corresponding to the binding energy of Cu<sub>2p3/2</sub>, is in good agreement with data observed for copper (I) oxide,<sup>2</sup> and the other one at 952.8 eV comes from the Cu<sub>2p1/2</sub>. As shown in Figure S1b, the O<sub>1s</sub> core-level spectrum is broad, peak at 530.85 eV, which is consistent with the literature data of Cu<sub>2</sub>O.<sup>1</sup> Thus, the XPS results prove that the sample is composed of Cu<sub>2</sub>O.



**Figure S2. The cuprite bulk unit cell of  $\text{Cu}_2\text{O}$ .**

1. C. D. R. Wagner, W. W.; Davis, L. E.; Moulder, J. F.; Muilenberg, G. E., *Handbook of X-ray Photoelectron Spectroscopy*, Perkin-Elmer Corporation Physical Electronics Division, Minnesota, **1979**.
2. J. E. Chastain, *Handbook of X-ray Photoelectron Spectroscopy*, Minnesota, Perkin-Elmer Corporation Physical Electronics Division, **1992**, 40-41.