Electronic Supplementary Information

Etching of Electrodeposited Cu₂O Films Using Ammonia Solution

for Photovoltaic Applications

Changqiong Zhu and Matthew J. Panzer*

Department of Chemical & Biological Engineering
Tufts University
4 Colby St., Medford, MA 02155, USA

* Email: matthew.panzer@tufts.edu
Figure S1 Top view SEM images of: (a) untreated homojunction with as-deposited p-Cu$_2$O (~2 µm thick) as the bottom layer; (b) etched homojunction with 10 min. etched p-Cu$_2$O (~2 µm thick) as the bottom layer. (c) Current density-voltage characteristics of the two homojunction PV devices under 100 mW/cm$^2$ simulated solar illumination.
Figure S2 UV-Visible absorption spectra of: a ~2 μm thick as-deposited p-Cu₂O film, an identically prepared p-Cu₂O film etched by ammonium hydroxide solution for 10 min., the untreated homojunction incorporating the as-deposited p-Cu₂O layer, and the etched homojunction incorporating the etched p-Cu₂O layer.
Figure S3 SEM cross-sectional view images of electrodeposited films grown on ITO-coated glass substrates: (a) ~750 nm thick p-Cu₂O film as-deposited; (b) identically prepared p-Cu₂O film etched by ammonium hydroxide solution for 1 min.; (c) untreated homojunction with the as-deposited p-Cu₂O film as the bottom layer; (d) etched homojunction with the etched p-Cu₂O film as the bottom layer.
Figure S4 Current density-voltage characteristics of an untreated homojunction vs. an etched homojunction device measured both in the dark (filled symbols) and under 100 mW/cm$^2$ simulated solar illumination (open symbols). Both homojunctions were constructed using identically prepared p-Cu$_2$O (~750 nm thick) bottom layers; the etched homojunction p-Cu$_2$O bottom layer was etched by ammonium hydroxide solution for 1 min.