Electronic Supplementary Information
Earth-abundant and low-cost CZTS solar cell on flexible molybdenum foil

Yongzheng Zhang\textsuperscript{a,b}, Qinyan Ye\textsuperscript{b}, Jiang Liu\textsuperscript{b}, Hao Chen\textsuperscript{b}, Xulin He\textsuperscript{b}, Cheng Liao\textsuperscript{b,*}, Junfeng Han\textsuperscript{b}, Hao Wang\textsuperscript{a}, Jun Mei\textsuperscript{b}, WoonMing Lau\textsuperscript{b}

\textsuperscript{a} The College of Materials Science and Engineering, Beijing University of Technology, Beijing 100124, PR China
\textsuperscript{b} Chengdu Green Energy and Green Manufacturing Technology R&D Centre, Southwest Airport Economic Development Zone, Shuangliu, Chengdu, 610207, P. R. China

* Corresponding author: Tel: +86-28-67076209, Fax: +86-28-67076210
E-mail address: cliao315@hotmail.com (Cheng Liao)

Characterizations and measurements
X-ray power diffraction (XRD) measurements were carried out on a Shimadzu XRD diffractometer with Cu K\textsubscript{\alpha} radiation. Raman spectra were recorded on a microscopic confocal Raman spectrometer (Labram HR 800) with an excitation of 514 nm laser light. The morphologies and compositions of the samples were observed using a Hitachi S5200 field emission scanning electron microscope (SEM) equipped with Bruker energy dispersive spectroscopy. Current-voltage (I-V) measurements were performed using a Keithley 2400 General Purpose Sourcemeter under simulated AM 1.5G illumination (100 mW cm\textsuperscript{-2}). External quantum efficiency (EQE) was collected by the EQE Measurement System (Continuous Solar Simulator for PV Cells, Hongming Technology Co., Ltd.).
Figure Captions

<table>
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<th>Table S1. Composition analysis and composition ratios of Cu-Zn-Sn precursors</th>
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<td>Sample</td>
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<td>Cu-Zn-Sn precursors</td>
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The composition ratios of Cu/(Zn + Sn) and Zn/Sn are 0.79 and 1.17 respectively, which yields Cu-poor and Zn-rich.

![AFM image of post-polished molybdenum foil](image1.png)

Fig. S1 AFM image of post-polished molybdenum foil.

The surface morphology of foil is found to be smooth with an average roughness of \(~10\) nm in most regions. An AFM 3D micrograph of foil surface shows that height between lowest feature and highest feature is \(~20\) nm.
Fig. S2 X-ray powder diffraction (XRD) patterns of Cu-Zn-Sn precursors.

The peaks correspond to alloy phases, where corresponding XRD patterns of Sn, Zn, CuZn, and CuSn phases are observed, which can be confirmed by JCPDS #65-7657, #65-9743, #65-9061, #65-3433 and #52-1228, respectively.