

## Supporting information

# Nano-scale sulfurization of $\text{Cu}_2\text{ZnSnSe}_4$ crystal surface for photovoltaic applications

Marit Kauk-Kuusik,<sup>\*a</sup> Xiaofeng Li,<sup>a</sup> Maris Pilvet,<sup>a</sup> Kristi Timmo,<sup>a</sup> Valdek Mikli,<sup>a</sup> Reelika Kaupmees,<sup>a</sup> Mati Danilson,<sup>a</sup> and Maarja Grossberg<sup>a</sup>

<sup>a</sup> Department of Materials and Environmental Technology, Tallinn University of technology, Ehitajate tee 5, Tallinn 19086, Estonia.

\* Corresponding autor: Email: marit.kauk-kuusik@taltech.ee

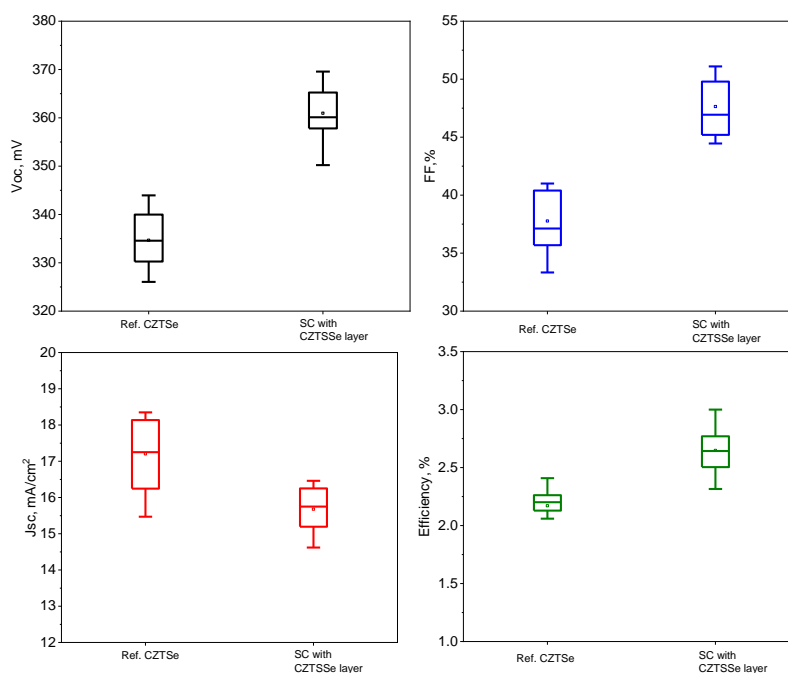


Figure S1. Box-plot diagram of the one-sun  $J$ - $V$  performance parameters of CZTSe cells made with no treatment (Ref) and nano-scale sulfurization treatment. 10 CZTSe solar cells (area  $\sim 4 \text{ mm}^2$ ) were fabricated per experiment. The box, horizontal bars, and point symbols indicate the 25/75 percentile, min/max and mean values, respectively.