

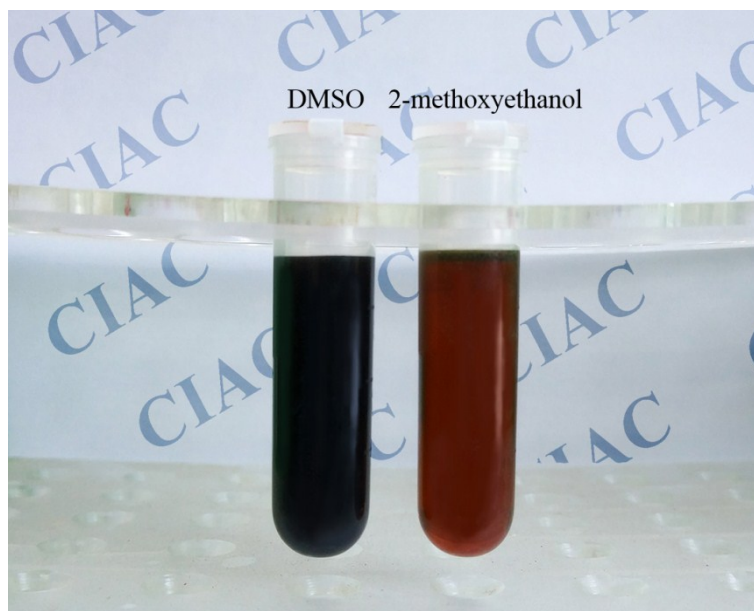
## Supporting Information

### A Versatile Strategy for Fabricating Various $\text{Cu}_2\text{ZnSnS}_4$ Precursor Solutions

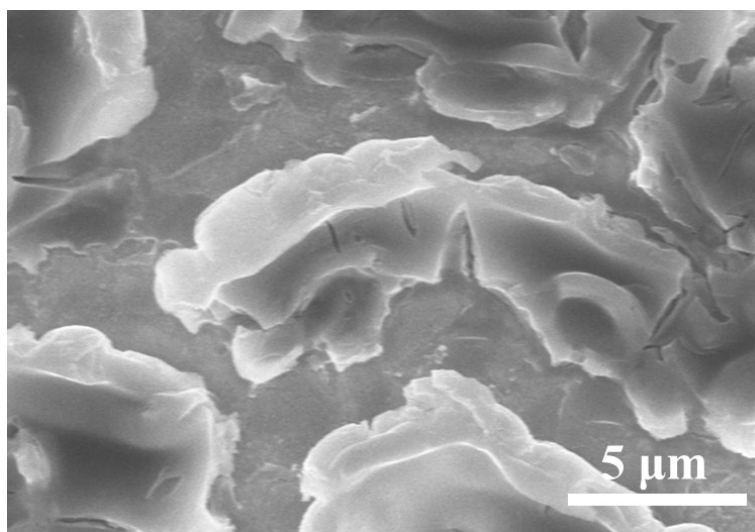
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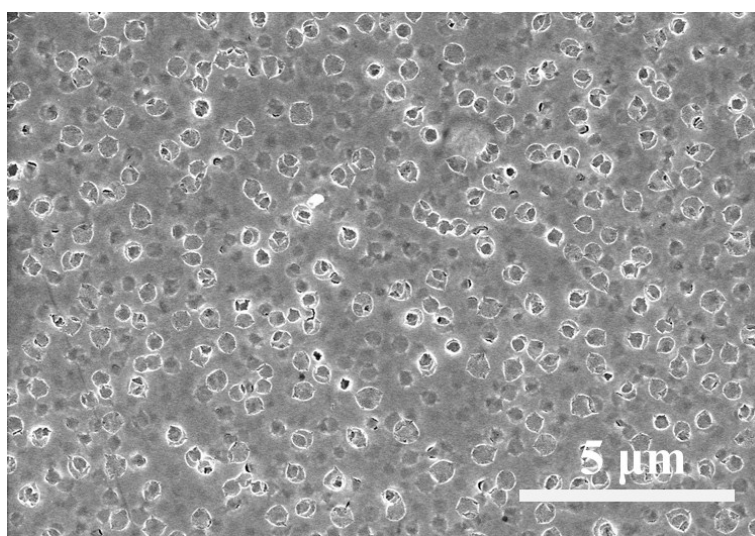
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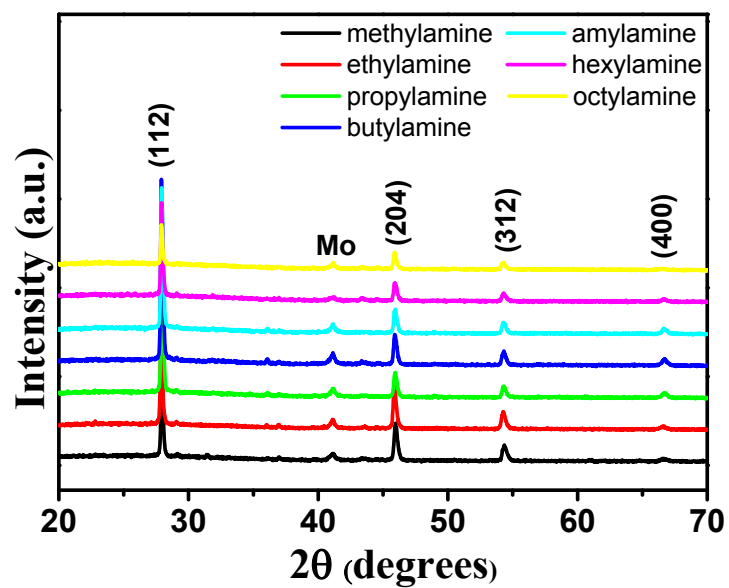
**Fig. S1** The butyl-dithiocarbamate-based CZTS precursor solutions used the DMSO (left) and the 2-methoxyethanol (right) as the solvents.



**Fig. S2** The top-view SEM image of as-prepared CZTS film fabricated by the methyldithiocarbamate CZTS precursor solution.



**Fig. S3** The top-view SEM image of as-prepared CZTS film fabricated by the ethyldithiocarbamate CZTS precursor solution.



**Fig. S4** The XRD patterns of selenized thin films fabricated by the methyl-, ethyl-, propyl-, butyl-, amyl-, hexyl-, and octyl- dithiocarbamate-based CZTS precursor solutions.