

Application of Atomic Layer Deposition for Thin Film Solar Cells: Zn-based Buffer Layers

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Atomic layer deposition (ALD) is one of the most promising techniques to deposit metal oxide thin films, allowing one to obtain highly conformal layers on planar and three-dimensional structures [1]. In this talk, I will introduce the ALD technique and discuss the formation of amorphous zinc-tin-oxides (a-ZTOs) at low-temperatures by using a newly synthesized cyclic tin (II) precursor [2]. Application of ALD-ZTOs as an *n*-type buffer layer for cuprous oxide (Cu₂O) thin-film solar cells (TFSC) will be presented focusing on controlled zinc-to-tin cation ratios [3]. Film formation of zinc oxysulfide (ZnOS) and its application to Cu₂ZnSn(S,Se)₄-based solar cells will also be dealt later in the presentation.

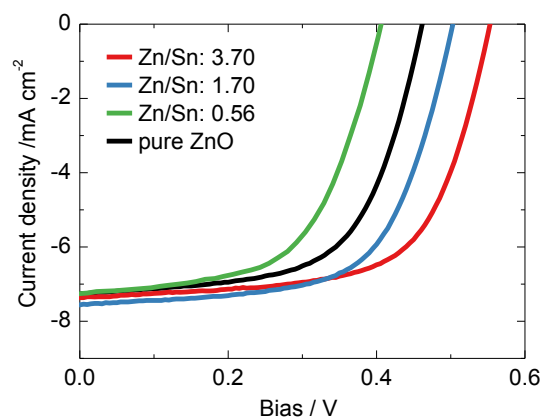


Fig. 1. Current–voltage characteristics of the Cu₂O TFSCs with different a-ZTO buffer layer cation ratios

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References

1. S. M. George, *Chem. Rev.*, 110(1), 111 (2010).
2. J. Heo, S. B. Kim, and R. G. Gordon, *Appl. Phys. Lett.*, 101(11), 113507 (2012).
3. Y. S. Lee, J. Heo, S. C. Siah, J. P. Mailoa, R. E. Brandt, S. B. Kim, R. G. Gordon, and T. Buonassisi, *Energy Environ. Sci.*, 6(7), 2112 (2013).