Controlling deposition temperature of VTD for pure-phase SnS thin film

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Tin sulfide (SnS) has recently been emerged as a very promising absorber material for thin film photovoltaics. It has a wide variety of attractive features, such as ideal optical band gap (~1.3 eV), relatively earth abundant constituents and non-toxicity. But till date, the efficiencies obtained from the SnS-based solar cells are relatively low compared to its theoretical limit of ~32%. In order to improve the efficiency, one of the requirements is to improve the crystallinity by depositing pure single-phase thin film.

In our study, vapor transport deposition was used to obtain pure single-phase SnS film. The effects of deposition temperature, Ar pressure, and growth duration on the properties of SnS have been studied. The characteristics of SnS thin films were investigated by scanning electron microscopy. Figure 1 shows the change in morphology of the SnS thin film as the deposition temperature increases from 550 °C to 625 °C. It also led to the increase in the tin film thinckness and grain size. Further detailed analyses using X-ray diffraction and Raman spectroscopy will be dealt in our presentation. [1]

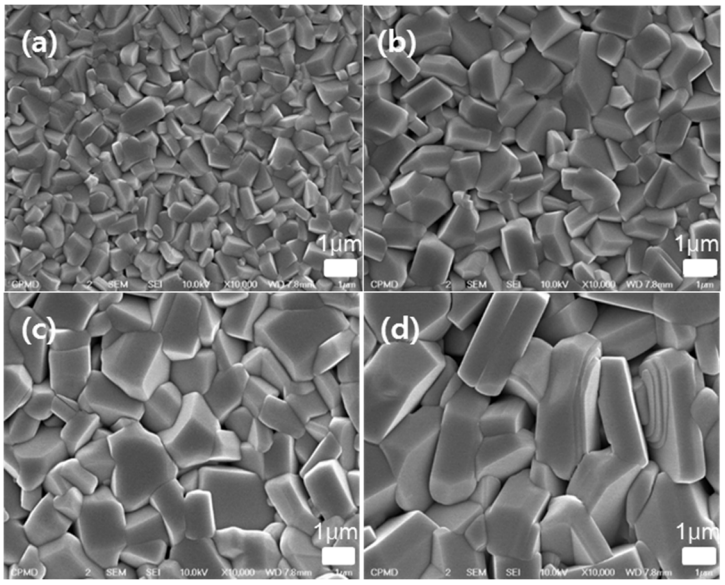

Figure 1. SEM images of the SnS films deposited at various deposition temperature of (a) 550 °C, (b) 575 °C, (c) 600 °C, (d) 625 °C.

References:

[1] Y. Kawano, J. Chantana, T. Minemoto, Curr. Appl. Phys., **15(8)**, 897–901 (2015).