Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

A significant increase in efficiency along limitation toxicity of solar cell based on Sb2Se3 with SnO_2 as buffer layer

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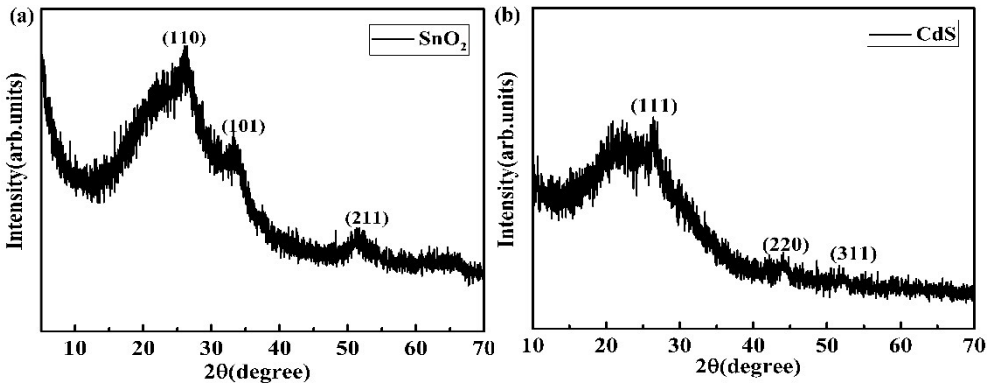

Fig S1 The XRD patterns of pure (a) SnO_2 and (b) CdS films

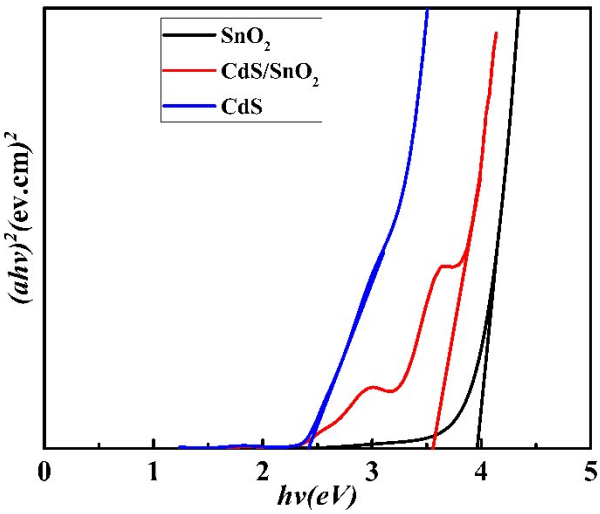

Fig S2. The band gap of SnO_2, CdS/SnO_2 and CdS buffer layers

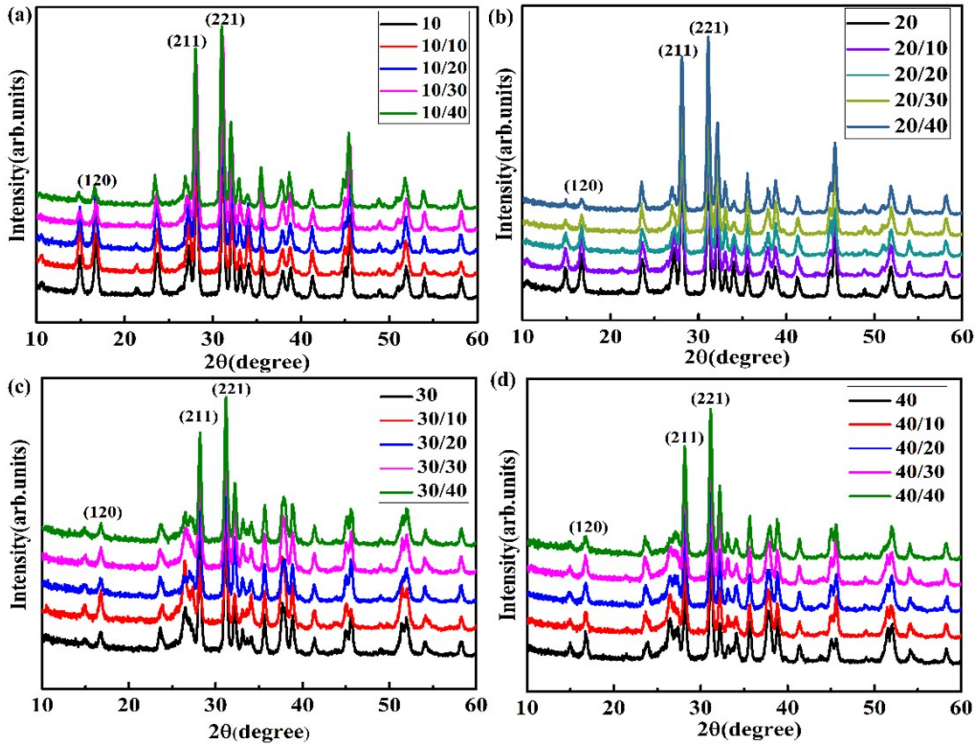

Fig S3 The XRD patterns of Sb_2Se_3 film based on different thickness of CdS(40nm)/SnO_2(10-40nm) layer.

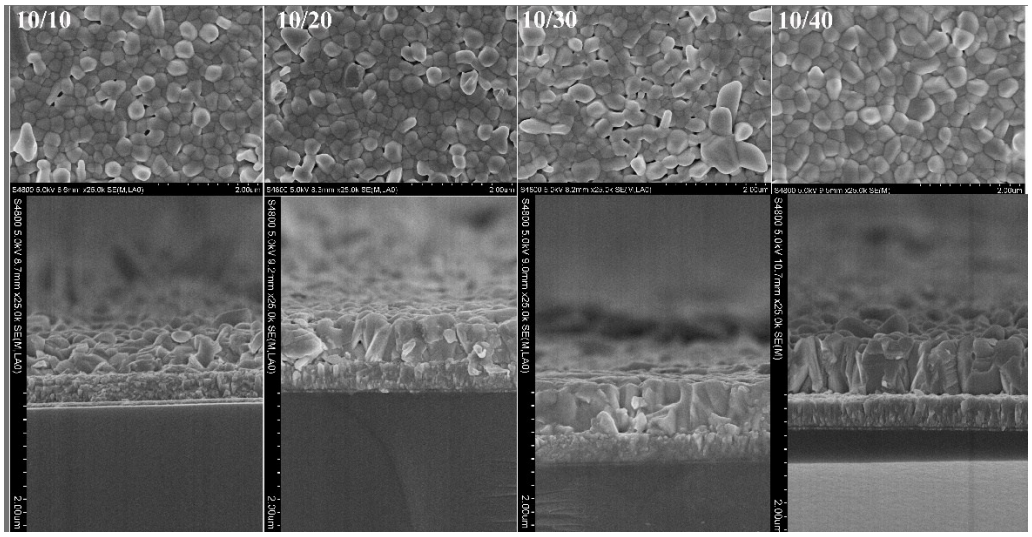

Fig S4 The surface and cross-sectional images of Sb_2Se_3 solar cells based on different thickness of CdS(10nm)/SnO_2(10-40nm) layer

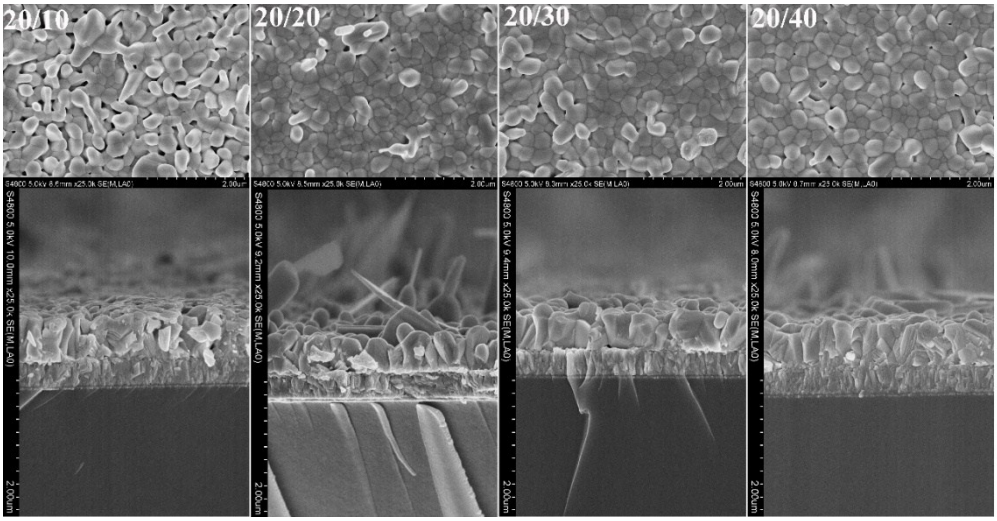

Fig S5 The surface and cross-sectional images of Sb_2Se_3 solar cells based on different thickness of CdS(20nm)/SnO_2(10-40nm) layer

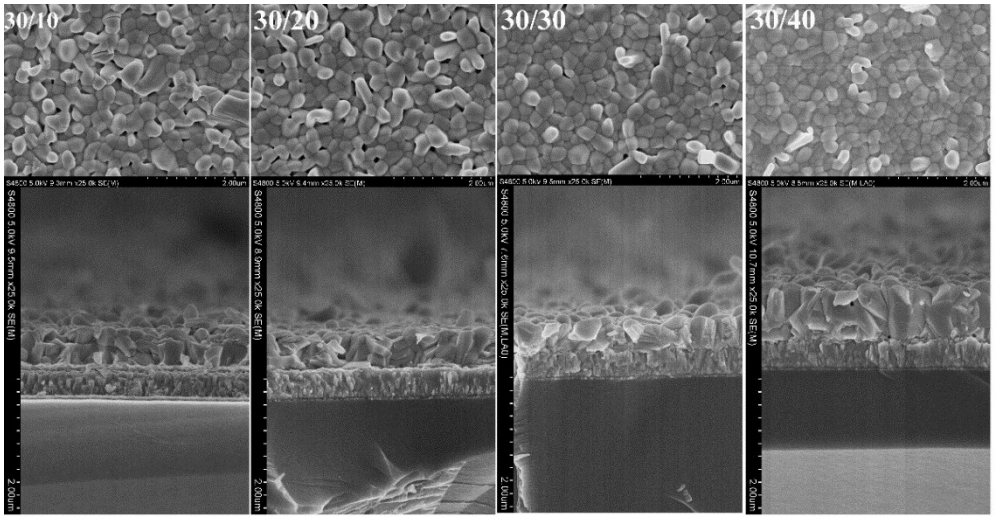

Fig S6 The surface and cross-sectional images of Sb_2Se_3 solar cells based on different thickness of CdS(30nm)/SnO_2(10-40nm) layer

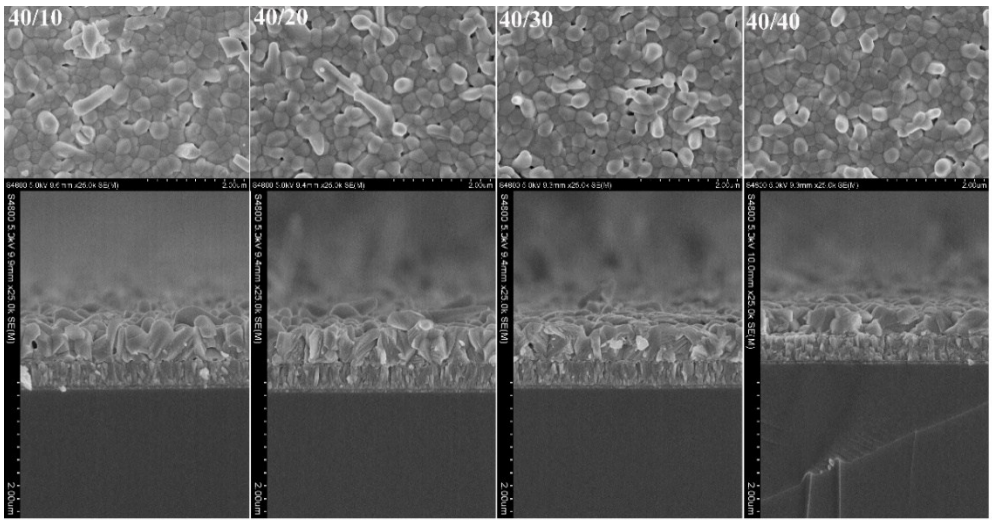

Fig S7 The surface and cross-sectional images of Sb_2Se_3 solar cells based on different thickness of CdS(40nm)/SnO_2(10-40nm) layer

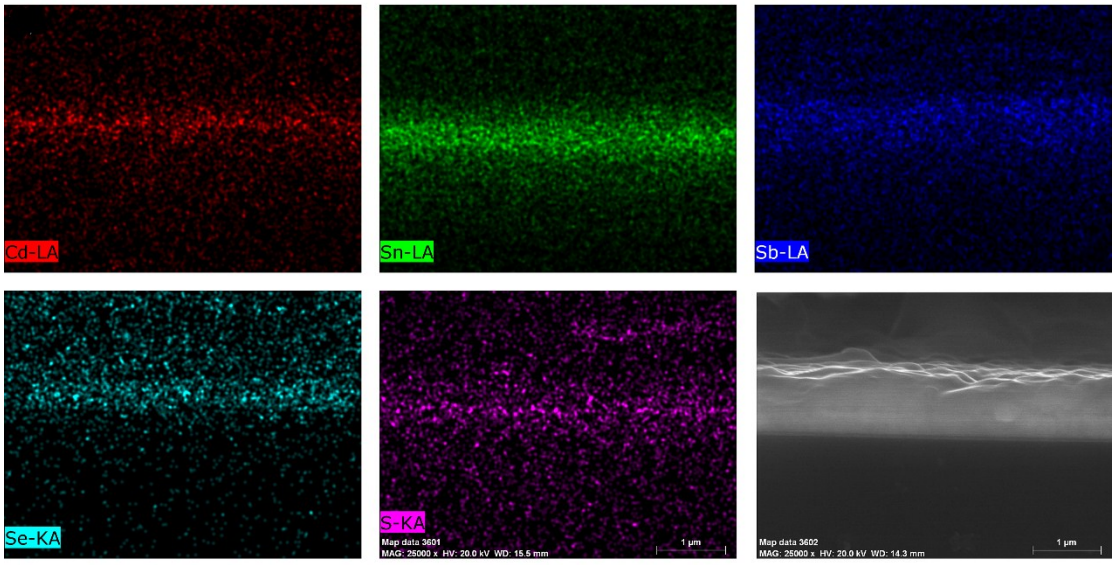

Fig S8 the cross-sectional EDS mapping of Sb_2Se_3 solar cell based on CdS/SnO_2 solar cells

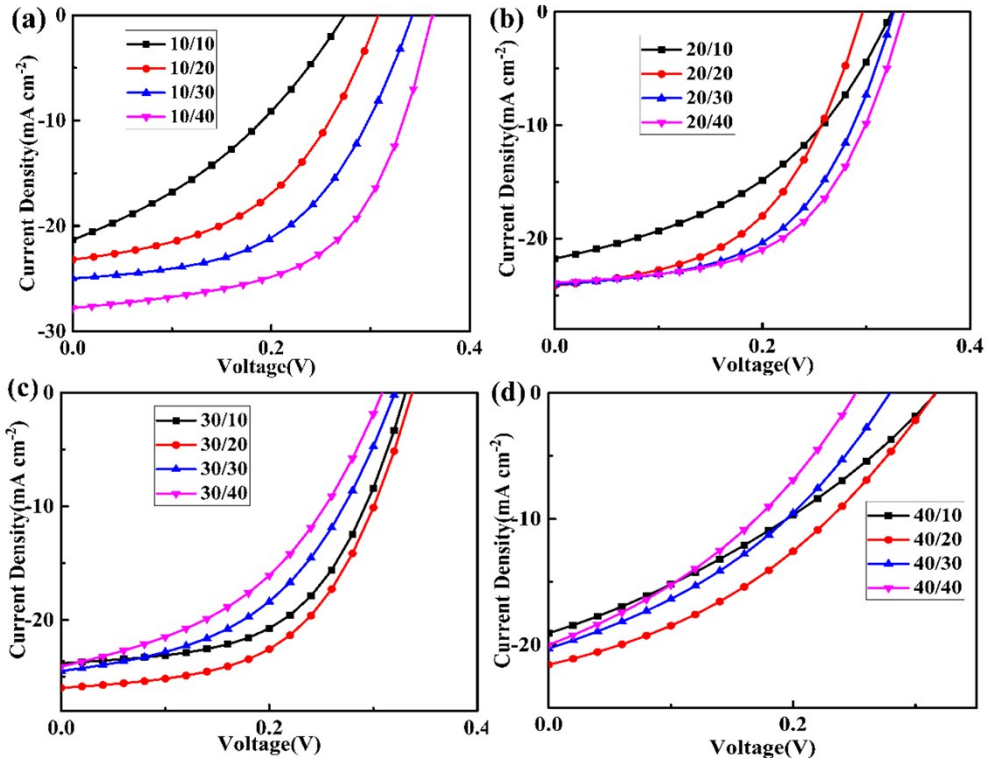

Fig S9 The efficiency of Sb_2Se_3 solar cells based on different thickness of CdS/SnO_2 layer.

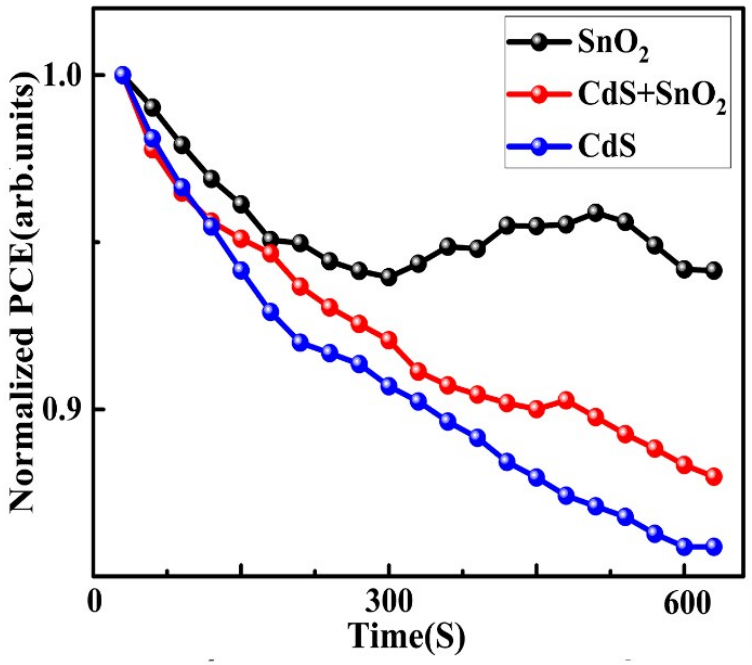

Fig S10 Light-soaking stability of Sb_2Se_3 solar cells based on SnO_2, CdS (10 nm)/SnO_2 (40 nm) and CdS buffer layers.

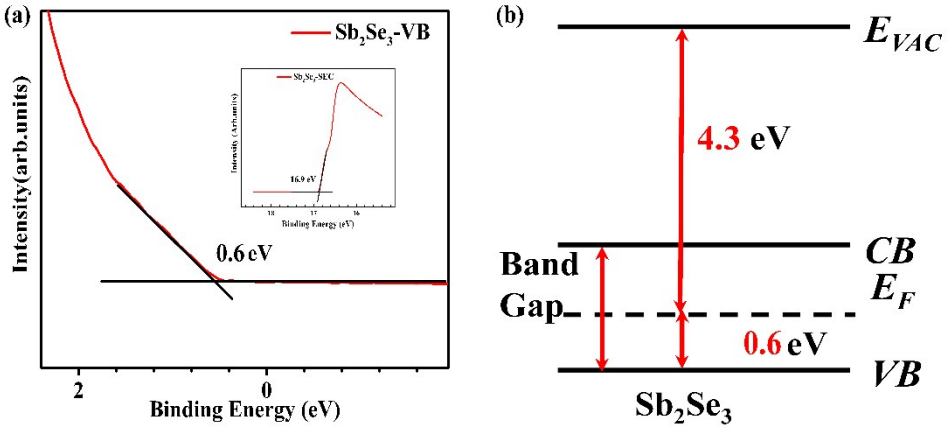

Fig S11 The UPS spectra and band energy alignment of Sb_2Se_3 films

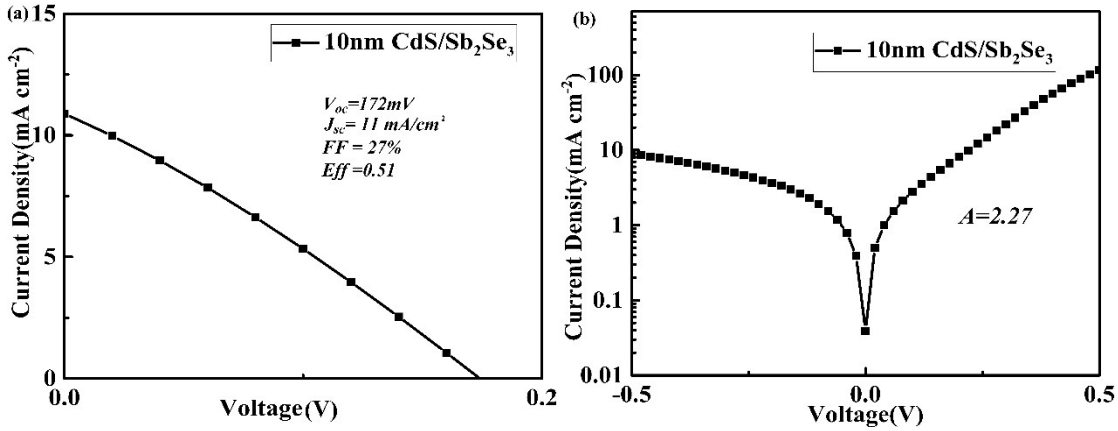

Fig S12 (a) *J-V* characteristics and (b) dark J-V characteristics of Sb_2Se_3 solar cells based on 10 nm CdS film

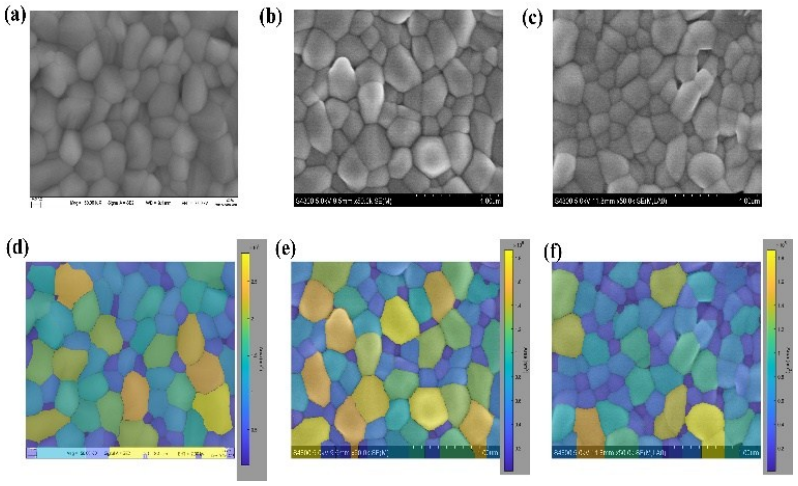

Fig. S13 (a) (b) and (c) The surface SEM images of Sb_2Se_3 films based on pure SnO_2, CdS (10nm)/SnO_2 (40 nm) and pure CdS film. (d) (e) and (f) Histogram of grain sizes of Sb_2Se_3 films based on pure SnO_2, CdS (10 nm)/SnO_2 (40 nm) and pure CdS film.

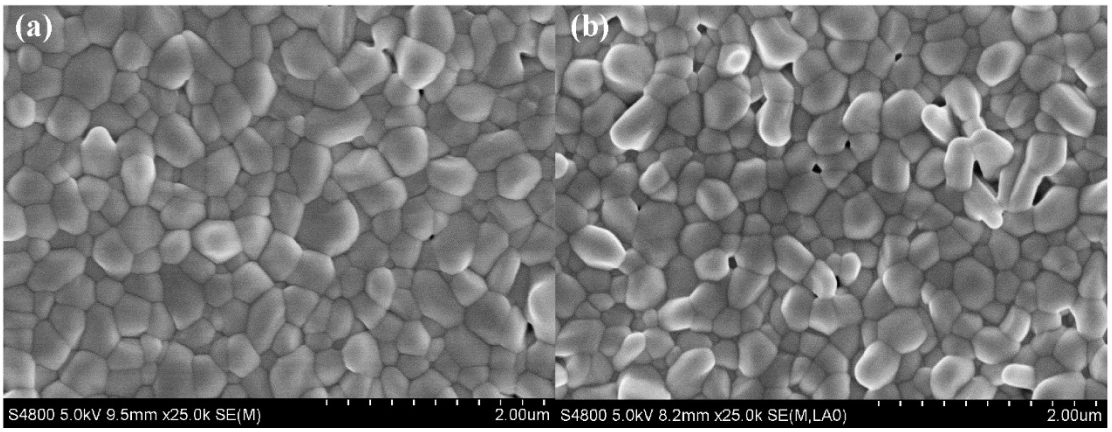

Fig S14 The large area of SEM figures of Sb_2Se_3 film based on (a) CdS/SnO_2 and (b) pure CdS film

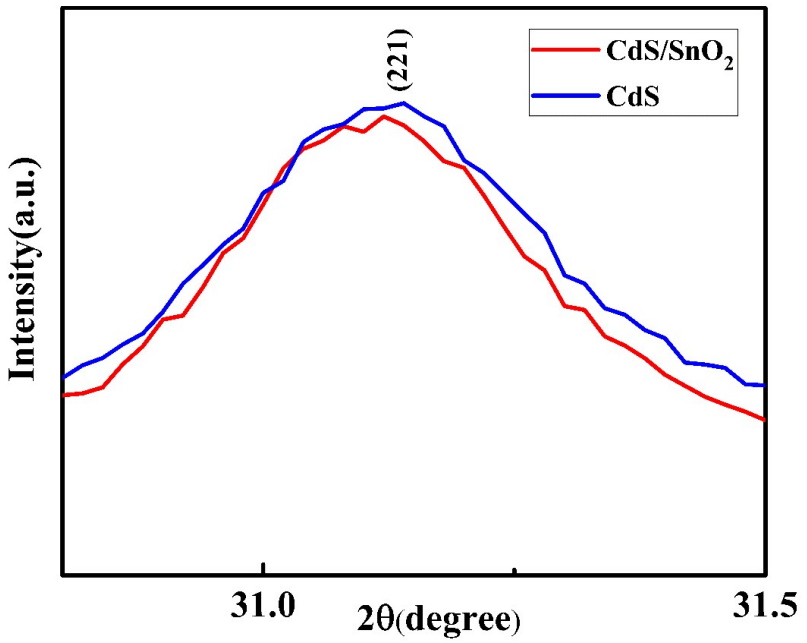

Fig S15 The XRD peaks of Sb_2Se_3 film based on CdS and CdS/SnO_2 film

The Debye-Scherrer equation was used to calculate the grain sizes of XRD peaks of Sb_2Se_3 film based on CdS and CdS/SnO_2 film. The Sb_2Se_3 film based on CdS/SnO_2 film show a small Half height and width which menas a larger grain size than Sb_2Se_3 film based on CdS film.

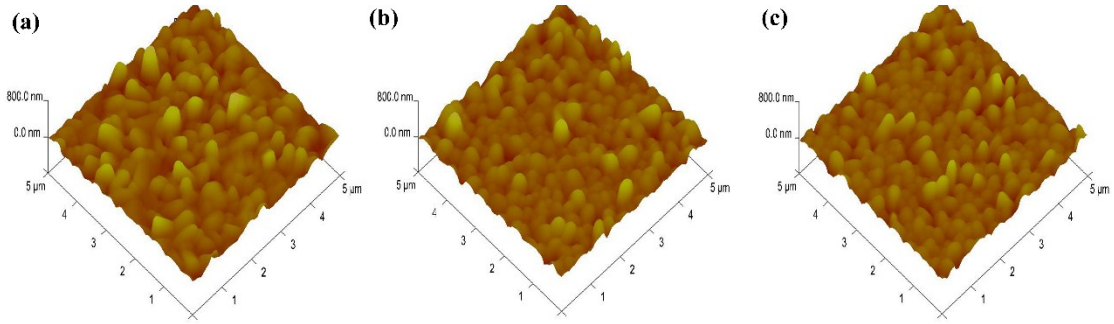

Fig S16 The AFM figures of Sb_2Se_3 film based on (a) SnO_2 (b) CdS/SnO_2 and (c) CdS film