

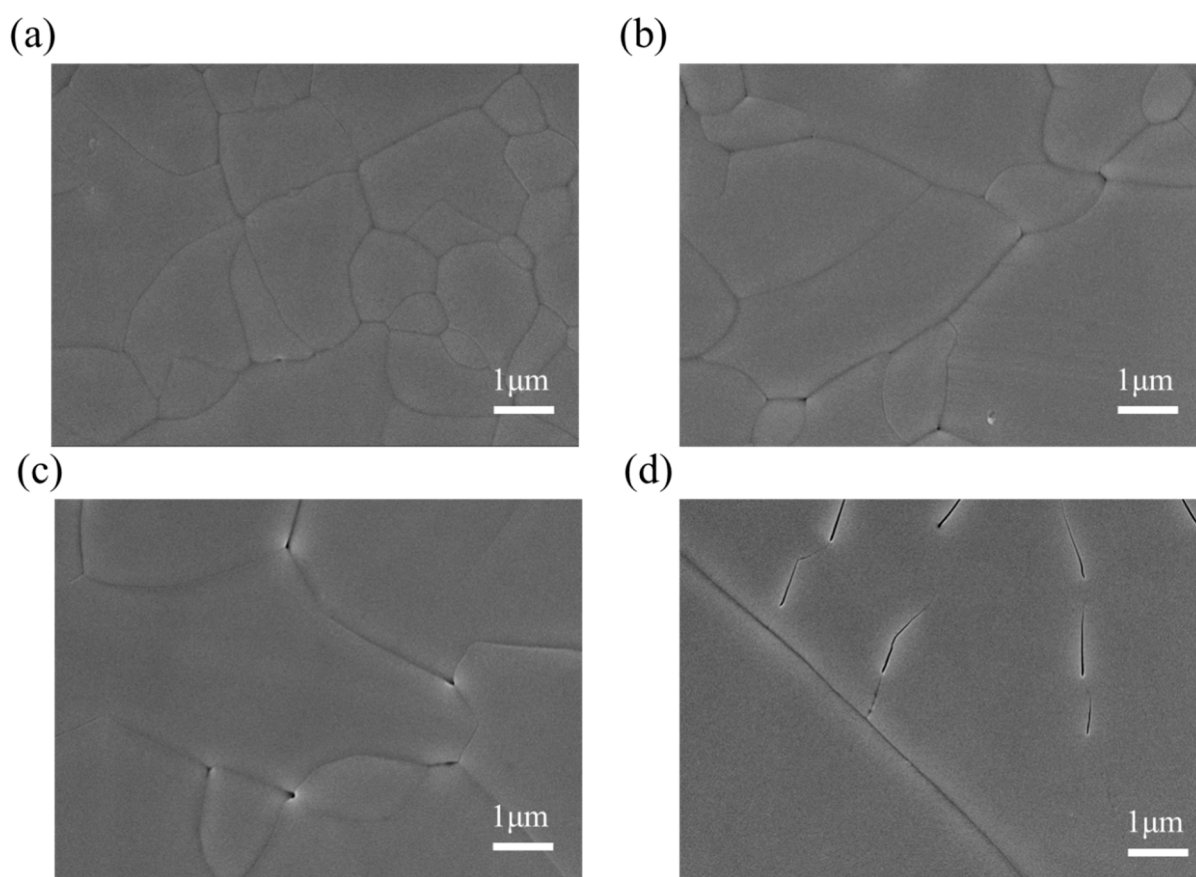
# Carbon-Based Sb<sub>2</sub>(S, Se)<sub>3</sub> Solar Cells

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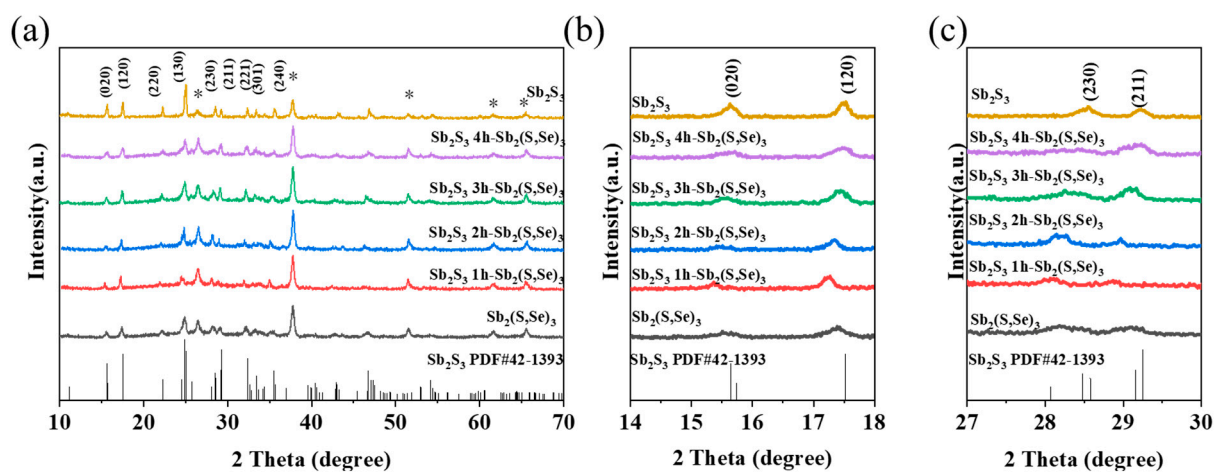
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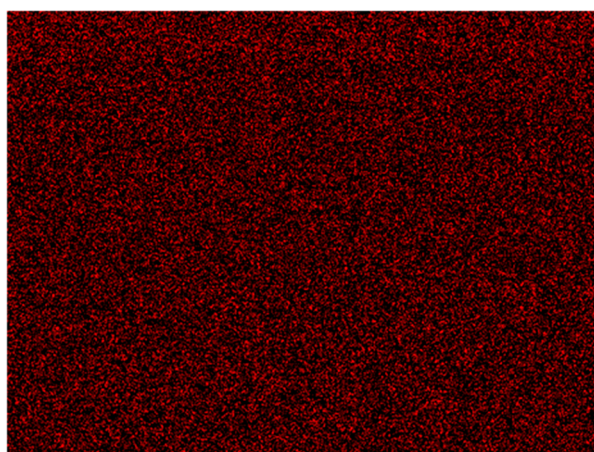
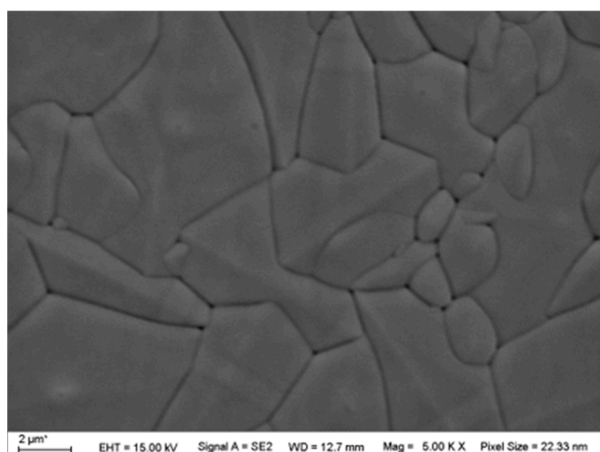
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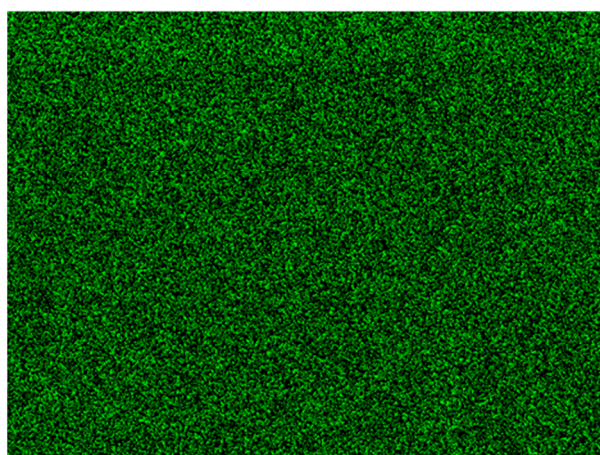
**Figure S1.** SEM images of  $\text{Sb}_2\text{S}_3/\text{Sb}_2(\text{S}, \text{Se})_3$  films with different deposition durations of the  $\text{Sb}_2\text{S}_3$  films: (a) 1 h, (b) 2 h, (c) 3 h and (d) 4 h.



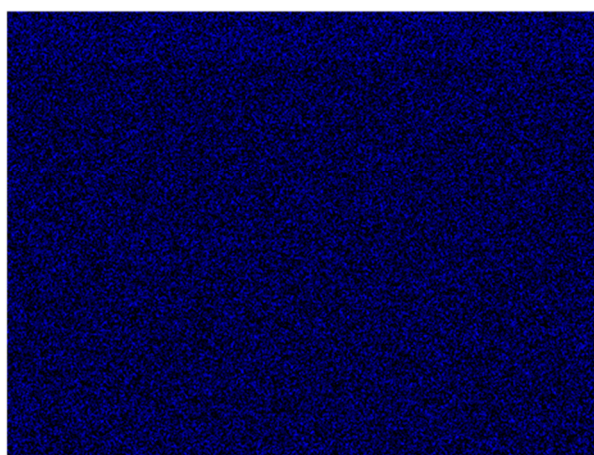
**Figure S2.** (a) XRD patterns of the Sb<sub>2</sub>S<sub>3</sub>, Sb<sub>2</sub>(S, Se)<sub>3</sub>, Sb<sub>2</sub>S<sub>3</sub>/Sb<sub>2</sub>(S, Se)<sub>3</sub> films. XRD patterns in the 2θ range of (b) 14 ~ 18° and (c) 27 ~ 33°.



Se La1\_2

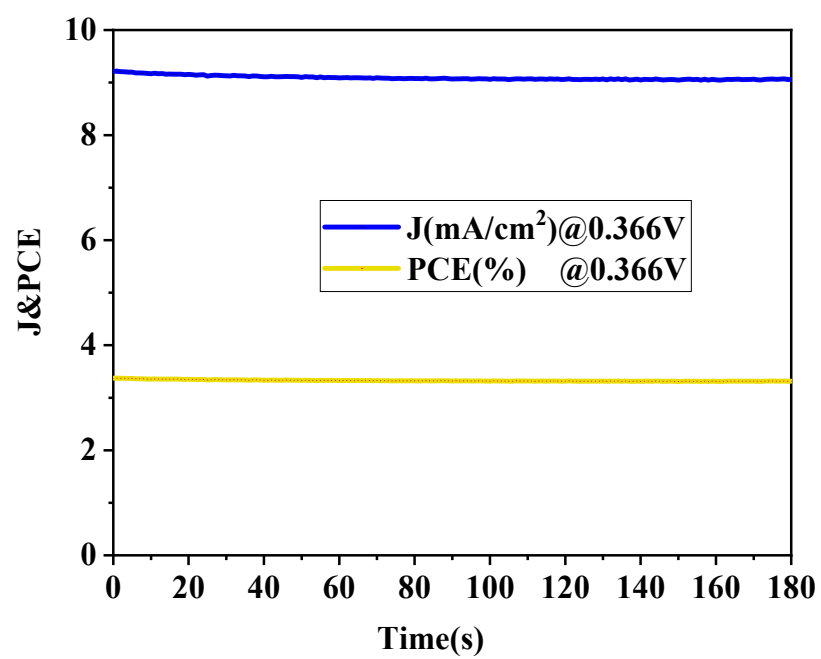


S Ka1



Sb La1

**Figure S3.** EDS element mappings of  $\text{Sb}_2\text{S}_3/\text{Sb}_2(\text{S}, \text{Se})_3$  films with the pre-deposition of  $\text{Sb}_2\text{S}_3$  for 3 h.



**Figure S4.** Steady-state power output of  $\text{Sb}_2\text{S}_3/\text{Sb}_2(\text{S}, \text{Se})_3$  based solar cells with P3HT.