

## Exploring the optoelectronic properties of SnSe: A new insight

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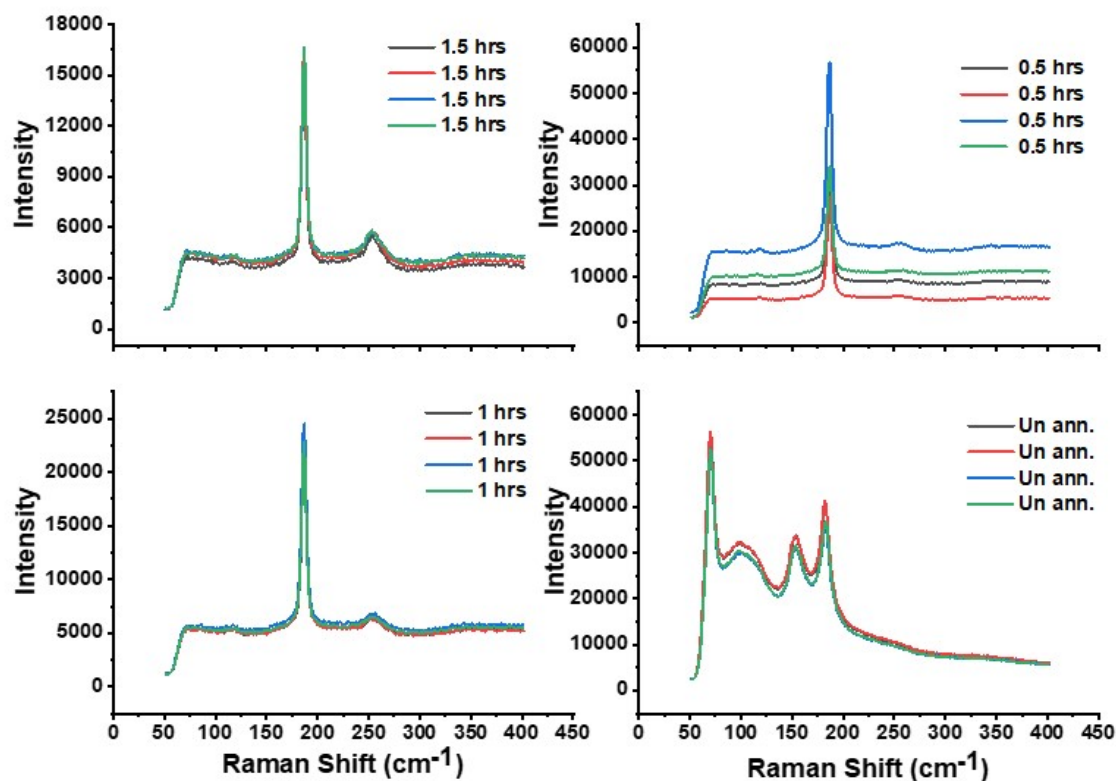
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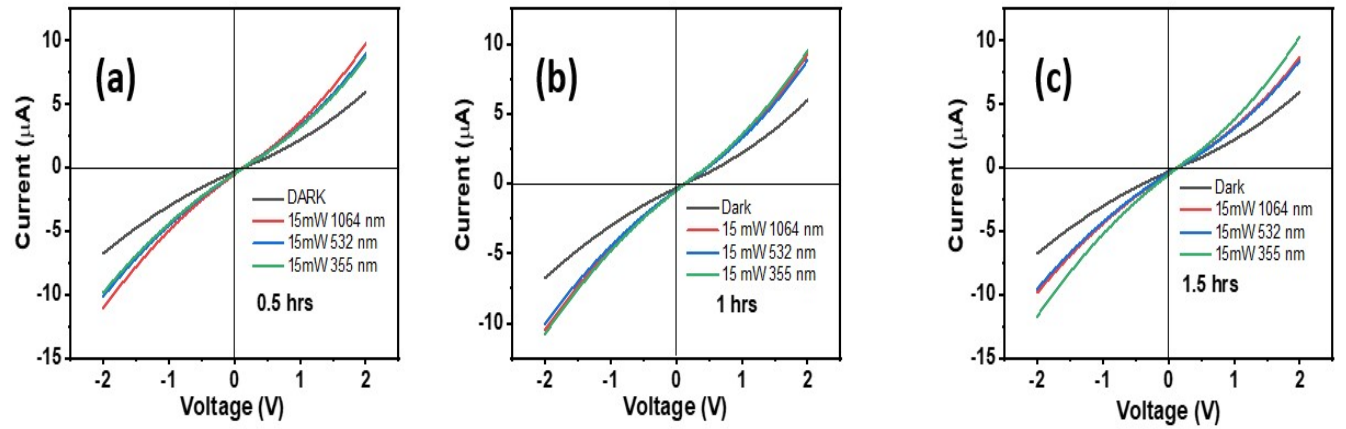
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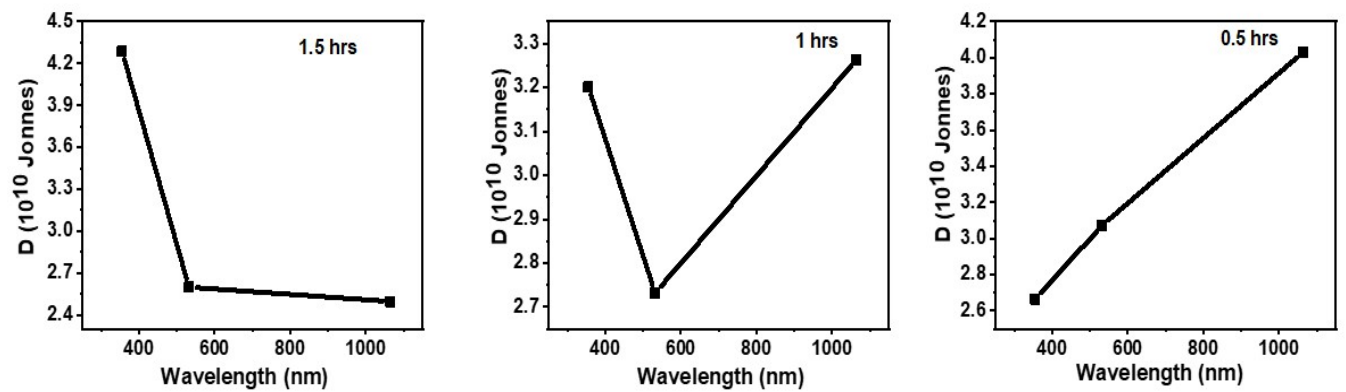
Supplementary Information-



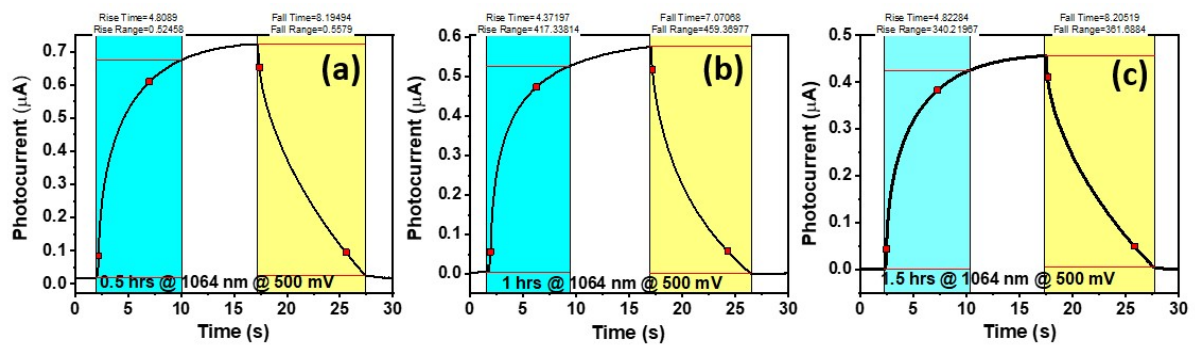
**Figure S1 Raman spectra at randomly selected points on the film of the samples annealed at different times.**



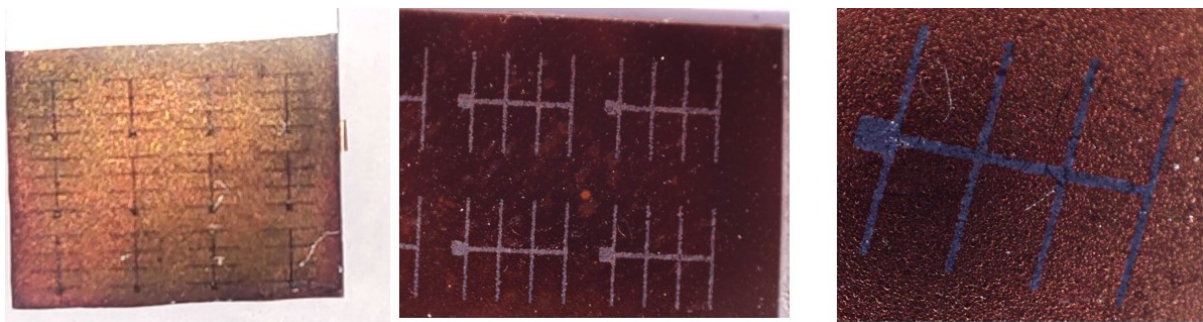
**Figure S2. I-V of the devices under different conditions.**



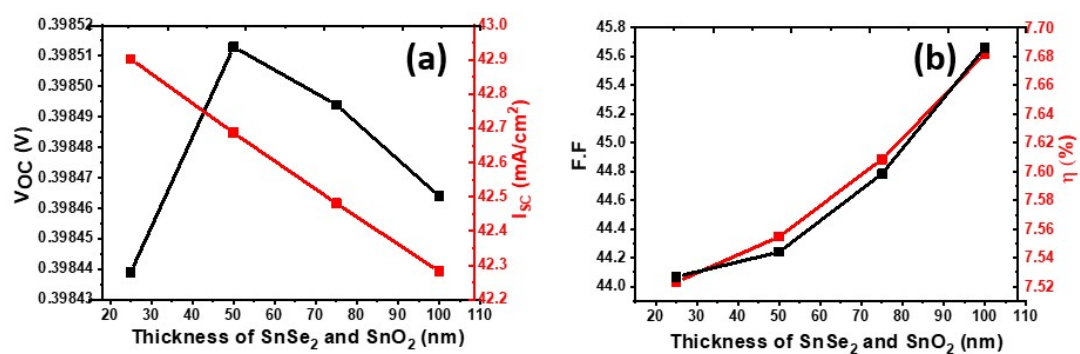
**Figure S3. Detectivity of the devices**



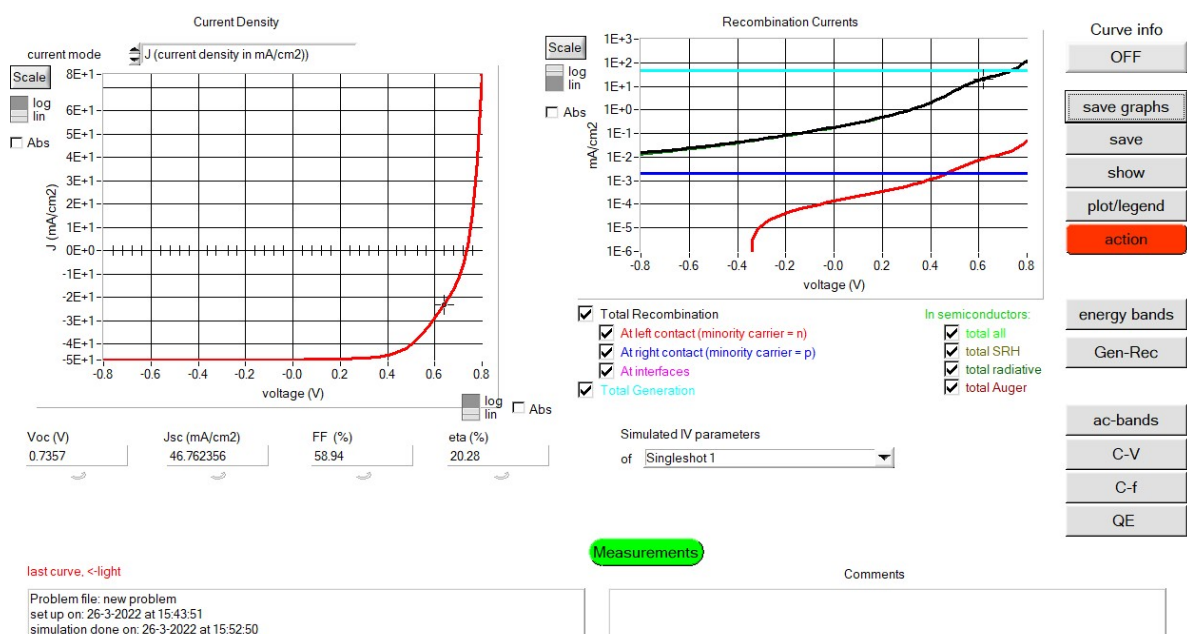
**Figure S4. Rise and decay time fitting at 1064 nm of (a) 0.5, (b) 1, and (c) 1.5 hrs annealed devices.**



**Figure S5.** Images of an actual solar cell device of SnSe annealed at 300 °C for one hour (having Ag silver contacts on the front face made using masking).



**Figure S6.** Effect of thickness of SnSe<sub>2</sub> and SnO<sub>2</sub> on the parameters, Voc, Jsc (a), FF, and efficiency ( $\eta$ ) (b) of SnSe-based solar device.



**Figure S7.** IV panel of the SCAPS-1D software shows efficiency of 20.28 %, with a back contact of 5.3 eV.