

# Supplementary Information

## **Antimony selenide solar cells fabricated by hybrid reactive magnetron sputtering**

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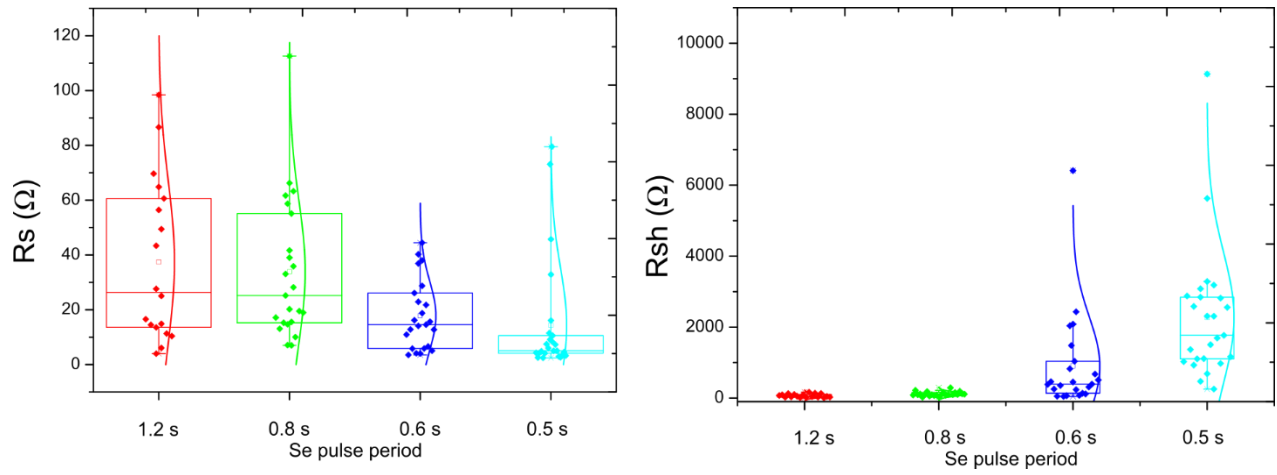
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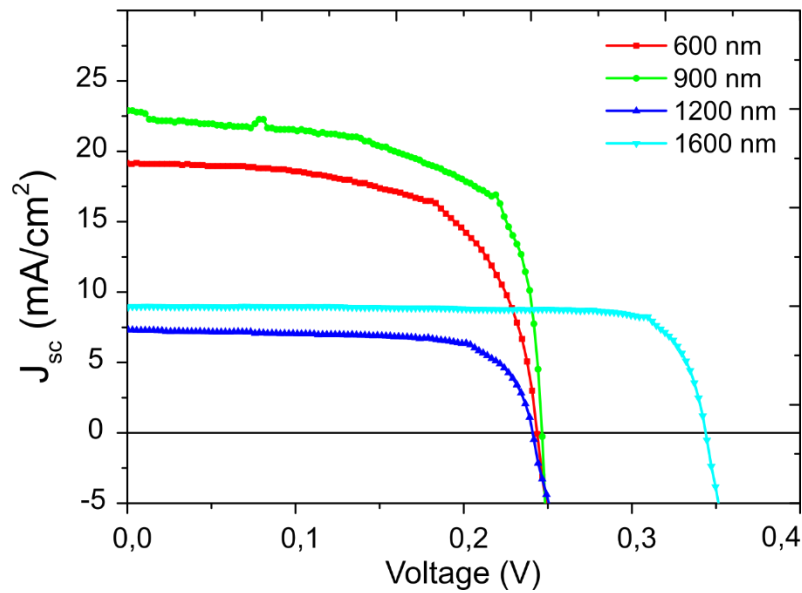
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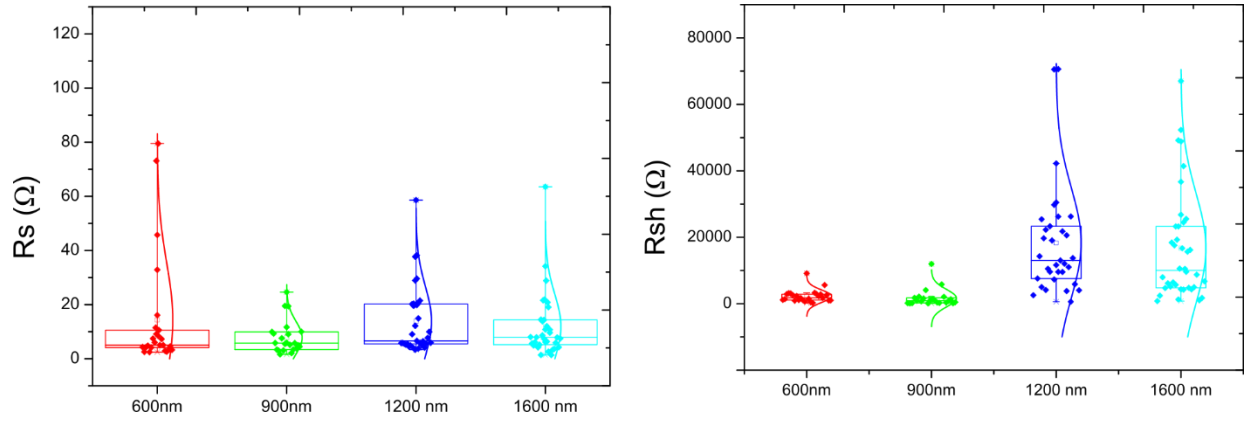
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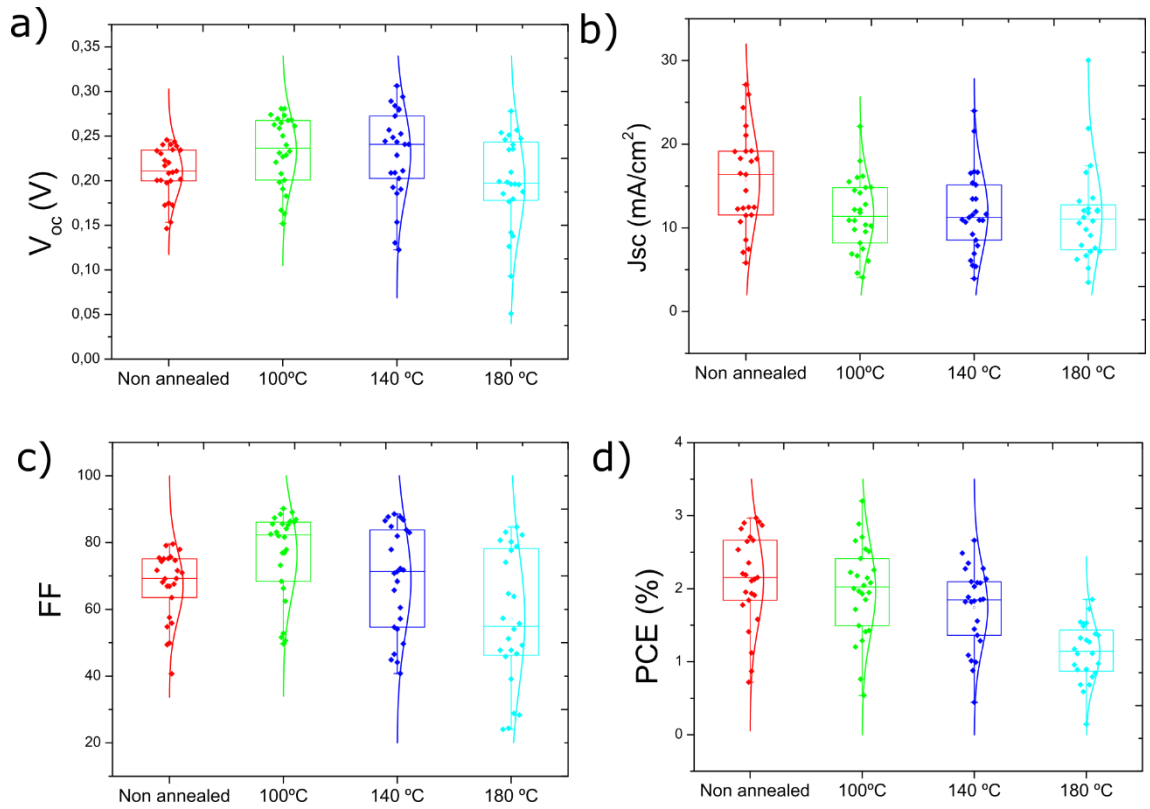
**Figure S1:** Box plot presenting the influence of the different Se pulse evaporation on series resistance and shunt resistance of  $\text{Sb}_2\text{Se}_3$  solar cells. All solar cells were deposited at a temperature of 270 °C.



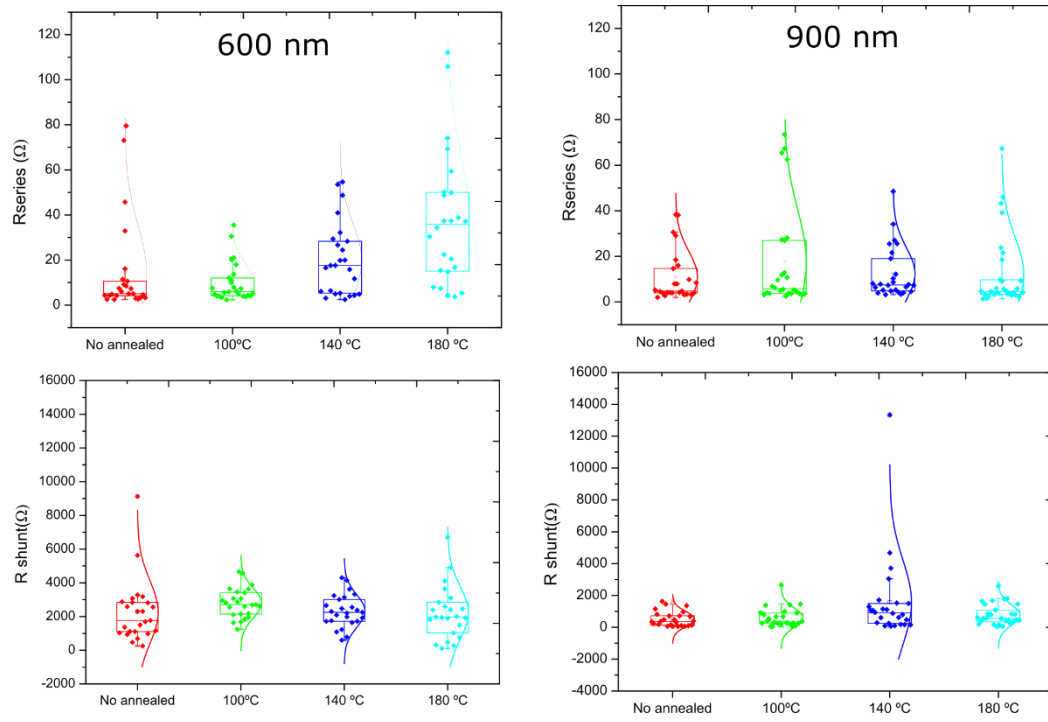
**Figure S2:** J-V curves of devices with the  $\text{Sb}_2\text{Se}_3$  absorbers deposited at 270°C with Se pulse period 0.5s for different  $\text{Sb}_2\text{Se}_3$  thicknesses.



**Figure S3:** Box plot presenting the influence of the  $\text{Sb}_2\text{Se}_3$  thickness on series resistance and shunt resistance of  $\text{Sb}_2\text{Se}_3$  solar cells. All solar cells were deposited at a temperature of 270 °C.



**Figure S4:** Box plots presenting the influence of annealing on the solar cell device parameters (a)  $V_{oc}$ , (b) short-circuit current density ( $J_{sc}$ ), (c) fill factor (FF), and (d) power conversion efficiency (PCE) for  $\text{Sb}_2\text{Se}_3$  solar cells with an absorber thickness of 600 nm deposited at 270 °C with Se pulse period of 0.5 s.



**Figure S5:** Box plot presenting the influence of the  $Sb_2Se_3$  solar cell annealing on series resistance and shunt resistance of  $Sb_2Se_3$  solar cells. All solar cells were deposited at a temperature of 270 °C.