

**SUPPORTING INFORMATION**

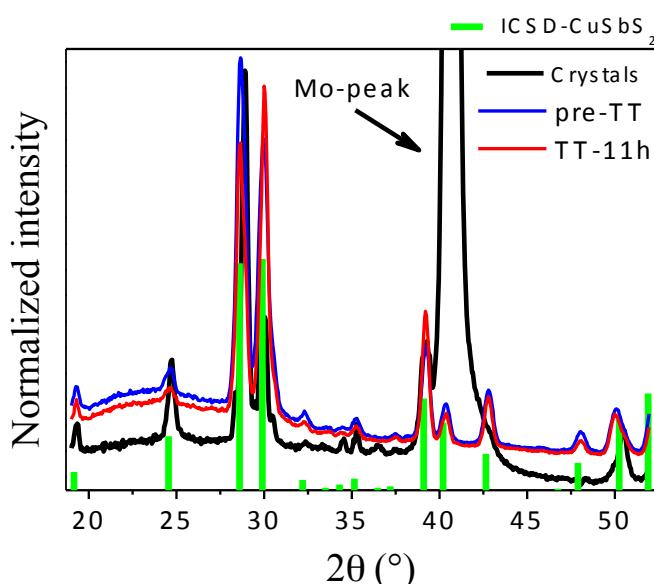
**Experimental characterization of defects in copper antimony disulfide**

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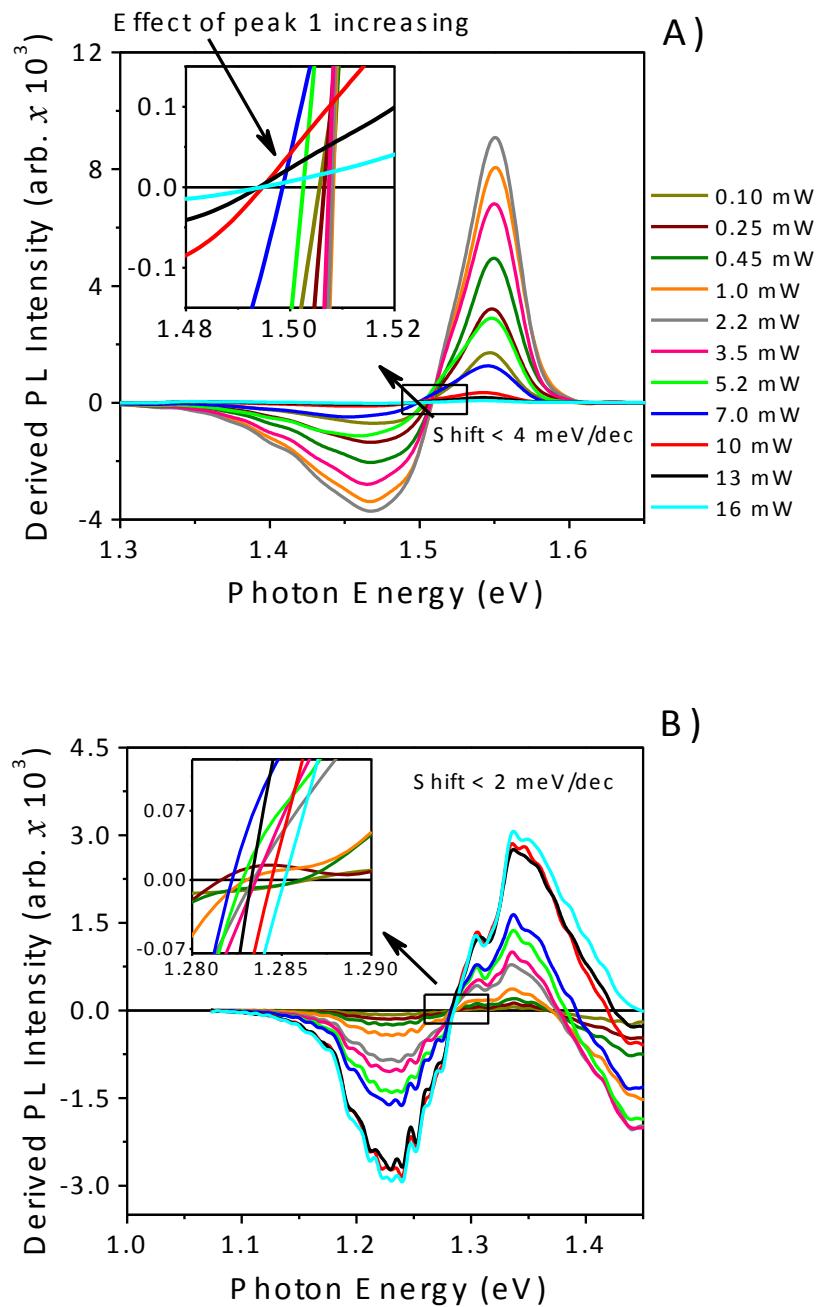
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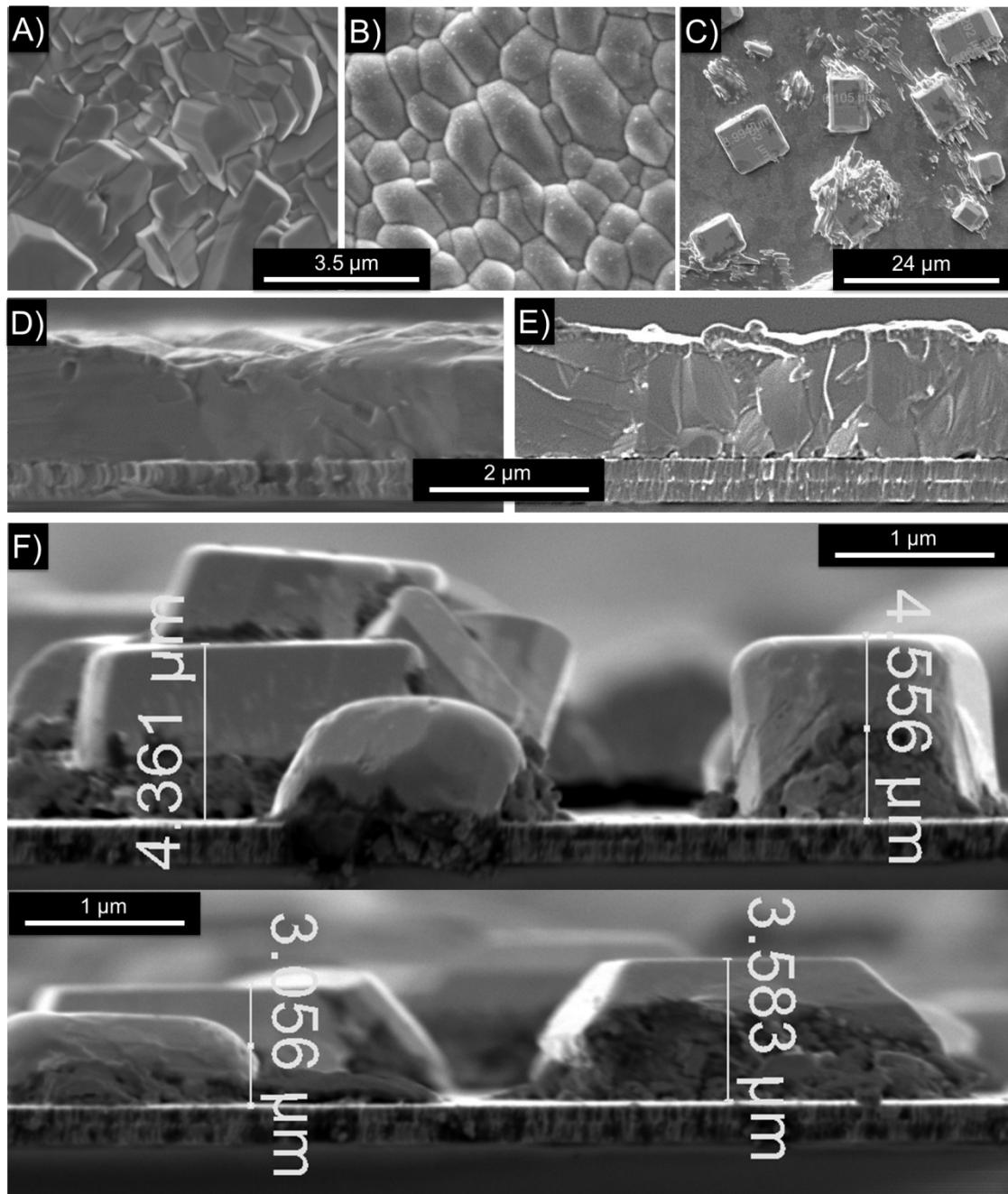
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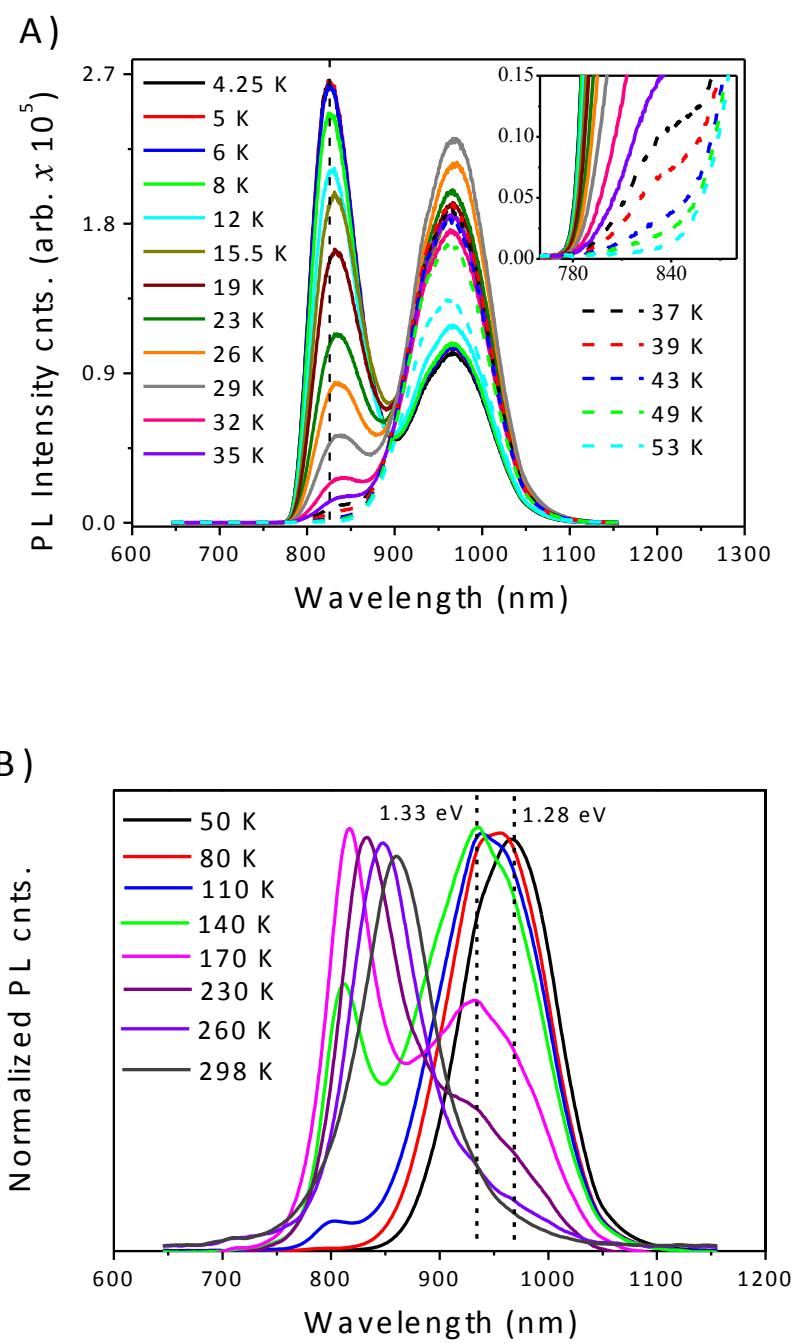
**Fig. S1** XRD patterns for crystals-film, and pre-TT and TT-11h films. The standard XRD pattern used as comparison (vertical green lines) was the ICSD-85133 orthorhombic CuSbS<sub>2</sub>.



**Fig. S2** Excitation power dependence of the derived PL spectra for A) peak 3 on the crystals-film and B) peak 1+2 on TT-11h film.



**Fig. S3** Scanning electron microscope (SEM) images were taken in FEI Quanta 600 instrument. Surface and cross-section images of the A) pre-TT, B) TT-11h (3.5  $\mu\text{m}$  scale / 2  $\mu\text{m}$  scale) films and C) crystals-film (24  $\mu\text{m}$  scale / 1  $\mu\text{m}$  scale), respectively.



**Fig. S4** Temperature dependence of the PL spectra for TT-11h film A) from 4.25 to 53 K and B) from 50 to 298 K (normalized PL counts scale).