



Supporting Information

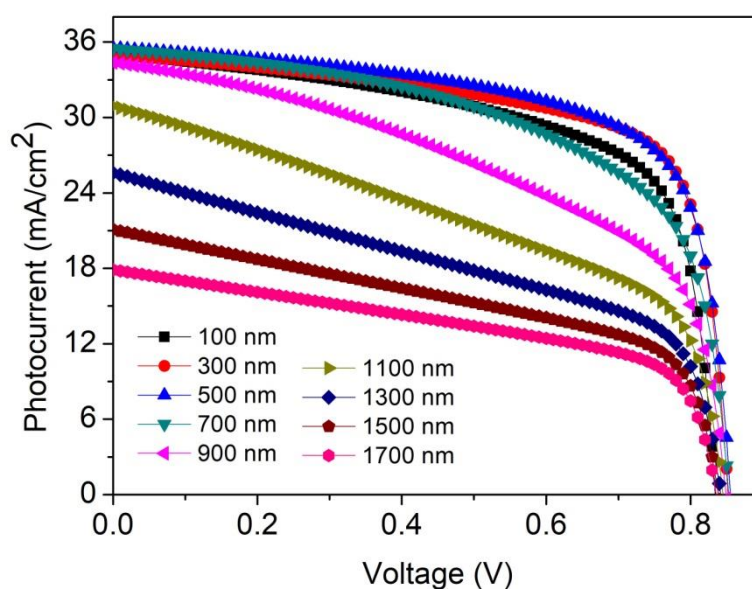
# Design and Optimize the Performance of Self-Powered Photodetector Based on PbS/TiS<sub>3</sub> Heterostructure by SCAPS-1D

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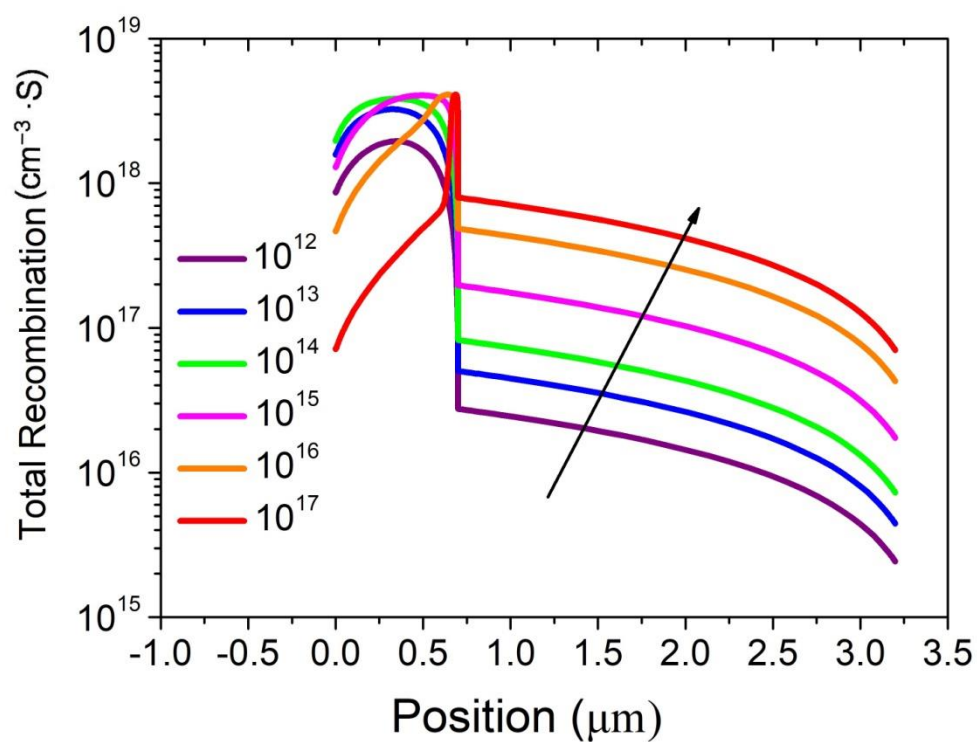
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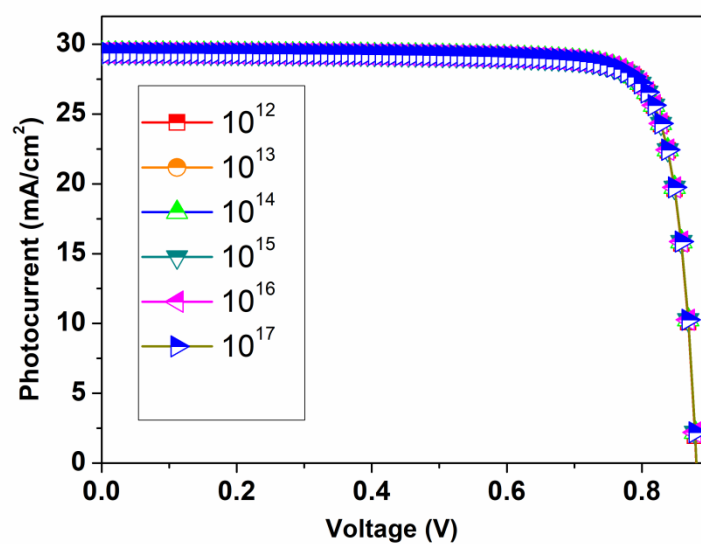
## Supplementary Materials:



**Figure S1.** J–V characteristic curves for varying the PbS layer thickness with constant optimized TiS<sub>3</sub> layer at 2.5  $\mu\text{m}$ .



**Figure S2.** Total recombination of photo carriers in the  $\text{TiS}_3$ -base photodetector with varied shallow acceptor density of PbS layer.



**Figure S3.** J-V characteristic curves for varying the PbS defect density from  $10^{12}$  to  $10^{17} \text{ cm}^{-3}$ .

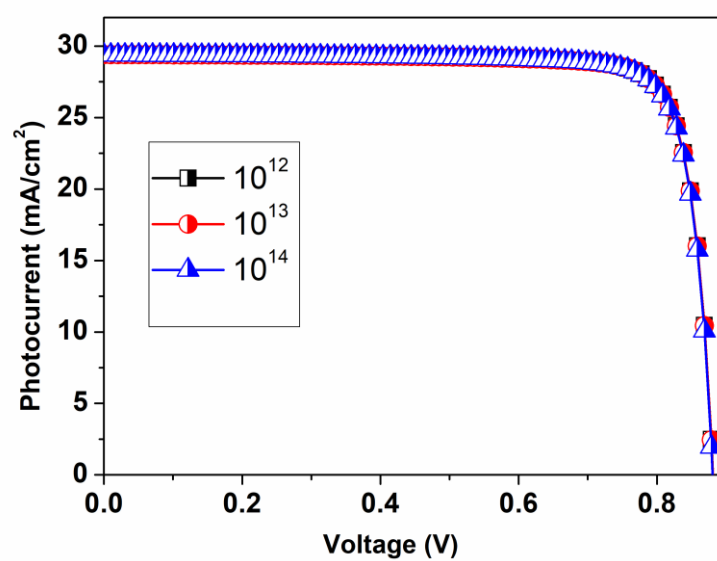


Figure S4. J-V characteristic curves for varying the  $\text{TiS}_3$  defect density from  $10^{12}$  to  $10^{14} \text{ cm}^{-3}$ .

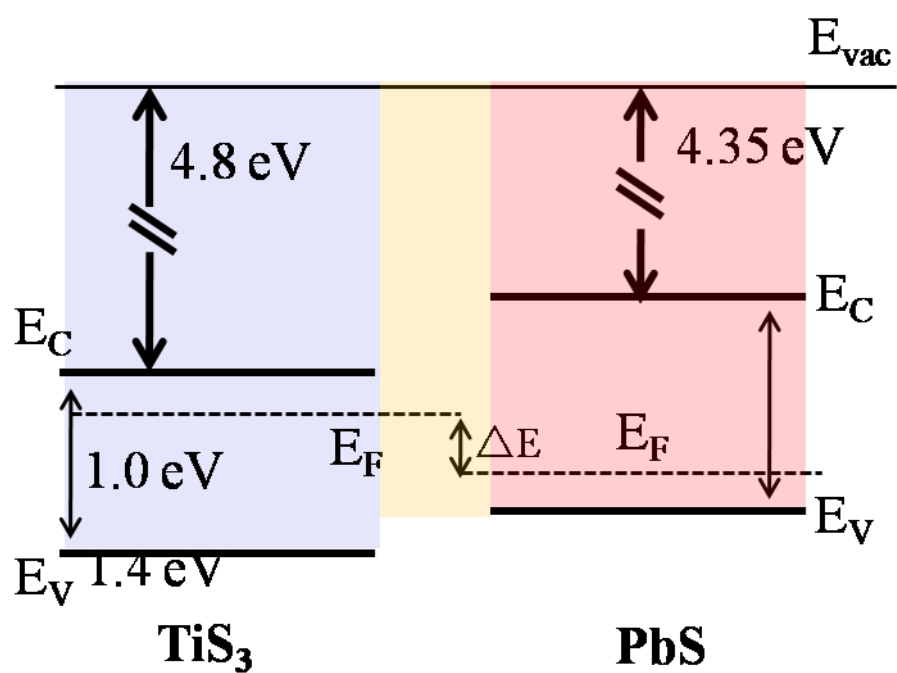


Figure S5. Schematic band diagram before  $\text{TiS}_3$  and  $\text{PbS}$  contacting.