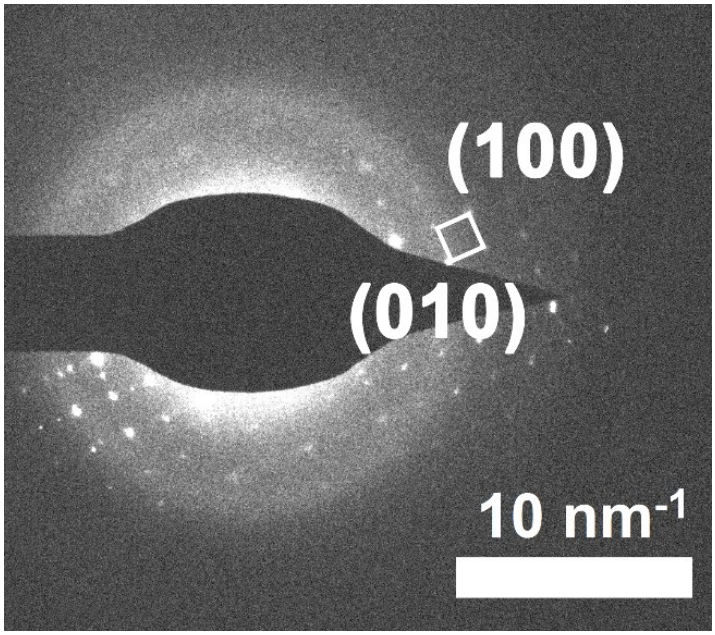
Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

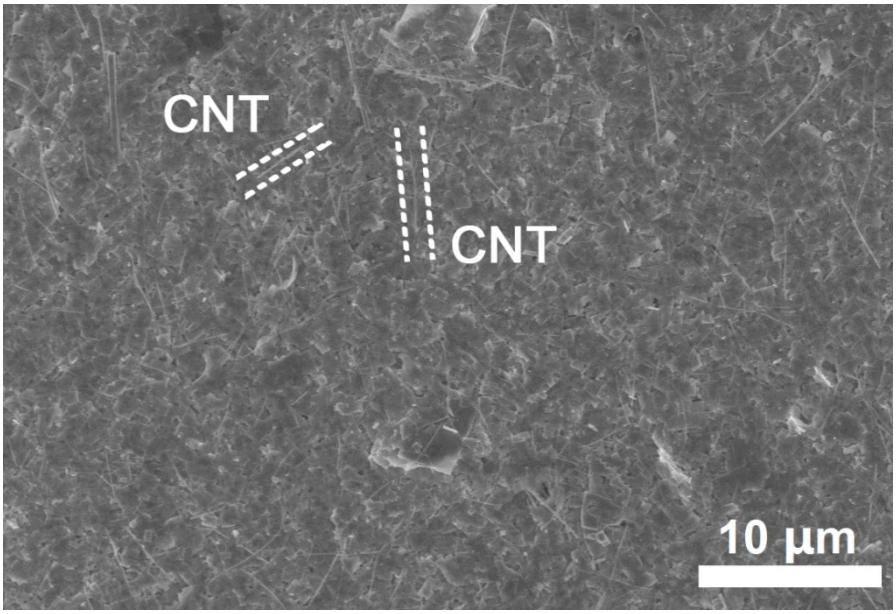
Vacuum-filtration enabled large-area $CsPbBr_3$ films on porous substrates for flexible photodetectors

Qishuo Tan,[a] Guo Ye,[a] Yan Zhang,[a] Xiaojia Du,[a] Haining Liu,[b] Liming Xie,[b] Yu Zhou*[c, d] and Nan Liu*[a]

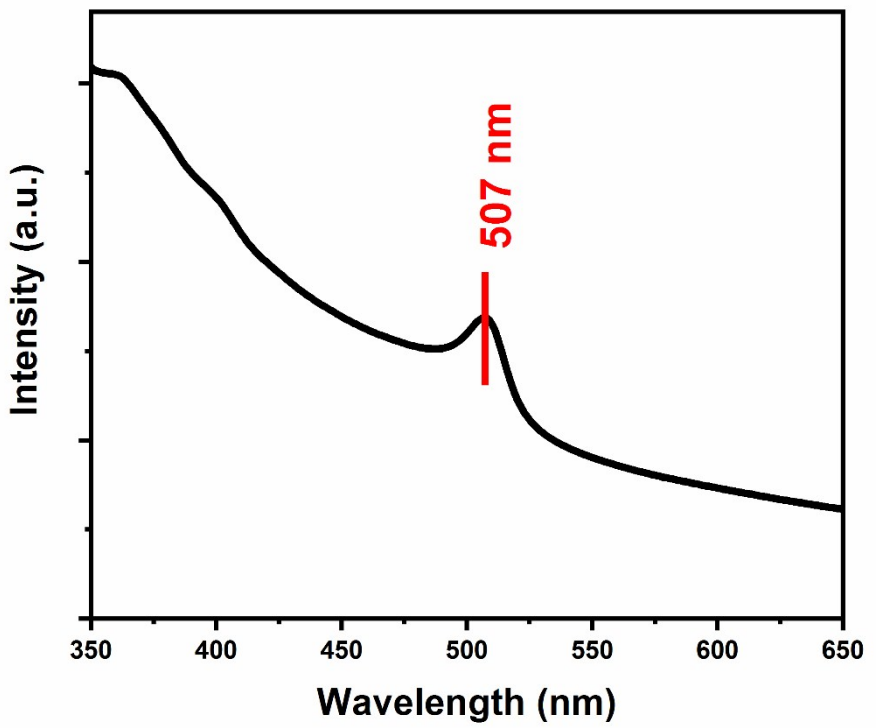
a. *Beijing Key Laboratory of Energy Conversion and Storage Materials, College of Chemistry, Beijing Normal University, Beijing 100875, P.R. China. E-mail: nanliu@bnu.edu.cn*
b. *CAS Key Laboratory of Standardization and Measurement for Nanotechnology, CAS Center for Excellence in Nanoscience, National Center for Nanoscience and Technology, Beijing 100190, P. R. China. E-mail: xielm@nanoctr.cn*
c. *School of Physics and Electronics, Central South University, Changsha 410083, P.R. China. E-mail: yu.zhou@csu.edu.cn*
d. *Powder Metallurgy Research Institute and State Key Laboratory of Powder Metallurgy, Central South University, Changsha 410083, China.*



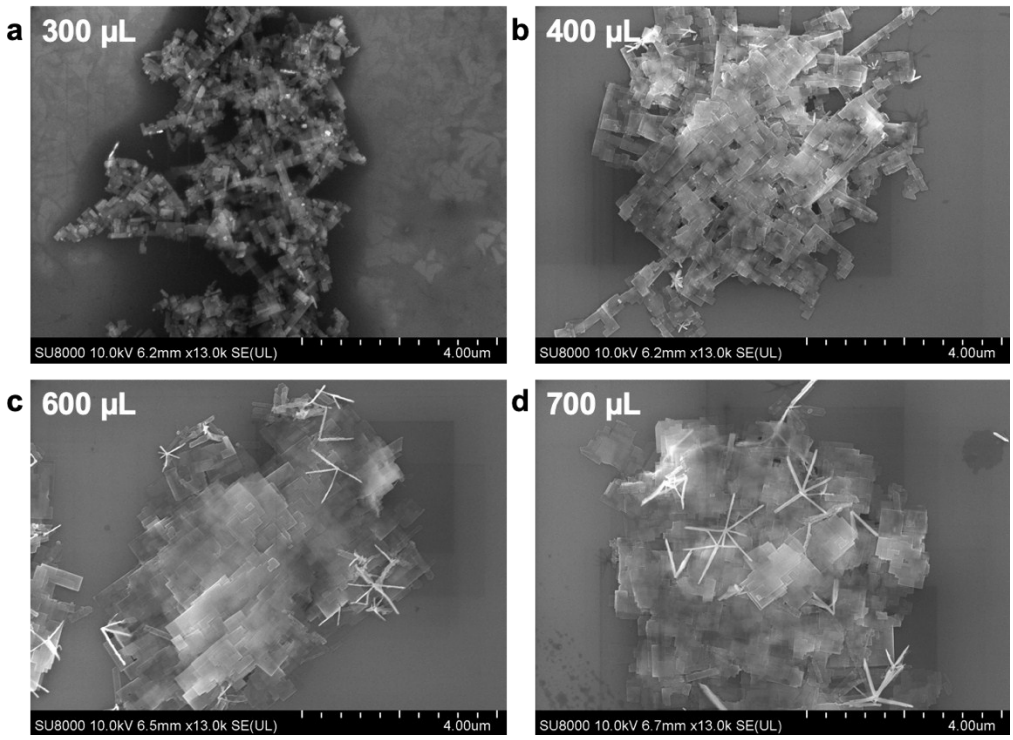
S1. SAED results of the $CsPbBr_3$ nanocrystal.



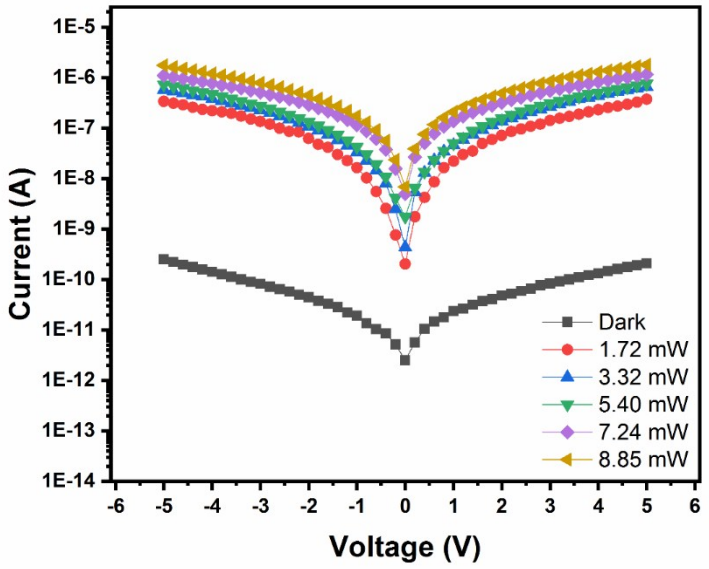
S2. SEM images of the all-inorganic perovskite/CNTs compact films. CNTs are clearly showed up to connect the different grains.



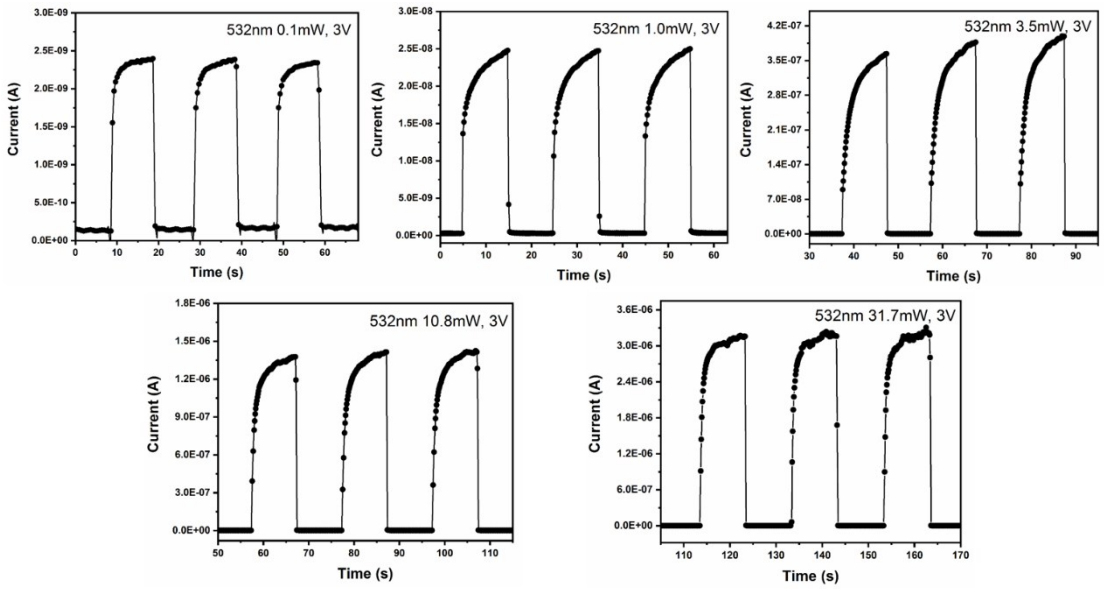
S3. UV-vis spectrum of the $CsPbBr_3$ compact film.



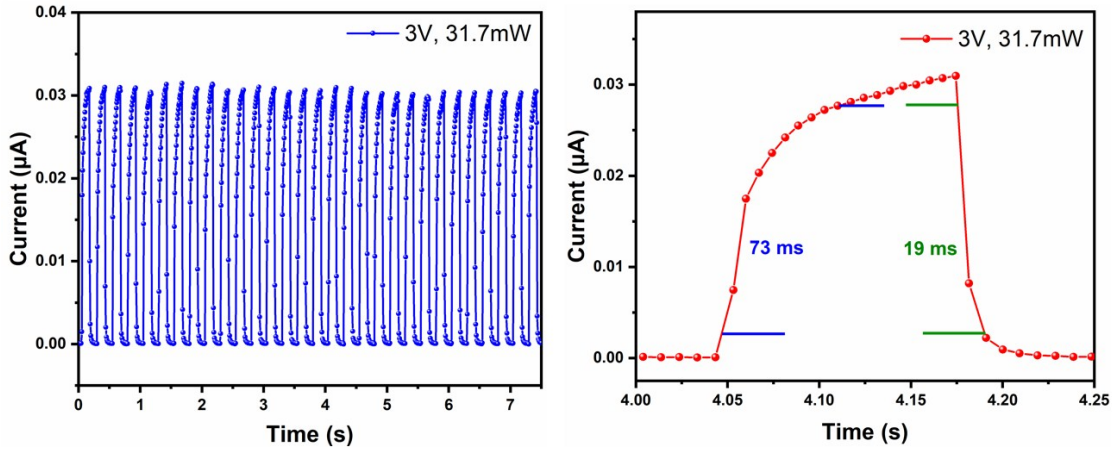
S4. SEM images of $CsPbBr_3$ nanocrystals dip-coated onto SiO_2/Si substrates under different concentrations of surfactants (100 µL precursor vs. 300 µL, 400 µL, 600 µL and 700 µL octadecylamine surfactant solution). It is clearly seen that they are all square nanosheets with domain sizes in a similar range (~ 0.1 - 0.3 µm). Preparation of $CsPbBr_3$ precursor dispersion and surfactant solution was followed the synthetic route as described in Material synthesis.



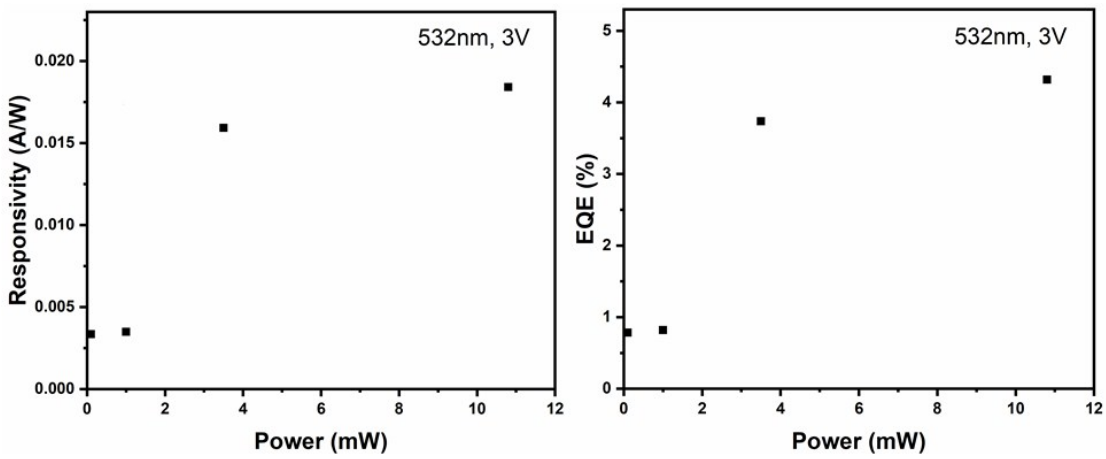
S5. Logarithmic *I-V* curves of the optimized photodetector tested in the dark and under various power intensities of 532 nm laser, sweeping from –5 V to 5 V.



S6. The response of photodetector under 532 nm laser with various irradiance: 0.1 mW, 1.0 mW, 3.5 mW, 10.8 mW, 31.7 mW.



S7. Photoswitching behavior of the photodetector without CNTs at a frequency of 4 Hz. Corresponding magnified plots of one response cycle, showing the rise and decay time are 73 and 19 ms, respectively.



S8. The responsivity and EQE of perovskite/CNTs photodetectors.