Electronic Supplementary Information for

Two-Step Vapor Deposition of Self-Catalyzed Large-Size PbI_2 Nanobelts for High-Performance Photodetectors

Mingming Han,[1#] Jiamin Sun,[1,2#] Luozhen Bian,[1,2#] Zhou Wang,[3] Lei Zhang,[4] Yanxue Yin,[1] Zhaofeng Gao,[1] Fulin Li,[1] Qian Xin,[1] Longbin He,[4] Ning Han,[3*] Aimin Song,[1] Zai-xing Yang[1,2*]

[1]*Center of Nanoelectronics and School of Microelectronics, Shandong University, Jinan, 250100, P. R. China*

[2]*Shenzhen Research Institute of Shandong University, Shenzhen, 518057, P. R. China*

[3]*State Key Laboratory of Multiphase Complex Systems, Institute of Process Engineering, Chinese Academy of Sciences, Beijing, 100190, P. R. China*

[4]*SEU-FEI Nano-Pico Center, Key Lab of MEMS of Ministry of Education, Collaborative Innovation Center for Micro/Nano Fabrication, Device and System, Southeast University, Nanjing, 210096, P. R. China*

* Address Correspondence to N. H. (nhan@ipe.ac.cn), and Z.-x. Y. (zaixyang@sdu.edu.cn).

[#] These authors contributed equally to this work.

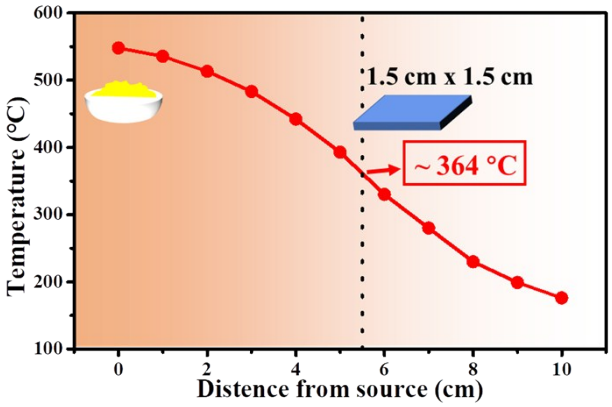

Fig.S1 The temperature profile of the downstream zone.

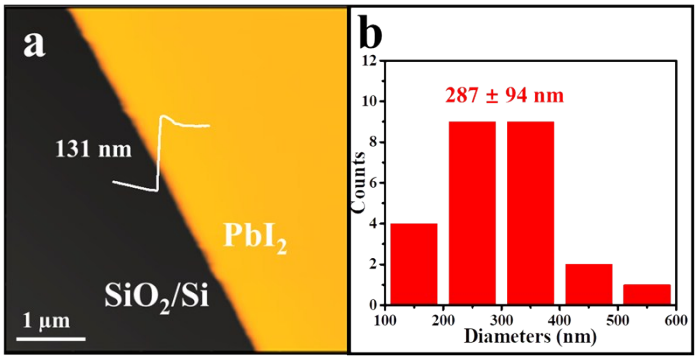

Fig.S2 AFM image of PbI_2 nanobelt and histogram of thickness.

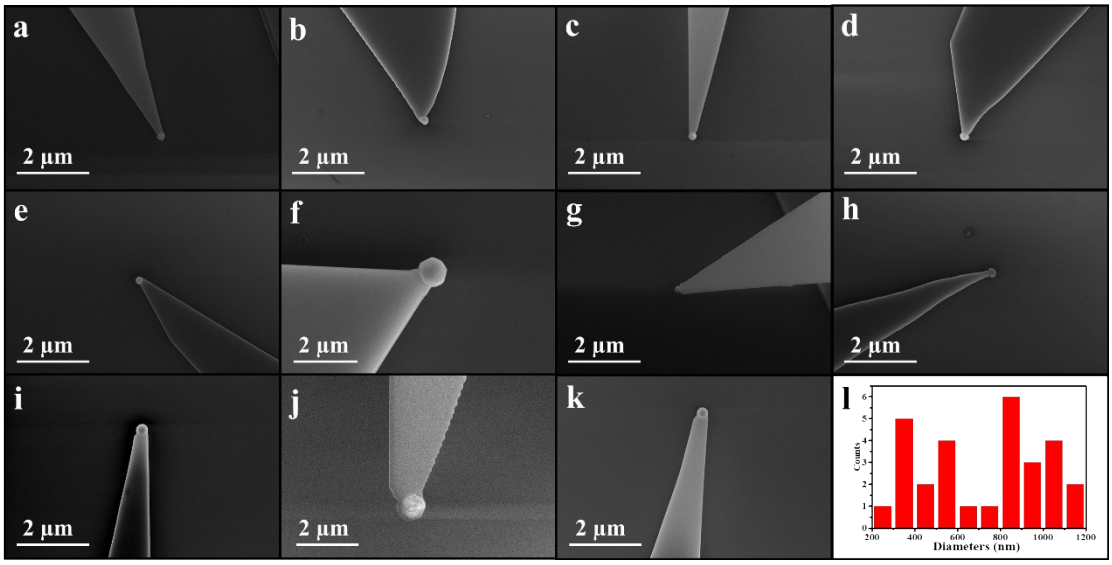

Fig.S3 SEM images of the tip sections of the as-prepared PbI_2 nanobelts.

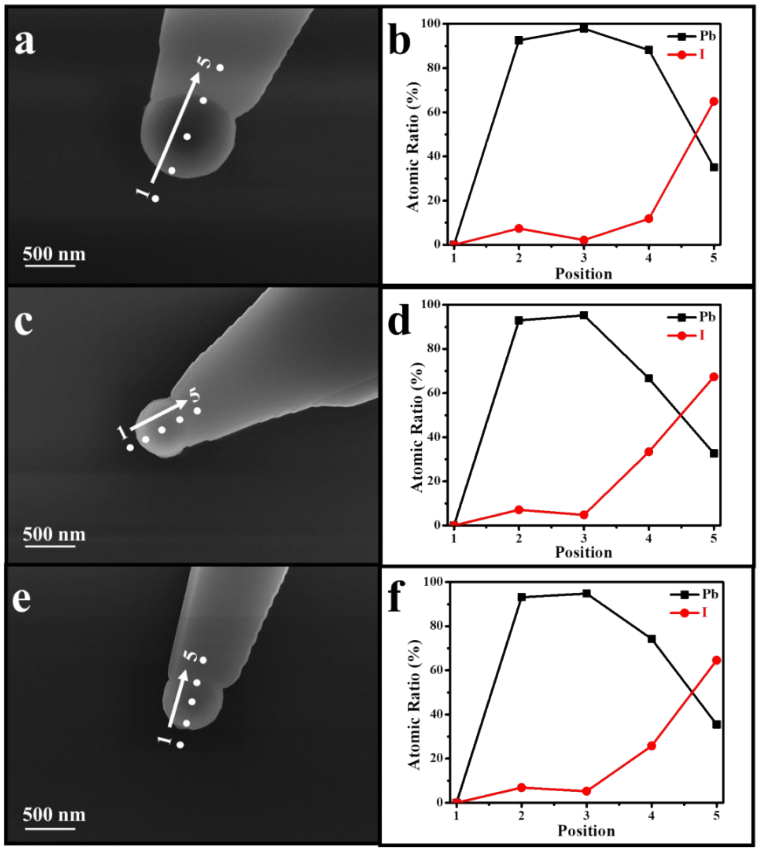

Fig.S4 SEM images and EDS spectra of the tip sections of the as-prepared PbI_2 nanobelts.

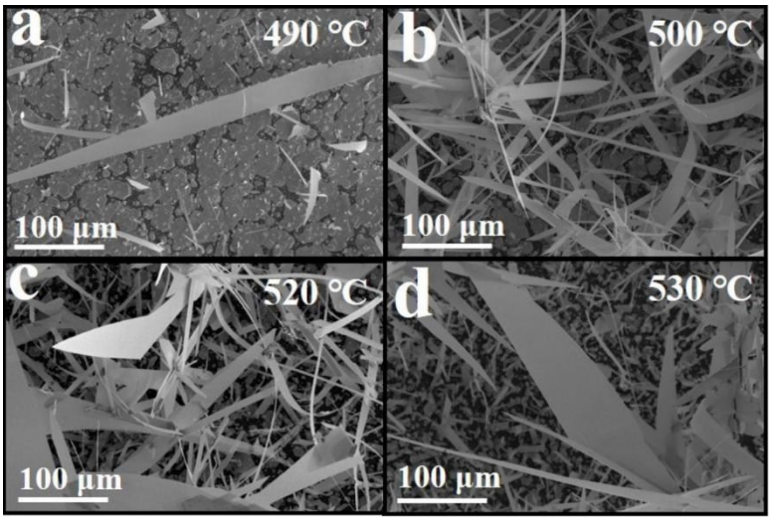

Fig.S5 Effect of growth temperature on the nanobelts growth. (a, b, c, d) SEM images of the as-prepared PbI_2 samples grown with different growth temperatures of 490 °C, 500 °C, 520 °C and 530 °C.

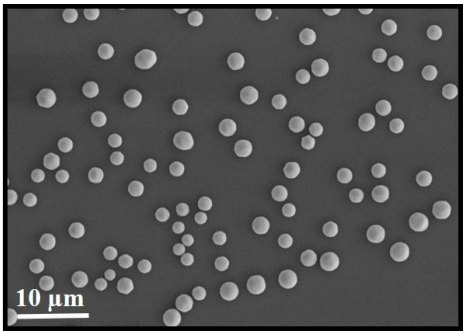

Fig.S6 SEM image of the as-prepared sample grown with a rapid heating rate of the source material (reach 550 °C in 7 min).

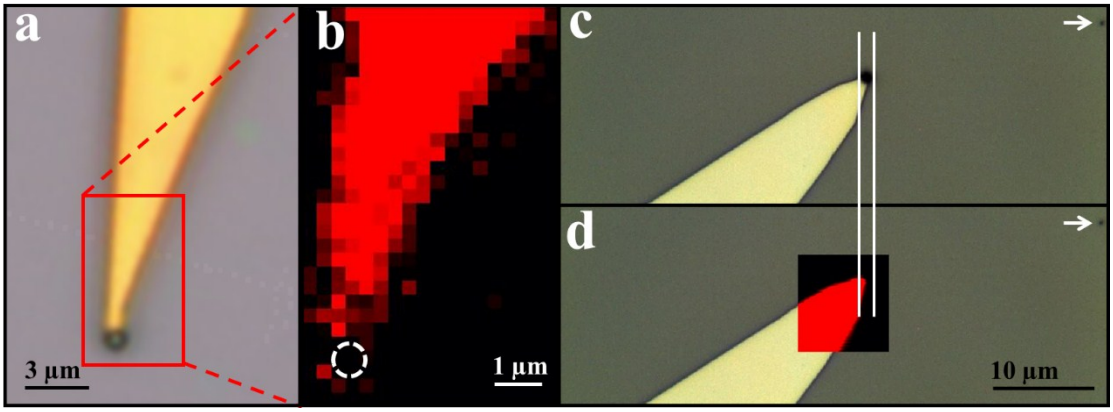

Fig.S7 2D PL mapping and Raman mapping at the tip sections of the as-prepared large-size PbI_2 nanobelts.

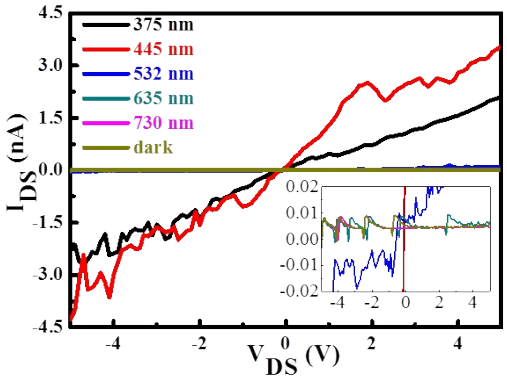

Fig.S8 I_{DS}-V_{DS} curves of the as-fabricated large-size PbI_2 nanobelt photodetectors with different incident light wavelength, inset is the amplified image.