Wafer-size growth of 2D layered SnSe films for UV-Visible-NIR Photodetector Arrays with High Responsivity

Lanzhong Hao,[a] Yongjun Du,[a] Zegao Wang,*[b,c] Yupeng Wu,[a] Hanyang Xu,[a] Shichang Dong,[a] Hui Liu,[a] Yunjie Liu,*[a] Qingzhong Xue,[a] Zhide Han,[a] Keyou Yan,[d] Mingdong Dong*[c]

[a] School of Materials Science and Engineering, China University of Petroleum, Qingdao 266580, China

[b] College of Materials Science and Engineering, Sichuan University, Chengdu 610065, China

[c] Interdisciplinary Nanoscience Center, Aarhus University, Aarhus 8000, Denmark

[d] School of Environment and Energy, National Engineering Laboratory for VOCs Pollution Control Technology and Equipment, South China University of Technology, Guangzhou 510006, China
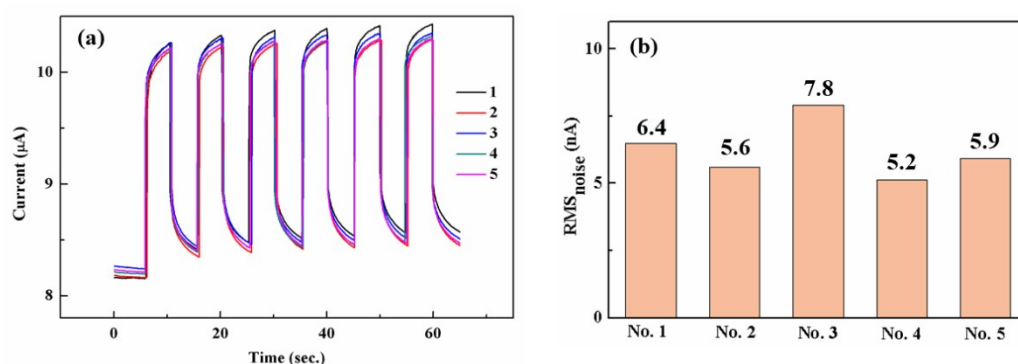
Fig. S1 a) Dynamic response curves under 404-nm laser with 15.5 mWcm^{-2} from five different devices. (b) The rms noise for the devices

The root-mean-square (RMS) noise was calculated from the dark currents of the above five devices based on the following equation,[1]

$$RMS_{noise} = \sqrt{\sum (I - I_0)^2 \Big/ N}$$

(1)

where I is measured dark current depending on time, I_0 is the initial dark current before illumination, and N is the number of data points. As shown Fig. R1b (new Fig. S1b in Supporting Information), the RMS noise for different devices has little

deviation of 5.2 ~ 7.8 nA, and its mean is 6.18±1.00 nA, which are much smaller than that of the light current (abut 2 μA), indicating the high electric noise homogeneity.
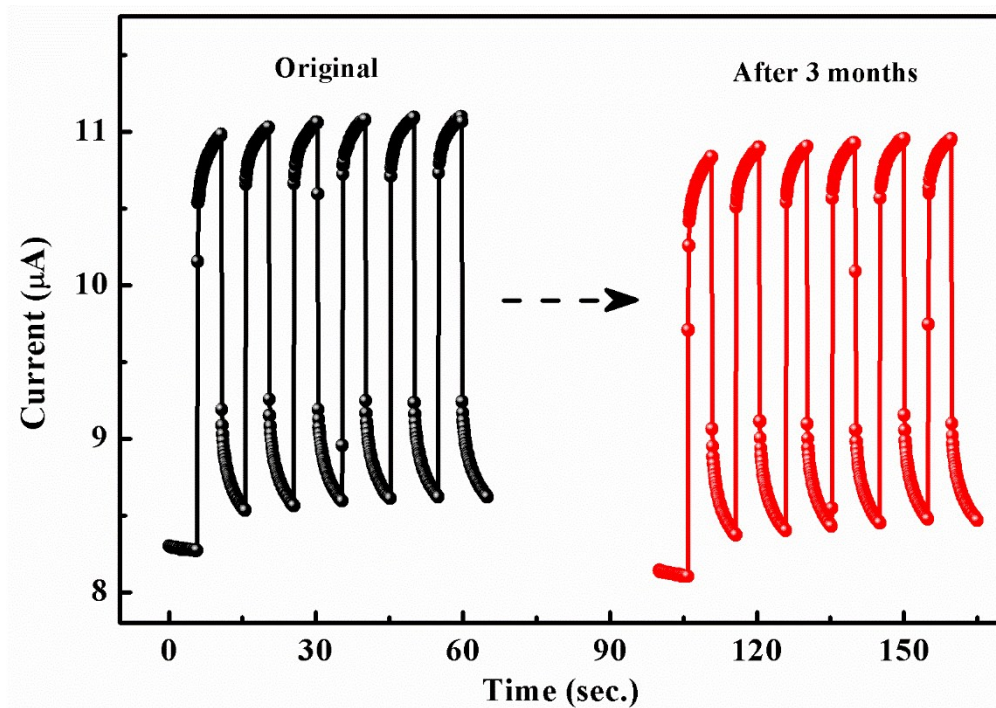

Fig. S2 Comparison between the original and 3-month response curve. The RMS currents of original and 3-month-age are 6.9 nA and 8.7 nA, respectively, further revealing the high stability of the fabricated photodetector.

Notes and refference

1 C. Yim, K. Lee, N. McEvoy, M. Brien, S. Riazimehr, N. Berner, C. Cullen, J. Kotakoski, J. Meyer, M. Lemme, G. Duesberg, ACS Nano 2016, 10, 9550.