The total dose effect of γ-rays induced domain evolution on α-In$_2$Se$_3$ nanoflakes

Pengfei Hou [a,b,*,†], Yun Chen [a,b,†], Xinhao Wang [a,b,†], Yang Lv [a,b], Hongxia Guo [a,b], Jinbin Wang [a], Xiangli Zhong [a,*] and Xiaoping Ouyang [a]

[a] *Key Laboratory of Low-dimensional Materials and Application Technology, School of Materials Science and Engineering, Xiangtan University, Xiangtan 411105, China*

[b] *Science and Technology on Reliability Physics and Application Technology of Electronic Component Laboratory, Guangzhou 510610, China*
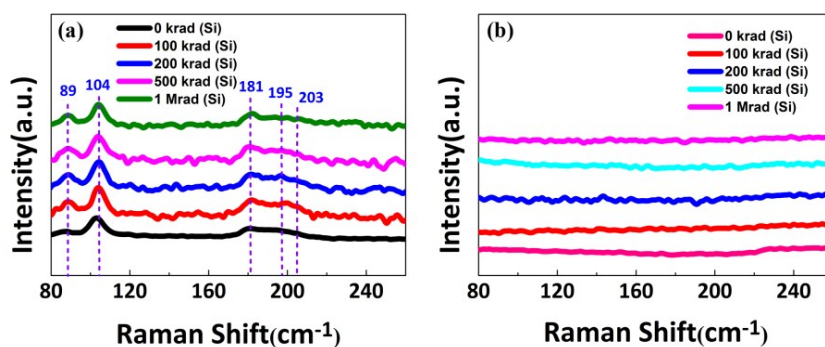
Figure S1. Raman spectra of the α-In$_2$Se$_3$ covered with Au electrode and the substrates with different total radiation doses.
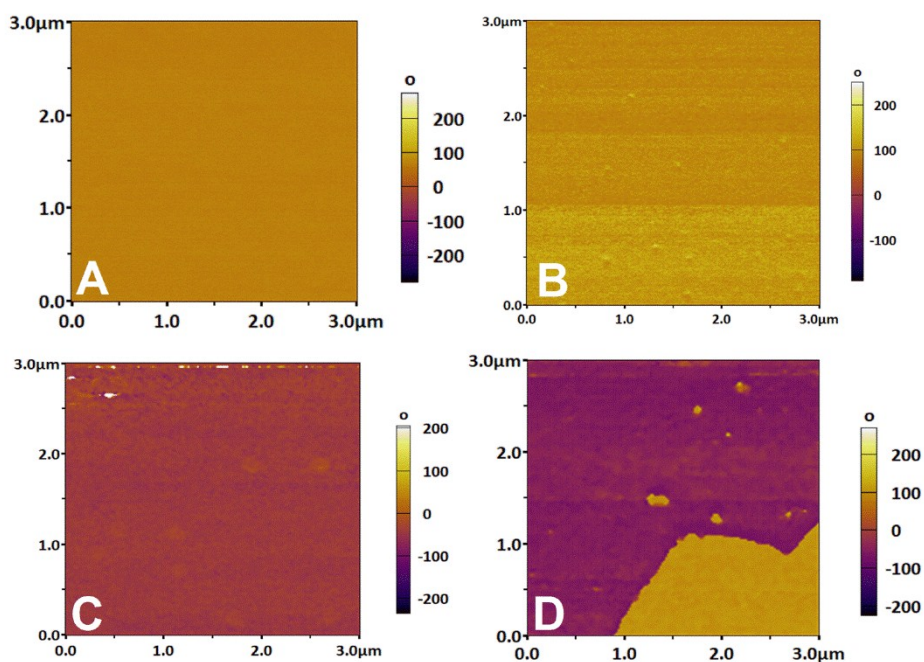

Figure S2. IP PFM phase images of the α-In$_2$Se$_3$ nanoflakes after different total dose: (A) 100 krad(Si); (B) 200 krad(Si); (C) 500 krad(Si); (D) 1 Mrad(Si).
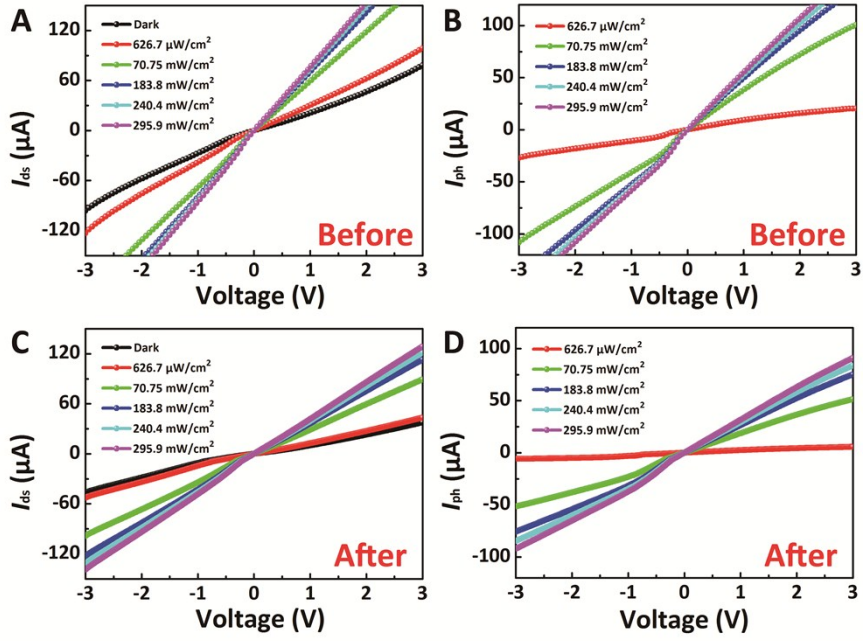
Figure S3. Electrical transport in α-In$_2$Se$_3$ based transistor before and after irradiation. (A) and (B) before the irradiation. (C) and (D) after the irradiation with a total dose of 200 krad(Si).
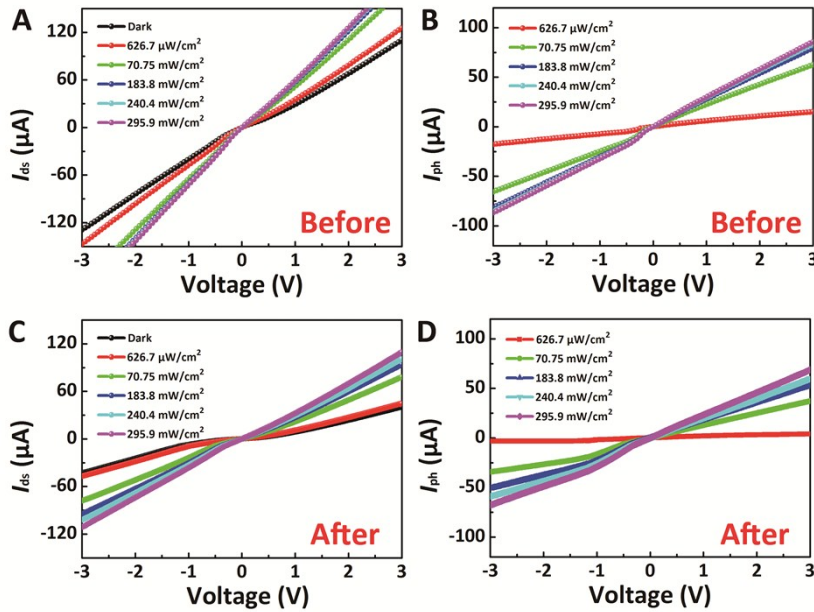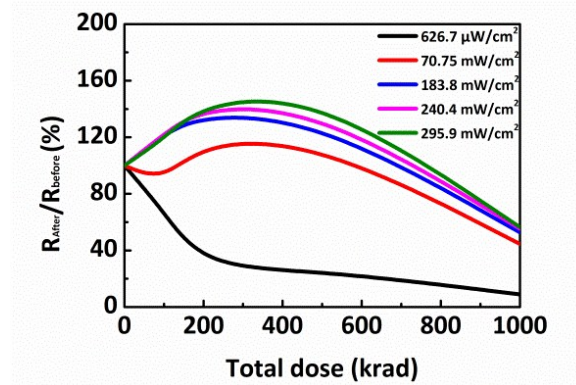

Figure S4. Electrical transport in α-In$_2$Se$_3$ based transistor before and after irradiation. (A) and (B) before the irradiation. (C) and (D) after the irradiation with a total dose of 500 krad(Si).
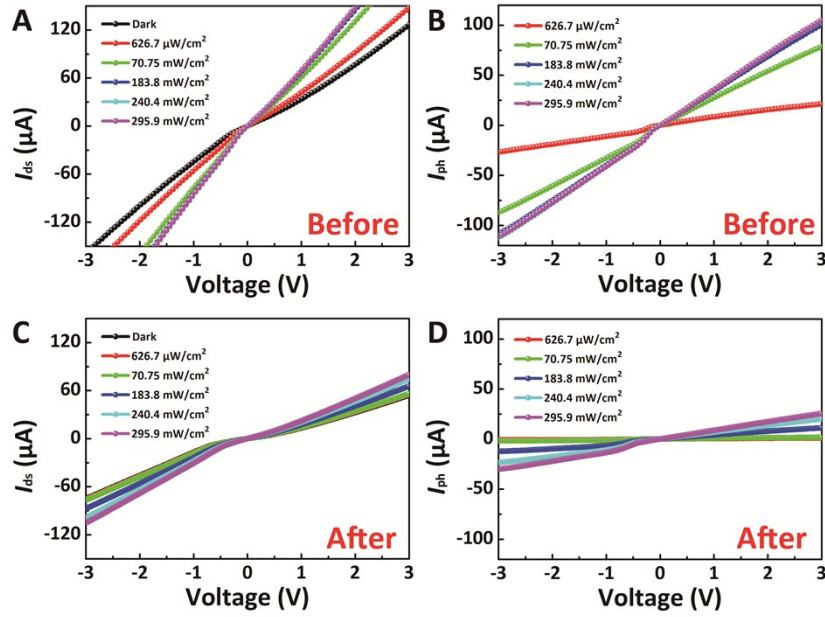
Figure S5. Electrical transport in α-In$_2$Se$_3$ based transistor before and after irradiation. (A) and (B) before the irradiation. (C) and (D) after the irradiation with a total dose of 1 Mrad(Si).

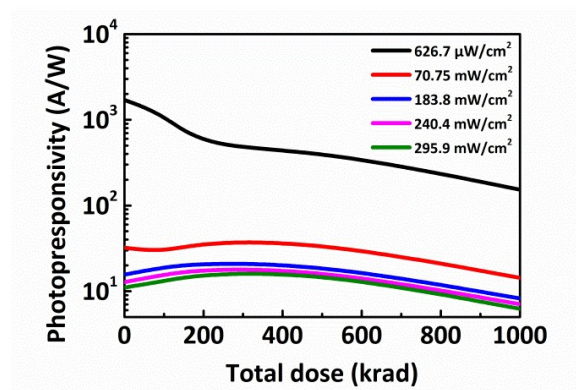
Figure R6. Photoresponsivity degradation ratio as a function of the total radiation dose.

Figure S7. Photoresponsivity as a function of the total radiation dose.