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High selective carrier-type modulation of tungsten selenide transistors by iodine vapor

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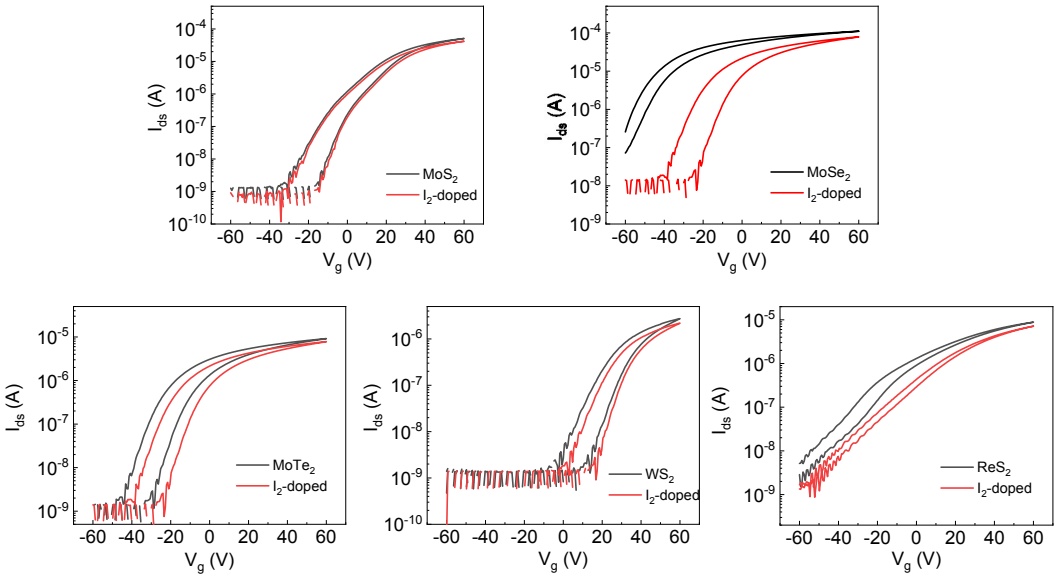

Fig. S1 Transfer characteristics of five TMDCs (MoS_2, $MoSe_2$, $MoTe_2$, WS_2, and ReS_2) before and after 15 s I_2 vapor treatment.

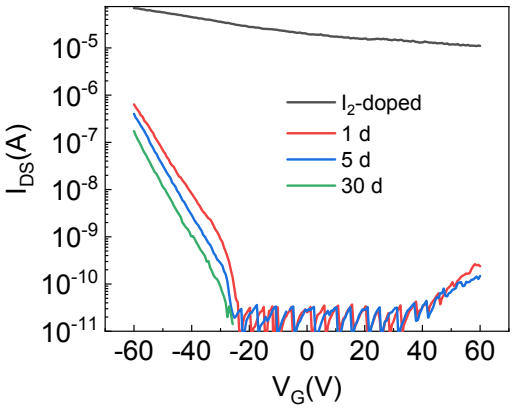

Fig. S2 Initial current drop after doping is attributed to desorption of weakly physisorbed I_2.

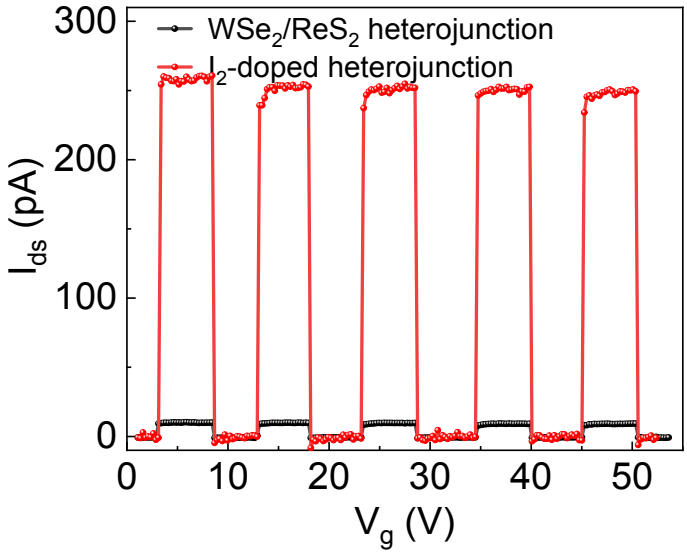

Fig. S3 Photocurrent of the WSe_2/ReS_2 heterojunction before and after 15 s I_2 vapor treatment.

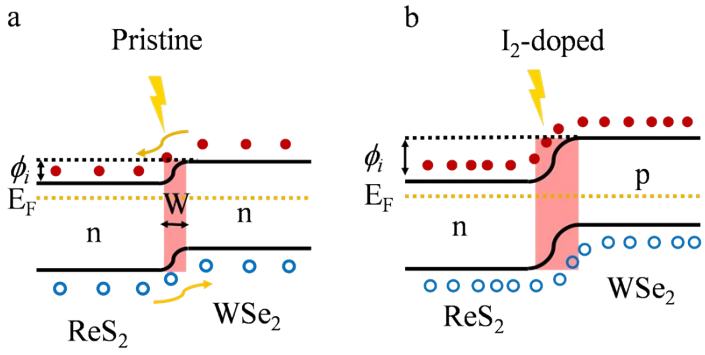

Fig. S4 Band diagrams before I_2-doping and after I_2-doping. The responsivity increases after the p-doping of WSe_2, which can be understood by the change in built-in field and depletion width with the treatment by iodine. As shown in Fig.R3a and b, after iodine doping, WSe_2 is p-doped, leading to a quasi-Fermi level close to the valence band. This can result in a larger built-in field and depletion region, leading to more e□cient photo-carrier collection and photo-absorption on the larger photoactive area.