

Supporting information

Fig S1(a) Transfer curve of monolayer WSe_2 before and after step by step ozone exposure. At each exposure step, the device was illuminated with UV light for 1 minute and left in the chamber for 10 minutes to allow ozone molecules to adsorb on the surface. Transfer curves of monolayer (b) and multilayer (c) MoSe₂ before and after ozone exposure.



Fig S2 Transfer curves of air-exposed monolayer (a), bilayer (b) and multilayer (c) WSe₂ devices after annealing at progressively increasing temperatures for 10 minutes.



Fig S3 Transfer curves of monolayer (a), bilayer (b) and multilayer (c) WSe_2 before and after progressive ozone exposure with varying conditions. The m-n indicates that the device were first UV-illuminated for m minutes and then kept in the chamber for n minutes. Long-term exposure results in irreversible degradation of the device. The degradation is most likely due to surface oxidation as recently reported by Yamamoto et al.²³.



Fig S4. Conductance of a trilayer WSe_2 device after multiple cycle of ozone exposure and annealing. The device was annealed at 150 °C for 10 minutes to remove adsorbed ozone.