Supporting information for

Modulation of $MoTe_2/MoS_2$ van der Waals heterojunction for multifunctional devices using N_2O plasma with opposite doping effect

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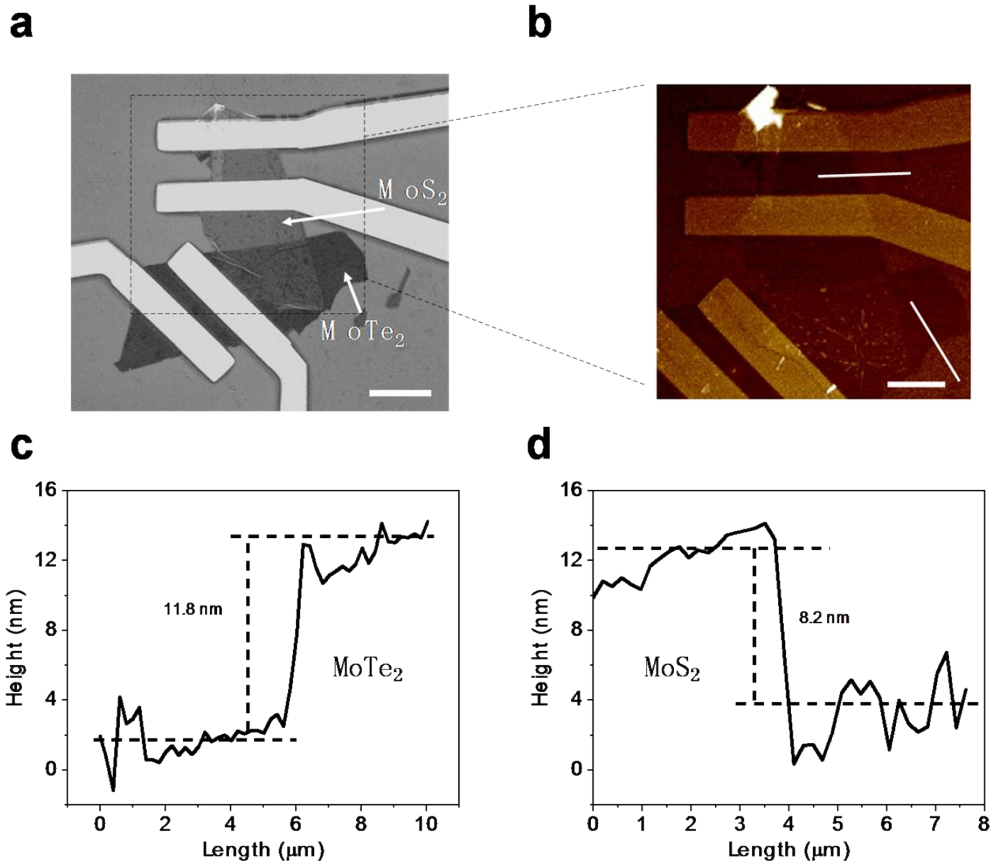

Figure S1: The AFM image of $MoTe_2/MoS_2$ heterojunction. (a) The SEM photograph of the $MoTe_2/MoS_2$ heterojunction. The dotted area is scanned by atomic force microscopy. Scale bar is 4 μm. (b) The atomic force microscopy image of $MoTe_2/MoS_2$ heterojunction. Scale bar is 4 μm. (c)-(d) The thickness data of the multilayer $MoTe_2$ and MoS_2 nanoflakes in Fig. S1b, respectively.

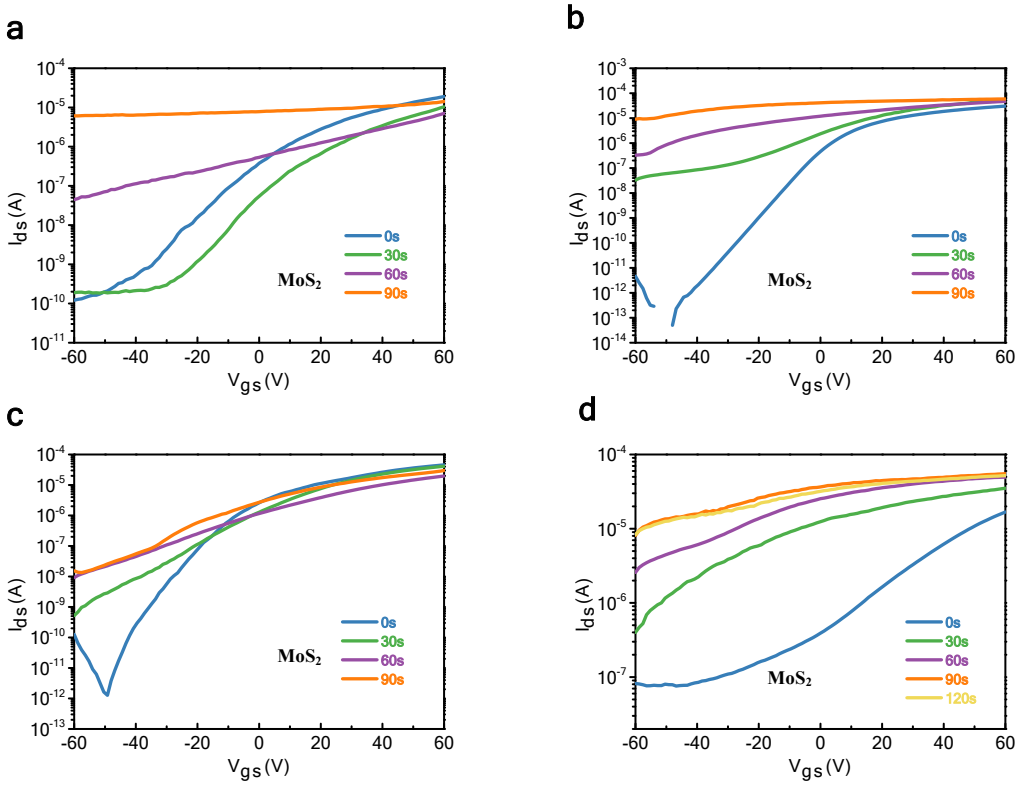

Figure S2: Transfer curve evolution of four MoS_2 devices under different plasma treatment times.

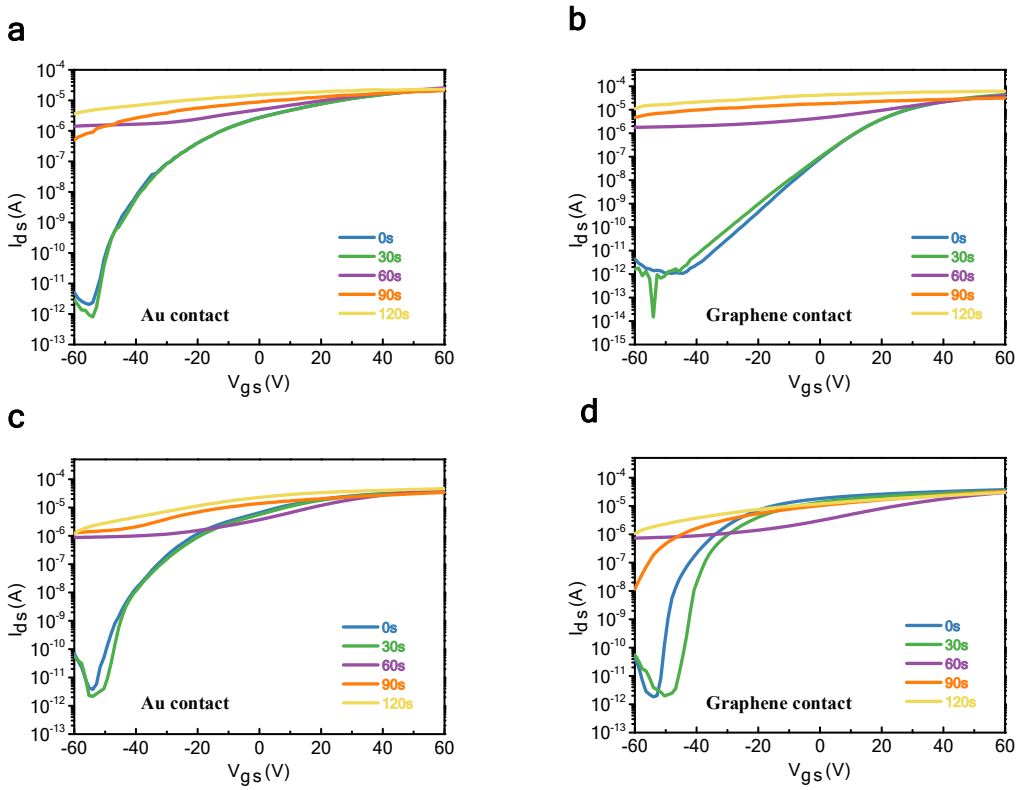

Figure S3: Transfer curve evolution of the MoS_2 FETs with Au (a) (c) and graphene (b) (d) as contacts under different plasma treatment times.

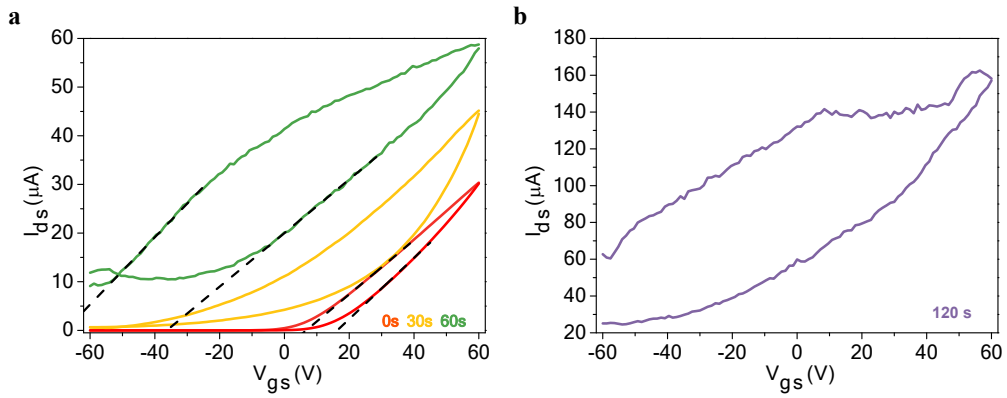

Figure S4: Transfer characteristics of pristine and N_2O-doped MoS_2 FET with the V_{gs} sweeping back and forth between -60 V and +60 V.

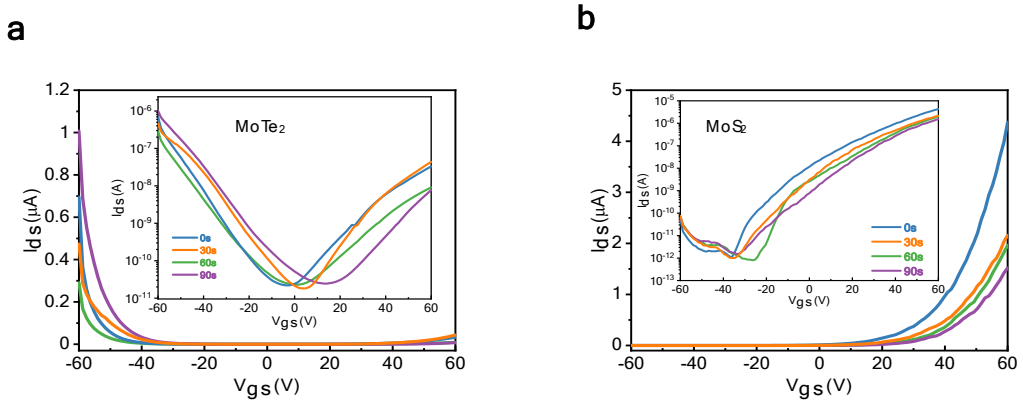

Figure S5: Transfer curves of the $MoTe_2$ FET (a) and MoS_2 (b) FET before and after consecutive O_2 plasma treatment with different exposure times.

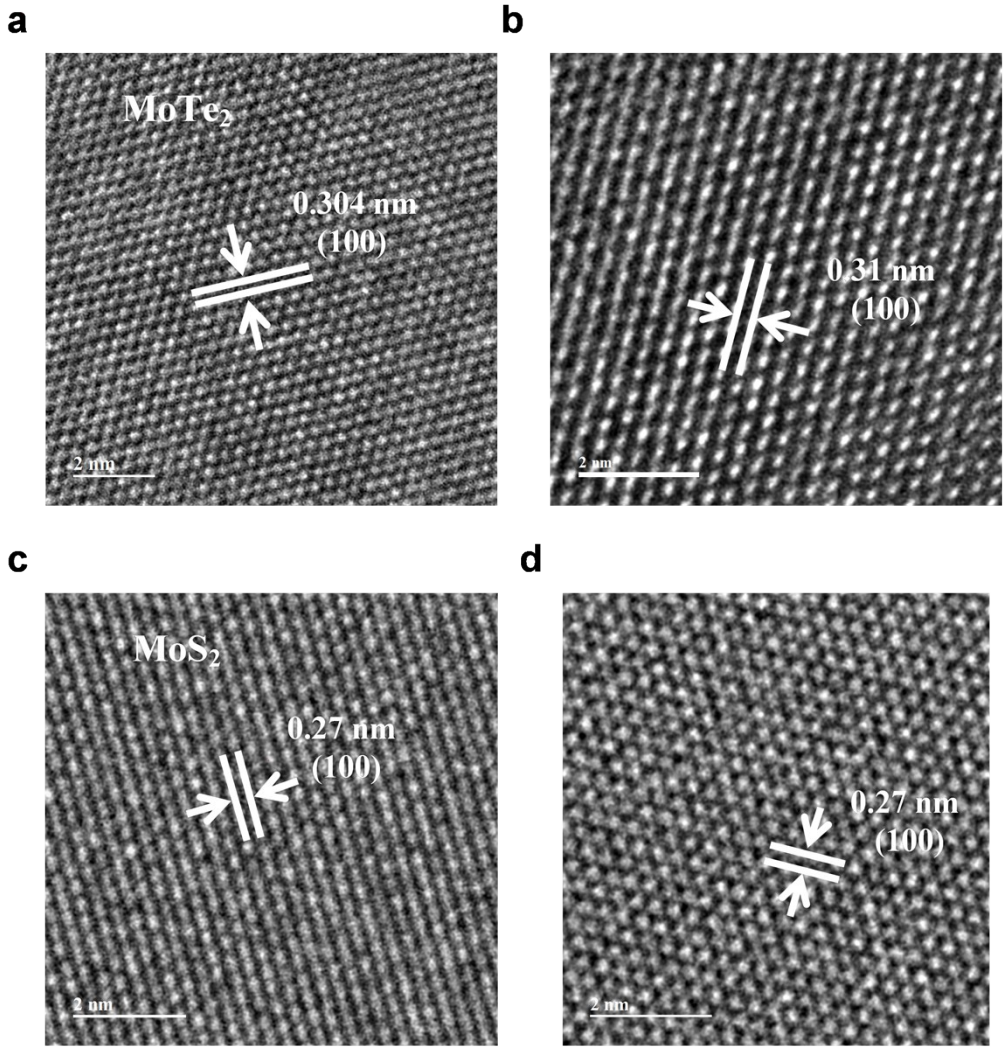

Figure S6: High-resolution TEM (HRTEM) images of $MoTe_2$ before (a) and after (b) plasma treatment. High-resolution TEM (HRTEM) images of MoS_2 before (c) and after (d) plasma treatment.

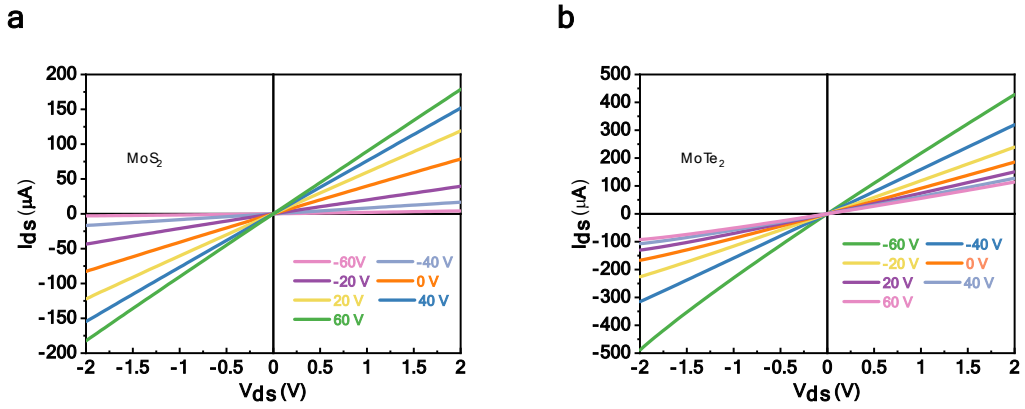

Figure S7: Output curves of the MoS_2 FET (a) and $MoTe_2$ FET (b) after N_2O plasma treatment with different V_{gs}.

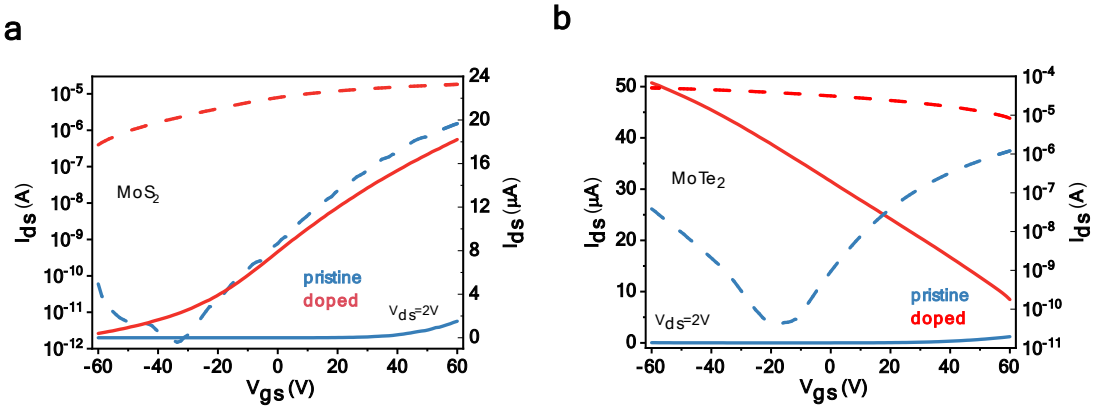

Figure S8: Transfer curves of the MoS_2 FET (a) and $MoTe_2$ FET (b) before and after N_2O plasma treatment. V_{ds}=2 V.

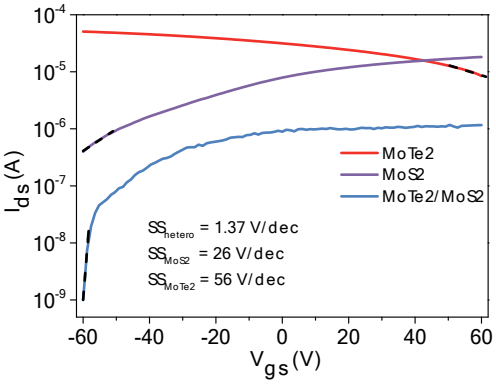

Figure S9: The values of subthreshold swings (SS) of $MoTe_2$, MoS_2 and $MoTe_2/MoS_2$ heterojunction, respectively.