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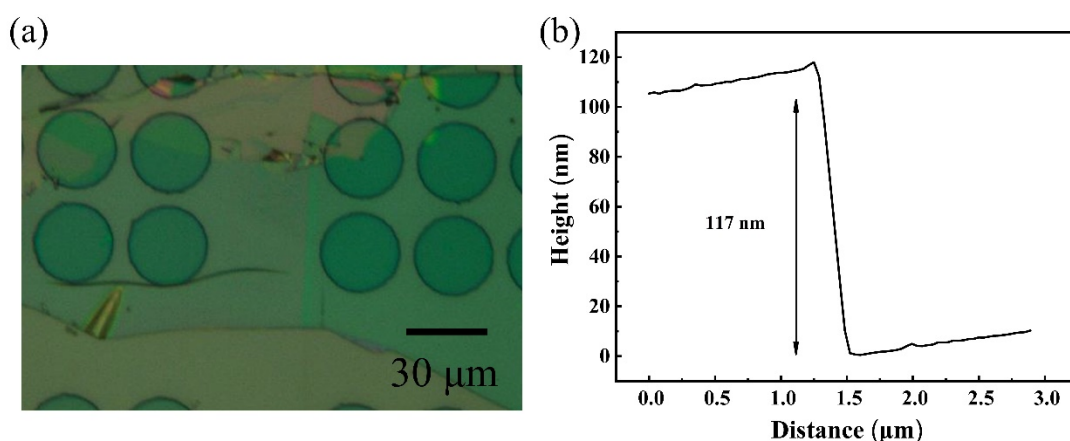
Supplementary

**Enhanced performance of a n-Si/p-GaTe heterojunction through interfacial passivation and thermal oxidation**

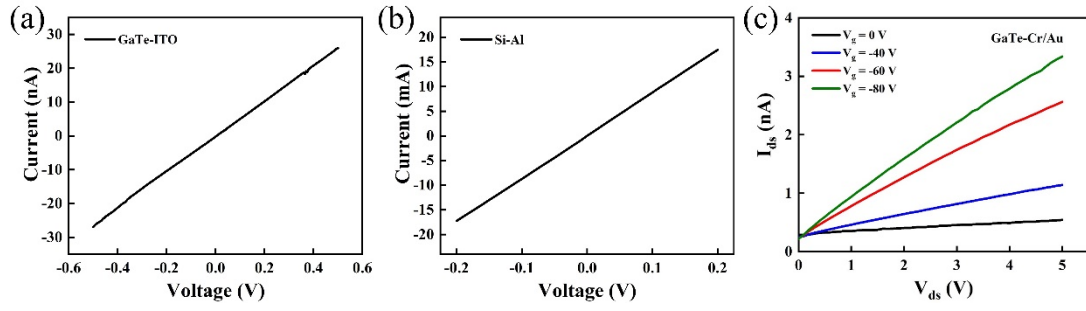
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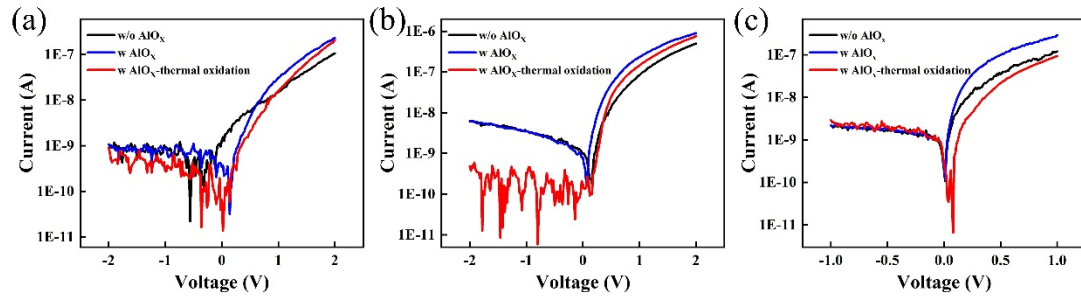
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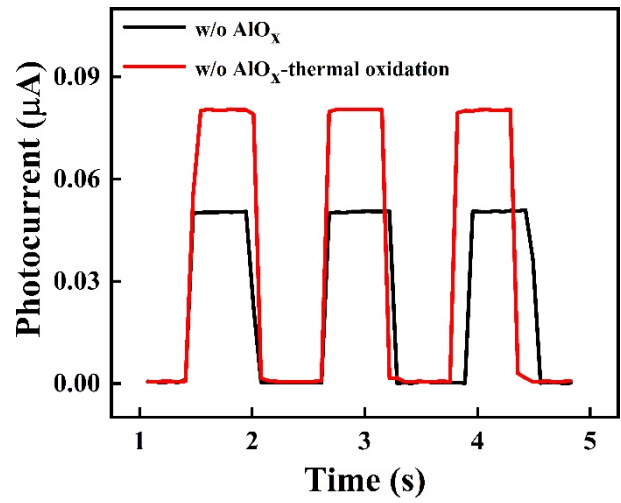
**Figure S1.** (a) The optical image of n-Si/p-GaTe heterojunction with and without AlO<sub>x</sub> passivation layer. (b) Thickness of GaTe flake used in the n-Si/p-GaTe heterojunction.



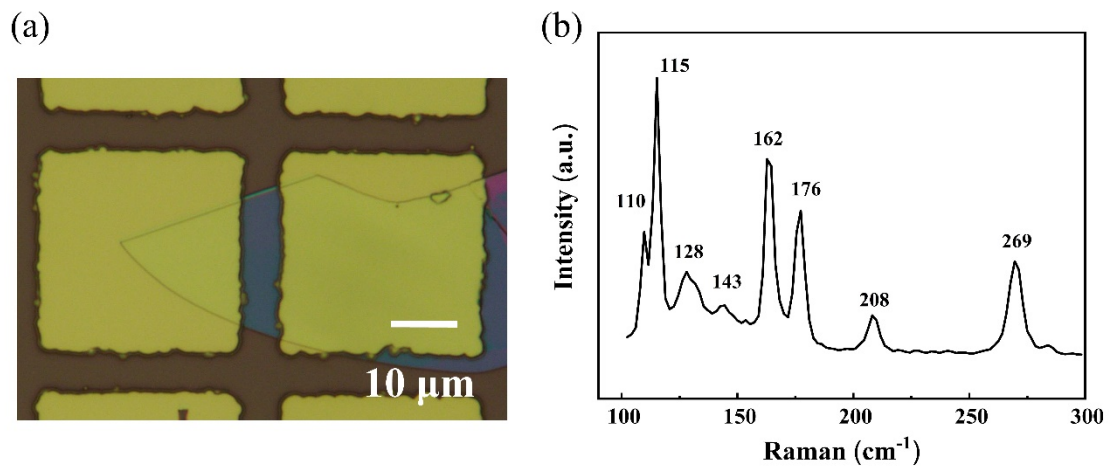
**Figure S2.** (a)  $I$ - $V$  curve of GaTe-ITO with Ohmic contact. (b)  $I$ - $V$  curve of Si-Al with Ohmic contact. (c) Output curves of GaTe FET with Cr/Au electrodes at various  $V_g$ .



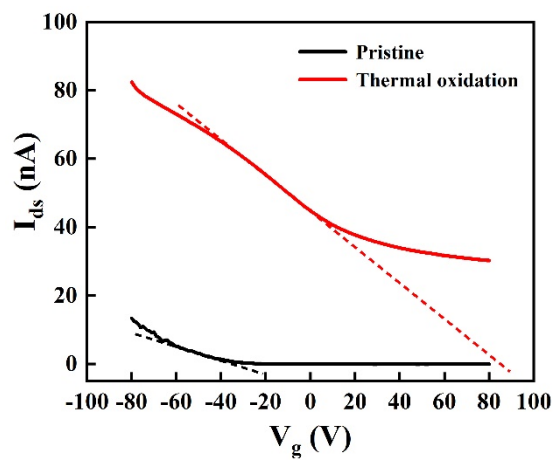
**Figure S3.**  $I$ - $V$  curves of other three n-Si/p-GaTe heterojunctions without  $\text{AlO}_x$  passivation, with  $\text{AlO}_x$  passivation and with  $\text{AlO}_x$  passivation-thermal oxidation under dark condition.



**Figure S4.** Time-dependent photoresponse of n-Si/p-GaTe heterojunction without  $\text{AlO}_x$  passivation layer before and after heat treatment.



**Figure S5.** (a) The optical image of GaTe FET. (b) Raman spectroscopy of GaTe channel of the FET.



**Figure S6.** Transfer curves of GaTe FET before and after thermal oxidation.