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Supplementary Information

β-Ga_2O_3 heterojunction field-effect transistors prepared *via* UV laser-assisted p-doping of two-dimensional WSe_2

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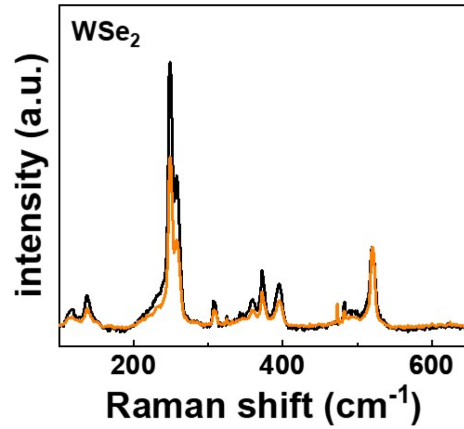

Figure S1. Raman spectra of WSe_2 before (black) and after (orange) UV laser treatment. The peak at ~520 cm^{-1} originates from the Si substrate.

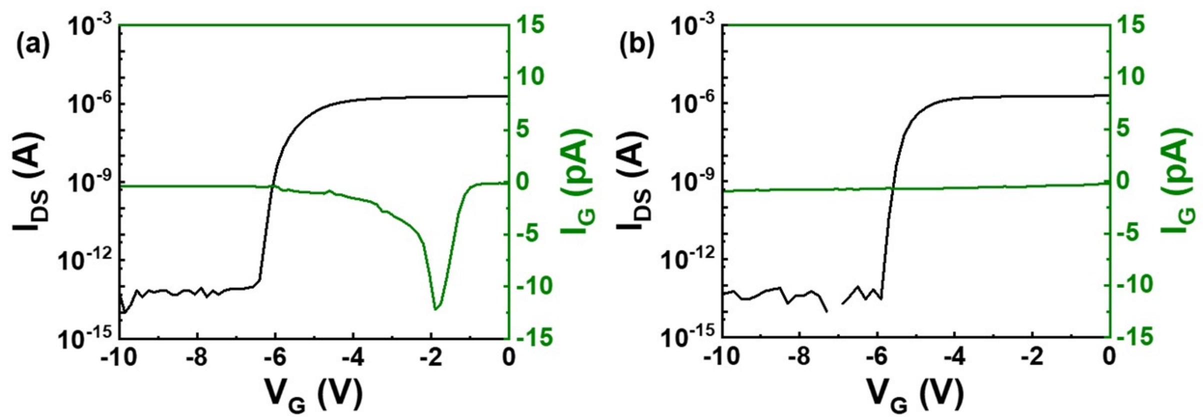

Figure S2. $I_{DS}\ vs\ V_G$ and $I_G\ vs\ V_G$ characteristics of the β-Ga_2O_3 HJFET with WSe_2 top-gate (a) before and (b) after UV laser treatment.

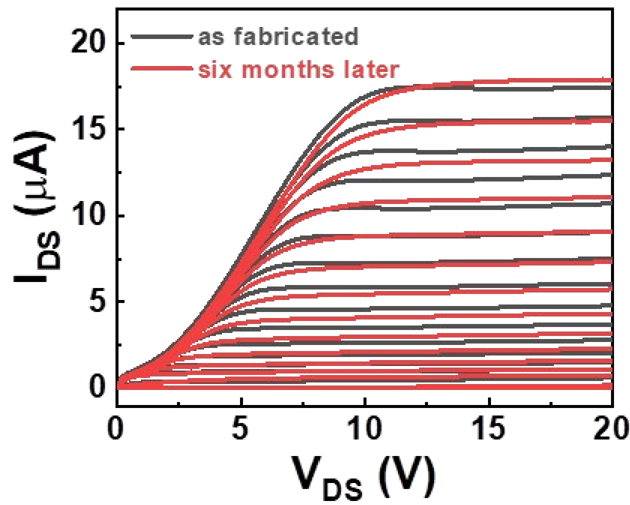

Figure S3. Comparison of the output characteristics ($V_G = +1\ V\ to\ -14\ V,\ -1\ V\ step$) of the β-$Ga_2O_3$ HJFET after the storage in an air ambience for 6 months.

thickness	β-Ga_2O_3	WSe_2
$h\ (nm)$	393.3	20.5
contact resistance	**β-Ga_2O_3 to Ti/Au**	**WSe_2 to Pt/Au**
$R_c\ (k\Omega{\cdot}\mu m)$	8.26	55.8

Table S1. The thickness of β-Ga_2O_3 and WSe_2, and the corresponding contact resistances