

Electronic Supplementary Information

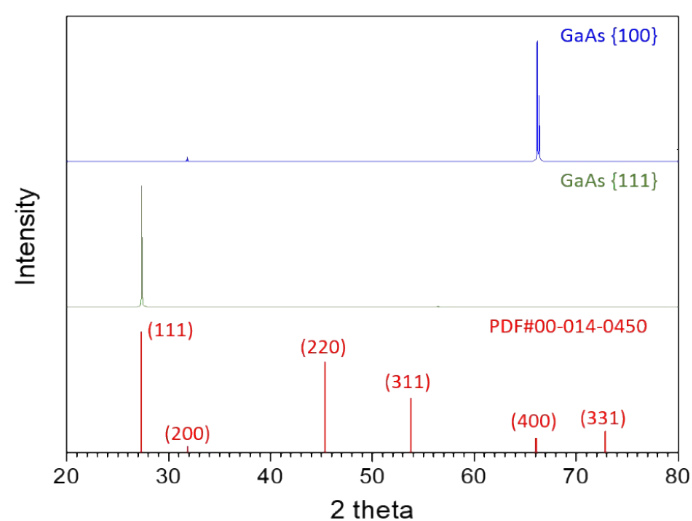
**GaAs Wafers Possessing Facet-Dependent Electrical Conductivity Properties**

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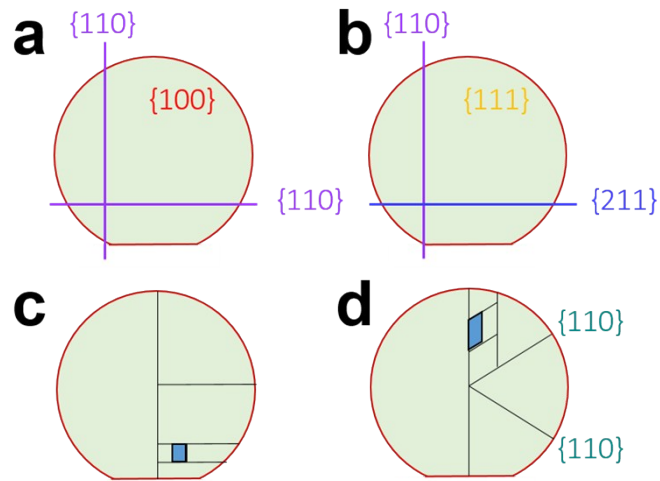
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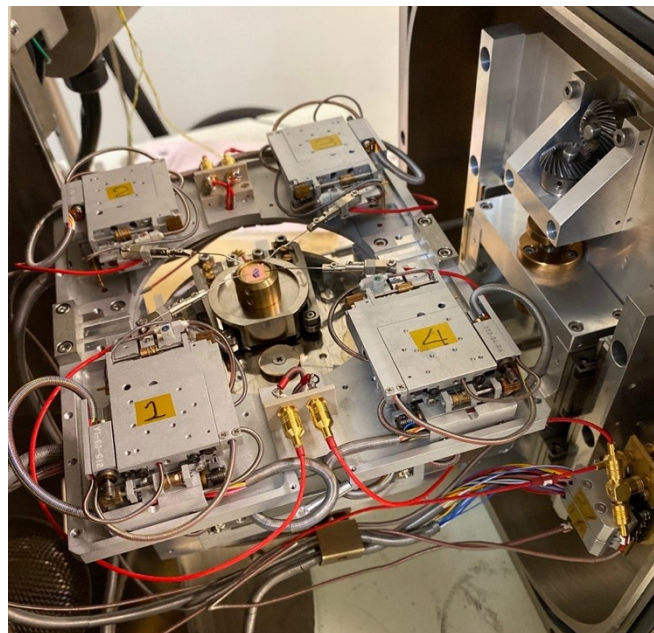
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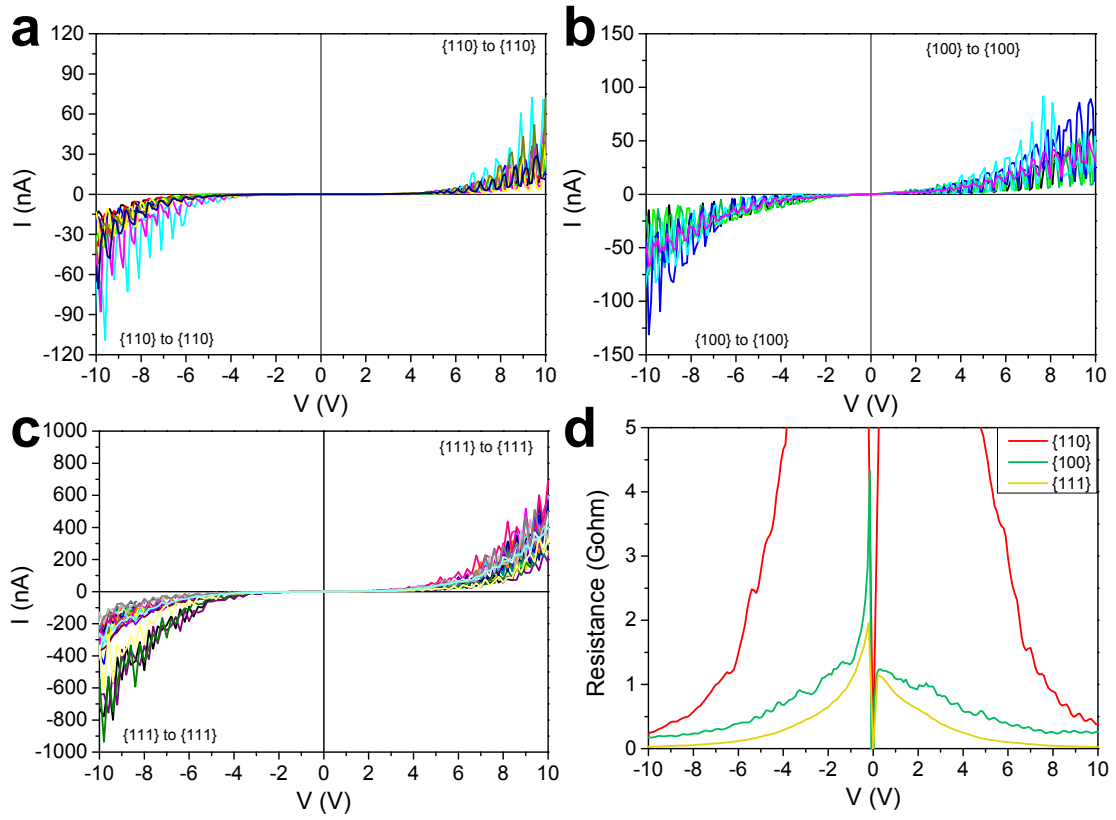
**Fig. S1** XRD patterns of intrinsic GaAs (100) and (111) wafers.



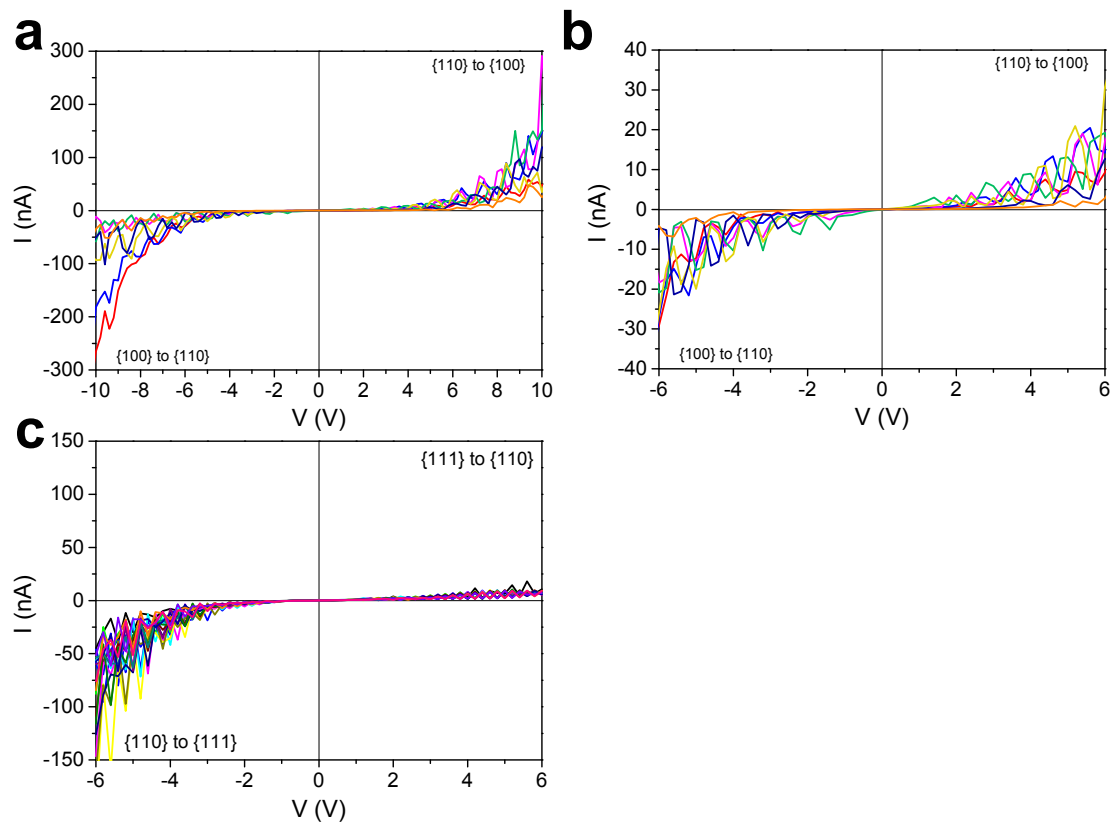
**Fig. S2** Schematic drawings of the GaAs (a) (100) and (b) (111) wafers with breakages along and perpendicular to the flat edge of the wafers. The lines indicate the exposed faces after breaking the wafer. (c, d) The resulting pieces after making the cuts on the GaAs (c) (100) and (d) (111) wafers. Attempted breakage along the  $[211]$  direction yields  $60^\circ$  fractures relative to the  $[110]$  direction, exposing only  $\{110\}$  side faces for the GaAs (111) wafer.



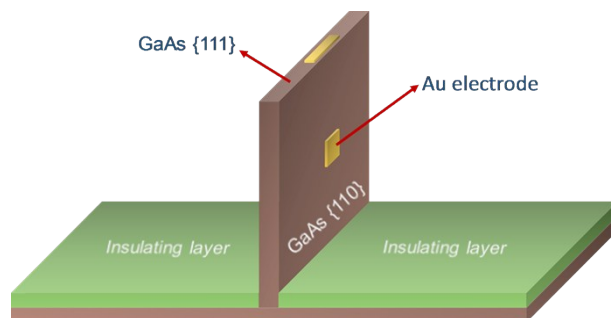
**Fig. S3** Photograph of the nanomanipulator installed in an SEM chamber for electrical conductivity measurements.



**Fig. S4** Multiple  $I-V$  curves recorded with tungsten probes contacting (a)  $\{110\}$ , (b)  $\{100\}$ , and (c)  $\{111\}$  surfaces of intrinsic GaAs wafers. (d) Electrical resistance values with respect to the applied voltage for the three GaAs surfaces. Sweep rate is 0.074 V/s for the  $\{110\}$  and  $\{110\}$  faces and 0.667 V/s for the  $\{111\}$  face.



**Fig. S5** Multiple  $I$ - $V$  curves recorded for the (a, b) {100}/{110} and (c) {110}/{111} facet combinations. Sweep rate is 0.150–0.154 V/s for the {100}/{110} combination and 0.343 V/s for the {110}/{111} combination.



**Fig. S6** FinFET design using electrical facet effects of a GaAs wafer.