

Electronic Supplementary Material (ESI) for Nanoscale.
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Electronic Supporting Information

for

Vertical tip-tip contact silicon nanowires array for gas sensing

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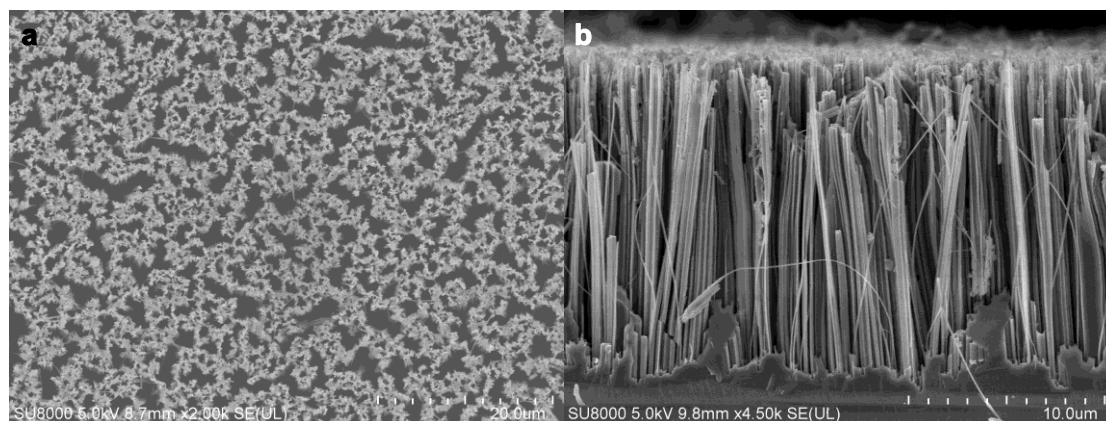


Fig. S1 The SEM images of n-type SiNWs array after two chip were pressed face to face under certain pressure.

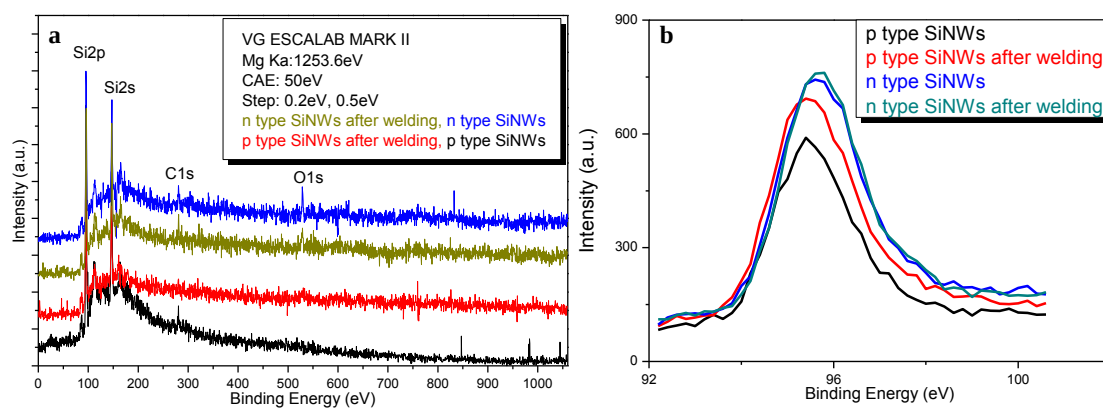


Fig. S2 (a)The XPS spectra of SiNWs array before and after welding treatment. (b)

High resolution XPS spectra of Si 2p peaks.

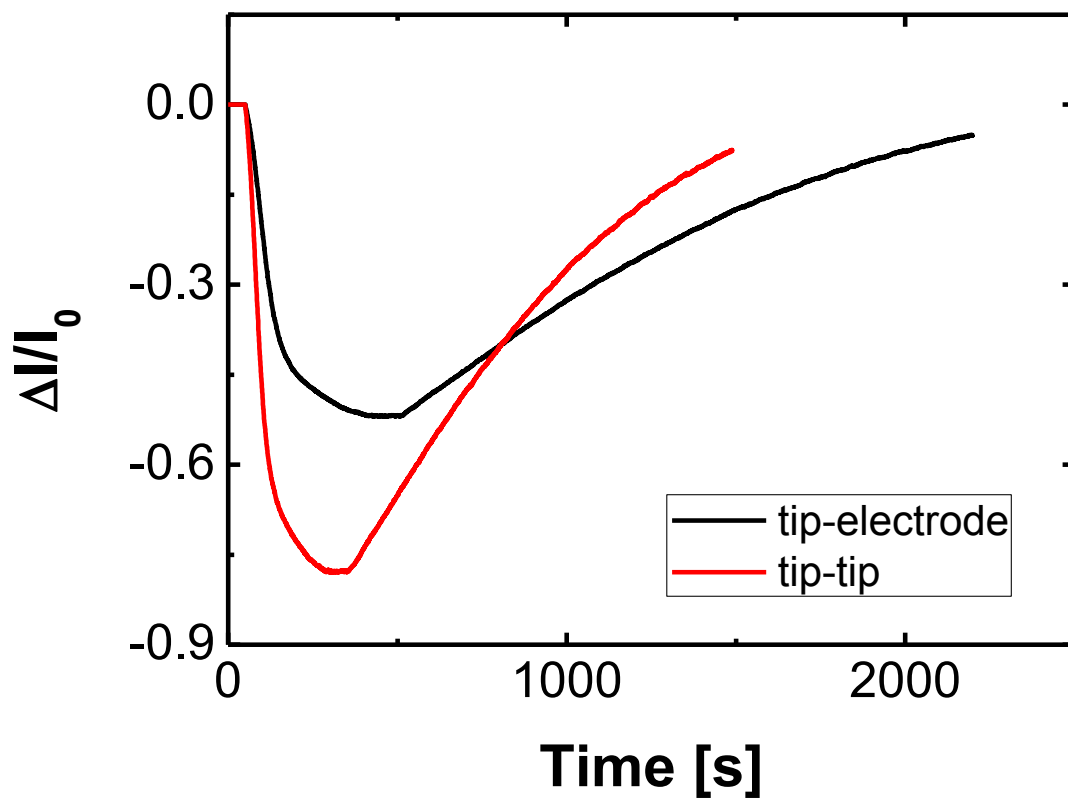


Fig. S3 Typical response of n-type SiNWs with tip-electrode structure (black trace) and tip-tip contact structure (red trace) towards 5 ppm NO₂ at bias voltage of 3V.

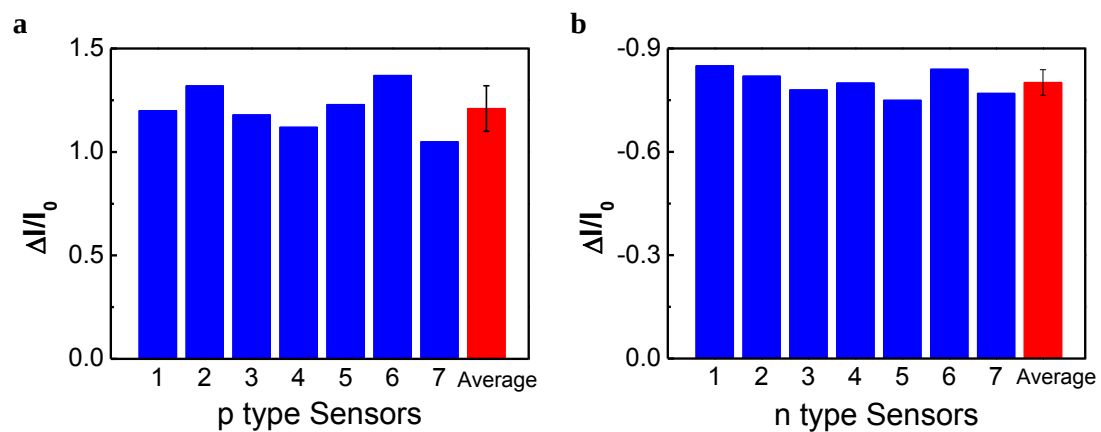


Fig. S4 The conductance response of TTC-SiNWs sensors prepared in seven batches but with same method. Each sensor was exposed to 5 ppm NO_2 with N_2 carrier gas at flow rate of 200 mL min^{-1} . (a) p-p TTC-SiNWs, (b) n-n TTC-SiNWs at bias voltage of 3V.

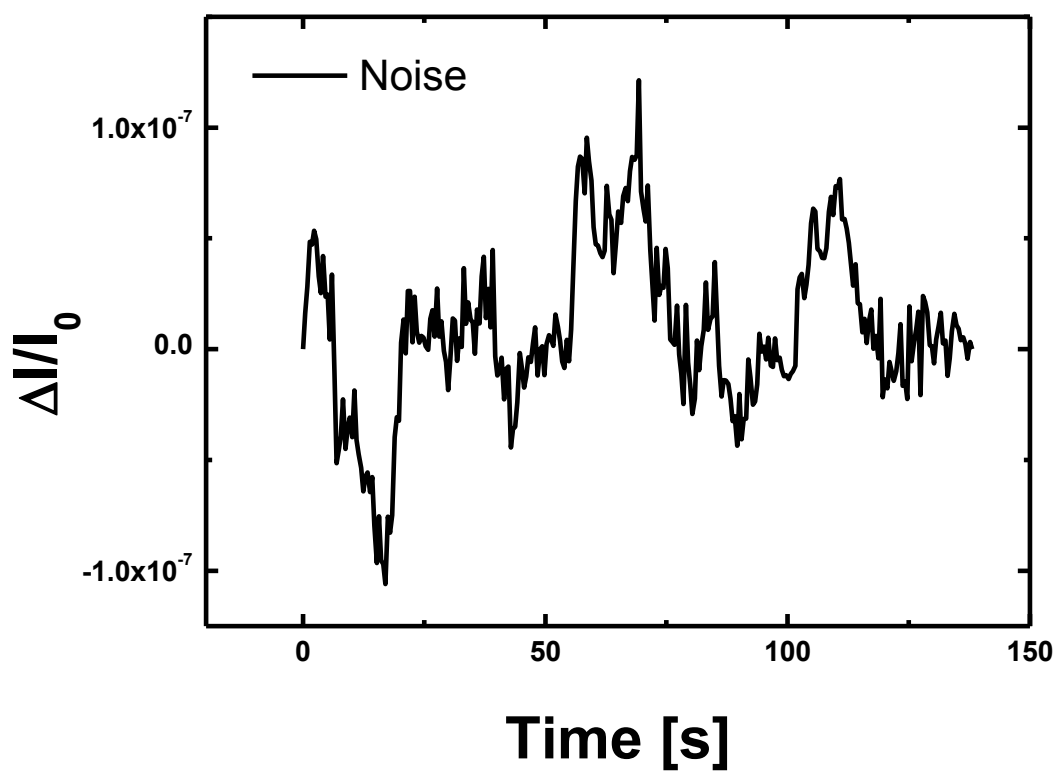


Fig. S5 Conductance noise of TTC-SiNWs structure under the N_2 stream.

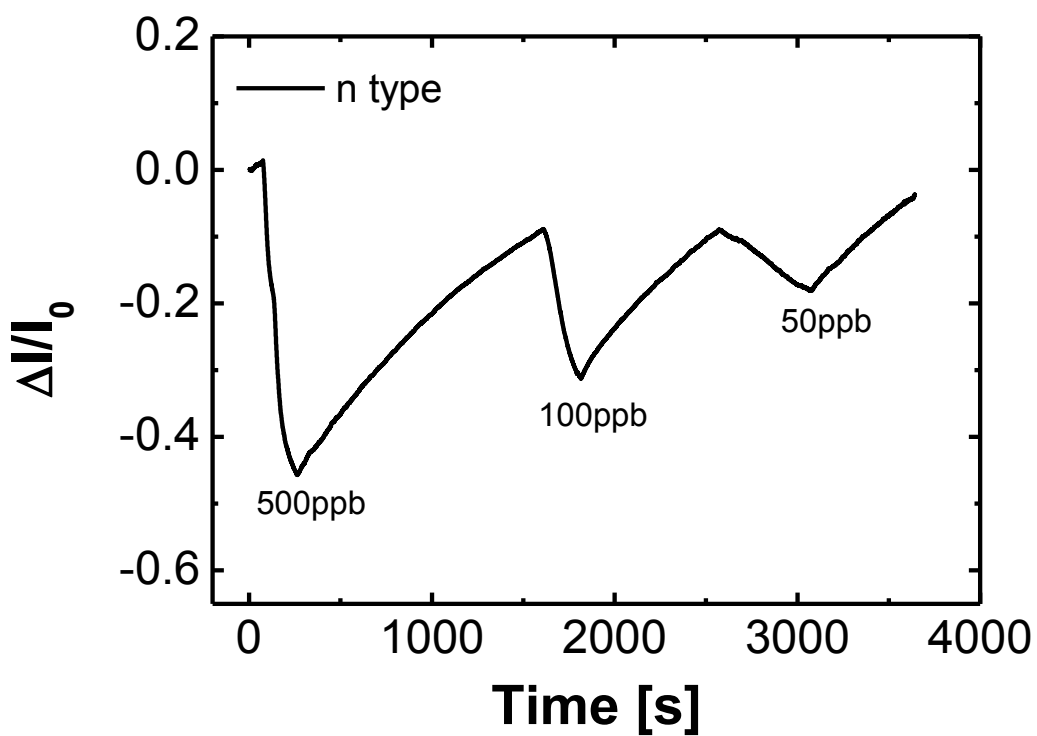


Fig. S6 Conductance response of n-type TTC-SiNWs structure to low concentration of NO₂.

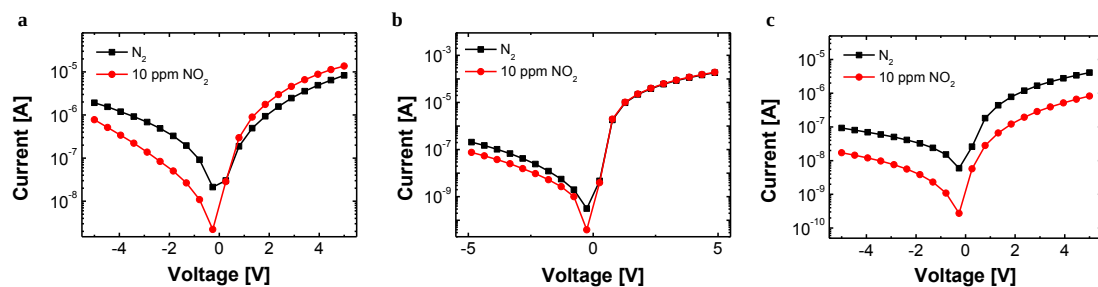


Fig. S7 The *I*-*V* curves of p-n TTC-SiNWs array with (a) ~35 μm p type SiNWs/~20 μm n type SiNWs, (b) ~25 μm p type SiNWs/~30 μm n type SiNWs and (c) ~15 μm p type SiNWs/~40 μm n type SiNWs. The measurements were performed after the sensing chip was exposed to pure N₂ gas flow (black line) and 10 ppm of NO₂ (red line) for 10 min.