

Supplementary Material

Development of a Novel Gas-Sensing Platform Based on a Network of Metal Oxide Nanowire Junctions Formed on a Suspended Carbon Nanomesh Backbone

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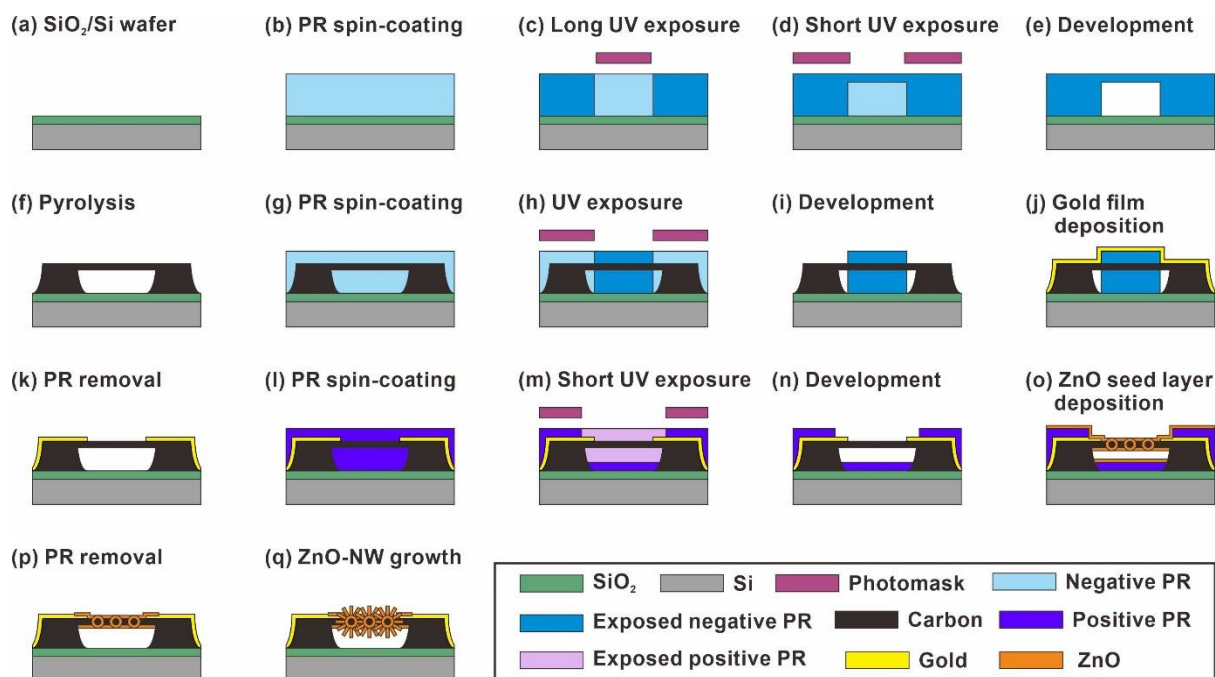


Figure S1. Schematic fabrication steps of suspended carbon nanomesh functionalized with ZnO NWs (PR: photoresist).

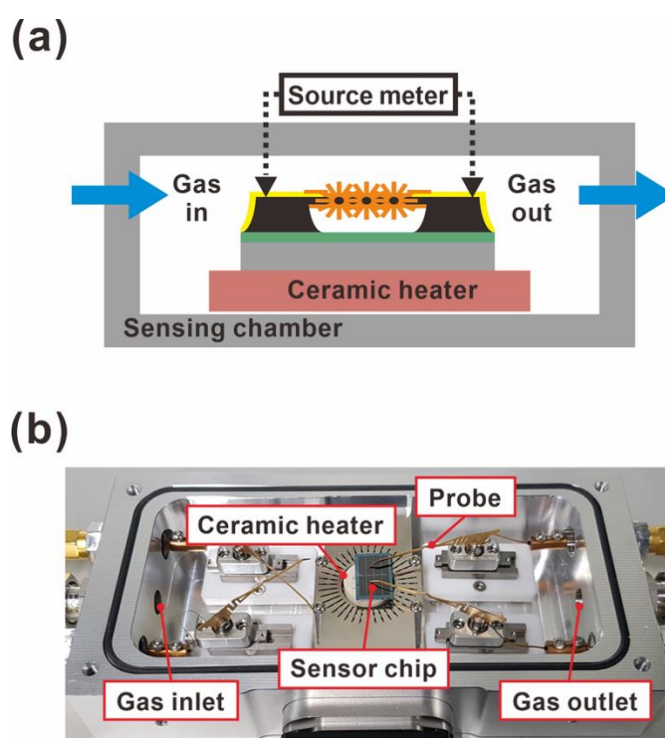


Figure S2. (a) Schematic of gas sensing experiment setup. (b) Photograph of the sensing chamber.

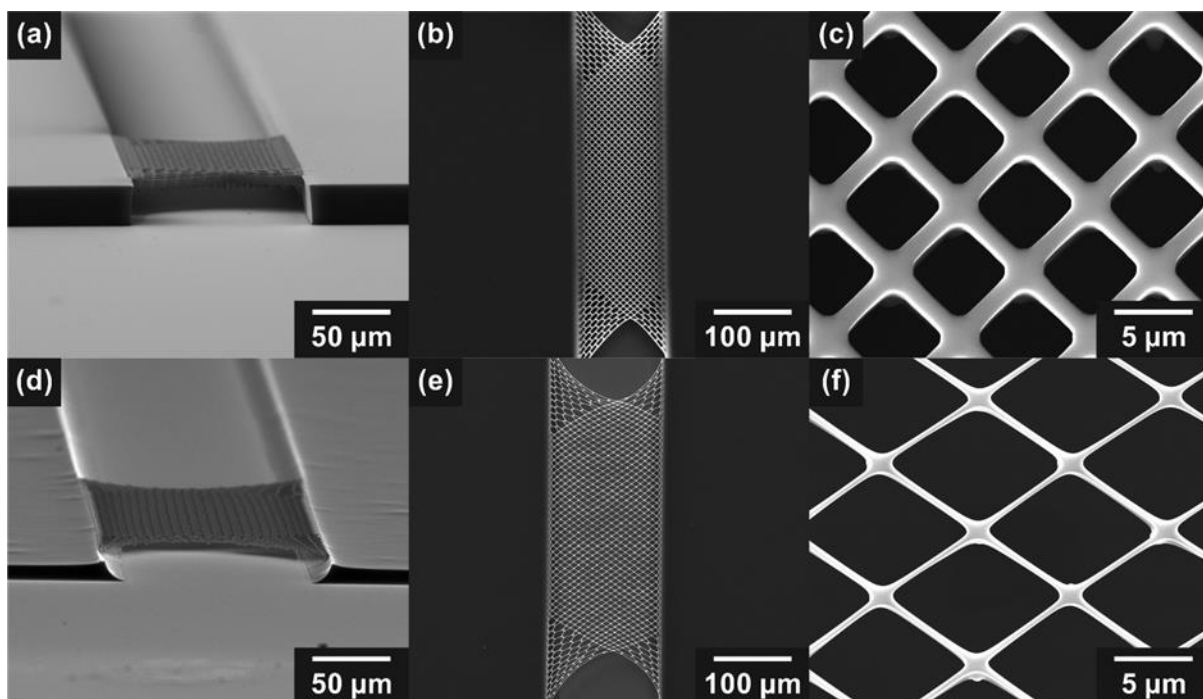


Figure S3. SEM images of (a-c) suspended polymer micromesh before pyrolysis and (d-f) corresponding suspended carbon nanomesh after pyrolysis: (a, d) Bird-eye view. (b, c, e, f) Top view.

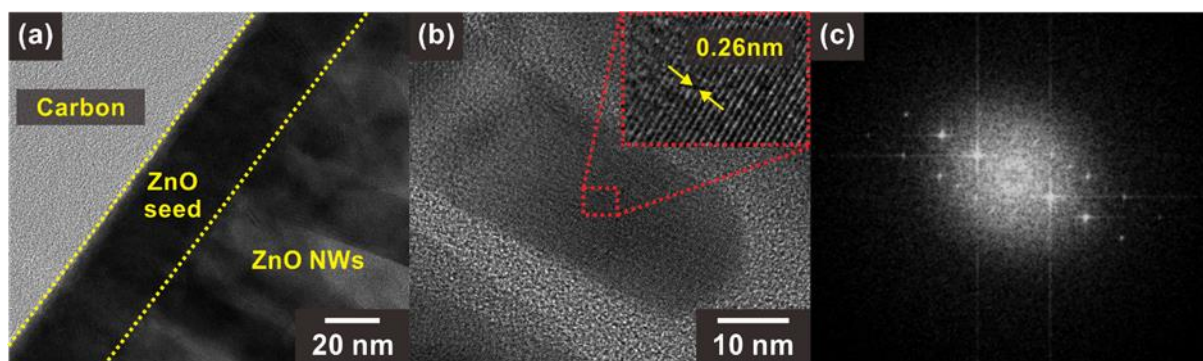


Figure S4. TEM analysis results of ZnO-NWs grown on a carbon pad: (a) TEM image of the overall sample structure, (b) HRTEM image, and (c) corresponding diffraction pattern.

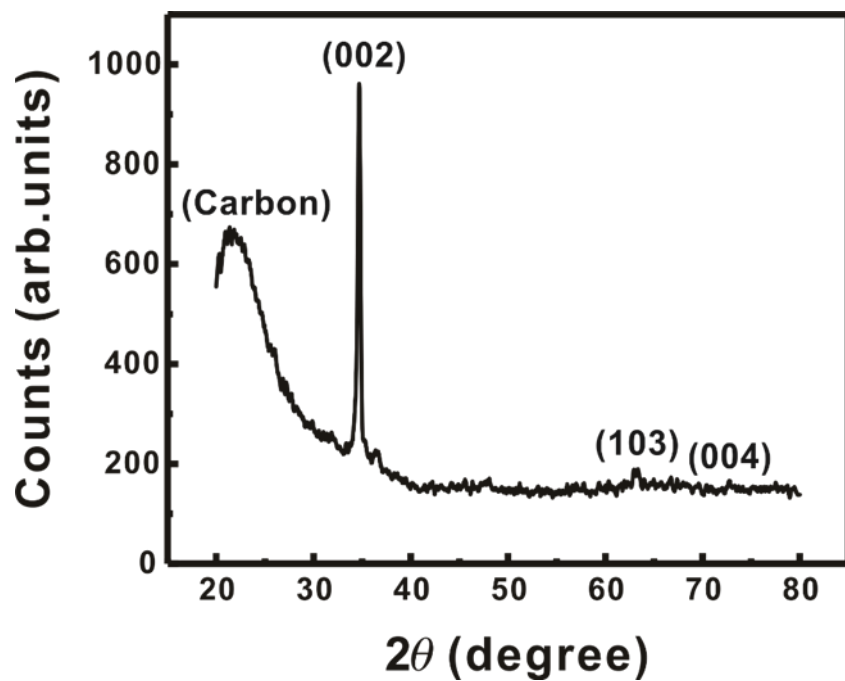


Figure S5. XRD pattern of ZnO NWs grown on a pyrolyzed carbon thin film in the quartz substrate.

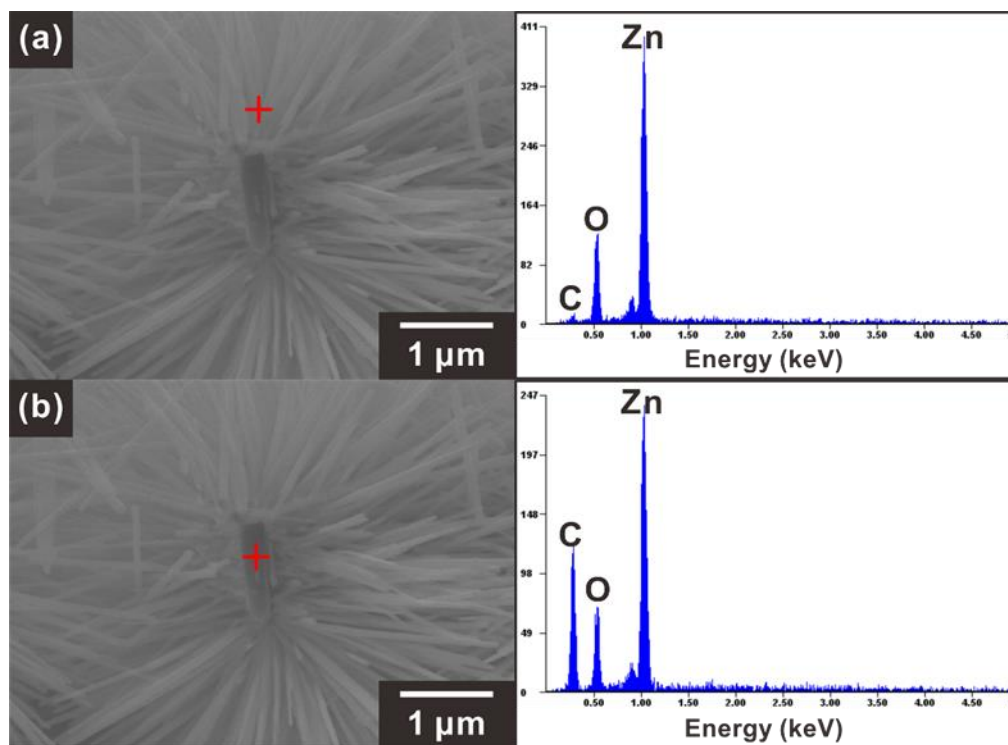


Figure S6. EDS analysis of the suspended carbon nanomesh functionalized with ZnO NWs: Point chemical analysis spectrum from (a) ZnO NWs and (b) carbon nanomesh.

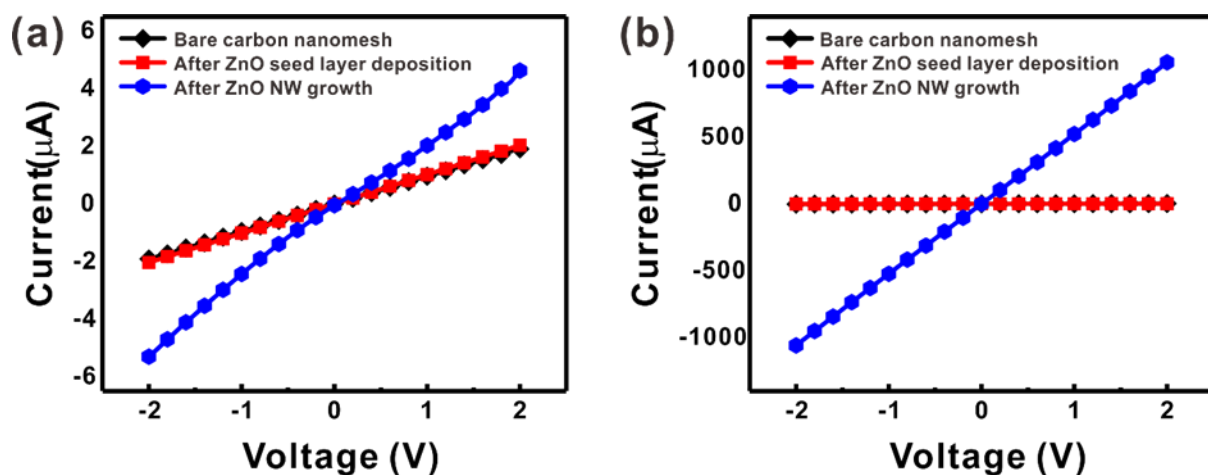


Figure S7. I-V curves of suspended nanomesh structures (black line: bare carbon nanomesh, red line: ZnO seed layer/carbon mesh, blue line: ZnO NWs/ZnO seed layer/carbon mesh) measured at (a) room temperature and (b) 250 °C.

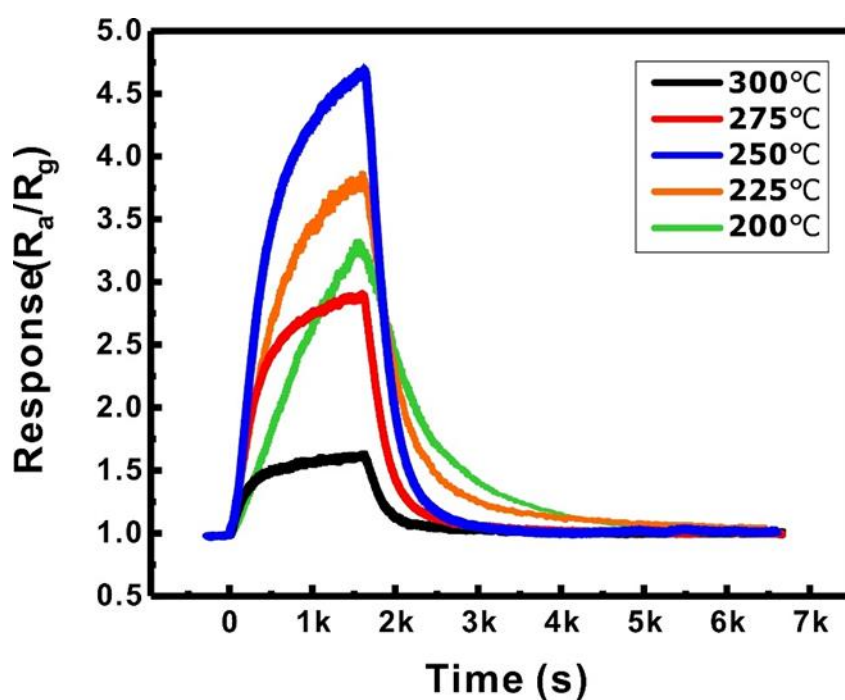


Figure S8. Gas sensing responses of a Type B sensor (ZnO NW junction networks grown on a suspended mesh with small voids) to 500 ppb NO₂ at various operating temperature conditions (200–300 °C).

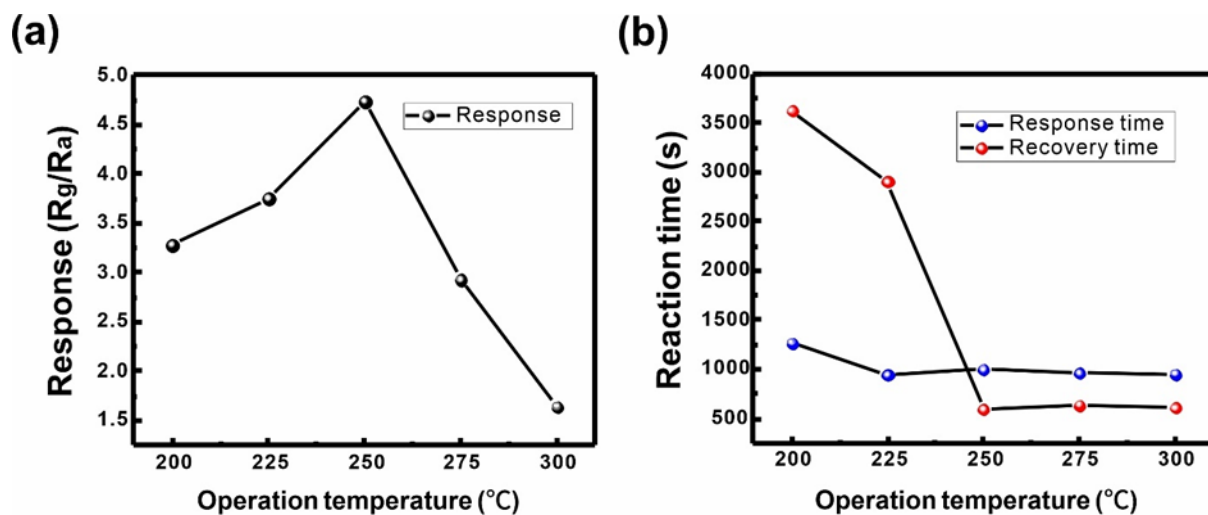


Figure S9. (a) Gas response and (b) response (blue)/recovery (red) time for various operating temperature conditions corresponding to the results shown in Figure S8.