Supporting information

ZnO Rods with Exposed {100} Facets Grown *via* a Self-Catalyzed Vapor-Solid (VS) Mechanism, and Their Photocatalytic and Gas Sensing Properties

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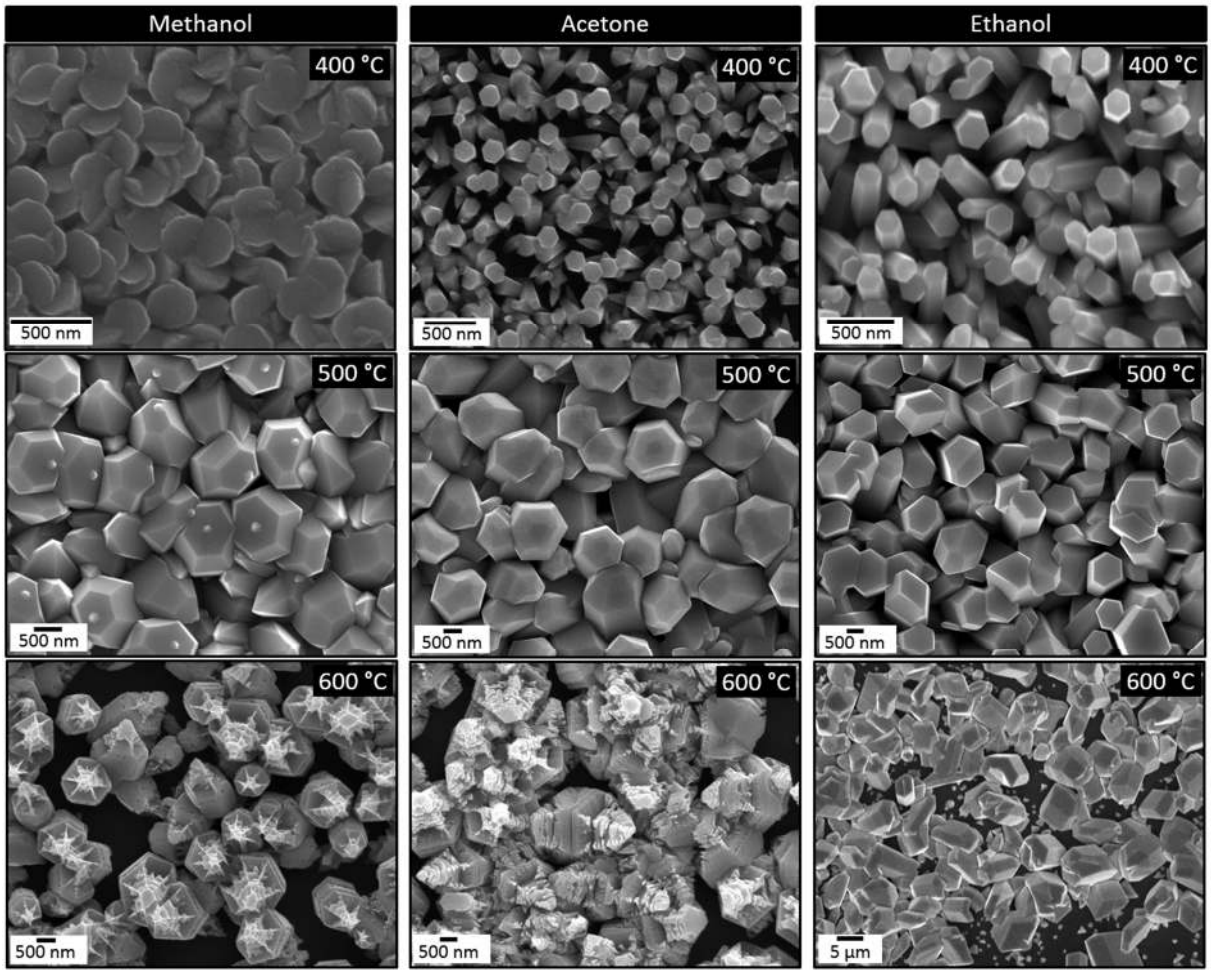

Figure S1. Typical SEM images of the aerosol-assisted chemical vapor deposited ZnO films grown at different temperatures either on silicon or glass substrate.

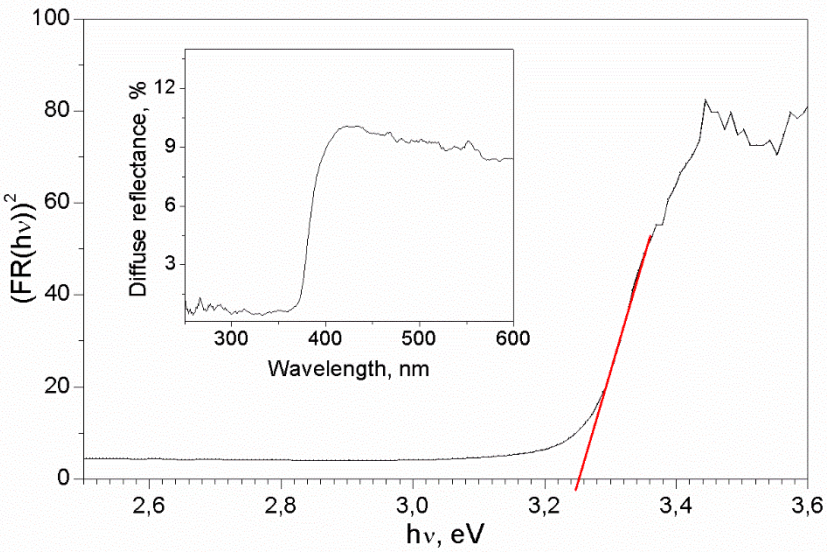

Figure S2. Diffuse reflectance spectra of the ZnO rods (inset) and estimation of the optical bandgap using the Kubelka-Munk method.

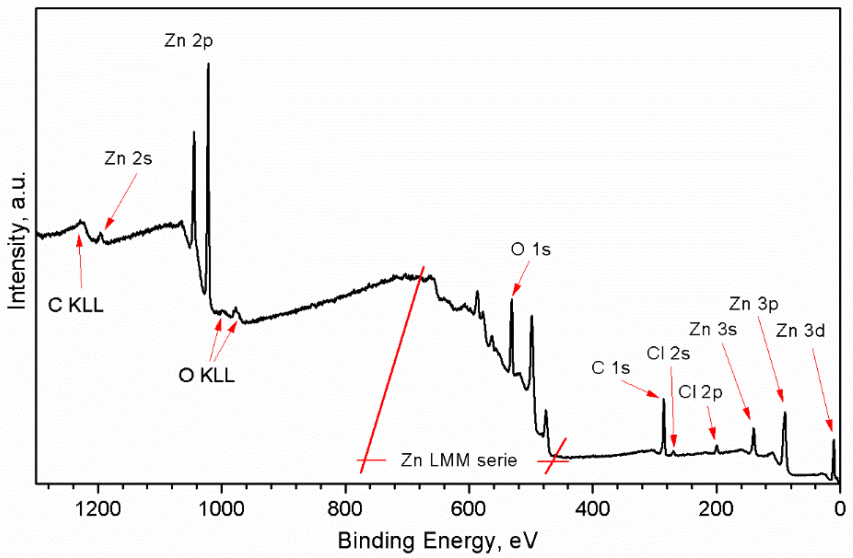

Figure S3. Survey XPS spectra for the aerosol-assisted chemical vapor deposited ZnO rods.

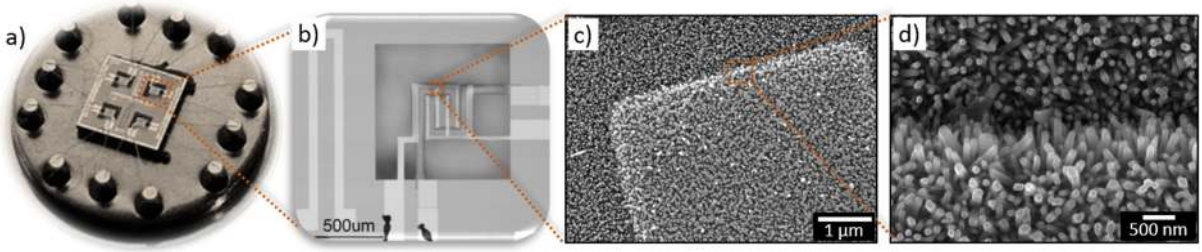

Figure S4. Photograph of the 4-microsensor array mounted on a standard TO8- package (a), view of a single microsensor platform (b), and SEM images at low (c) and high (d) magnification showing one of the electrode-ends of the microplatform and the ZnO rods grown onto it.

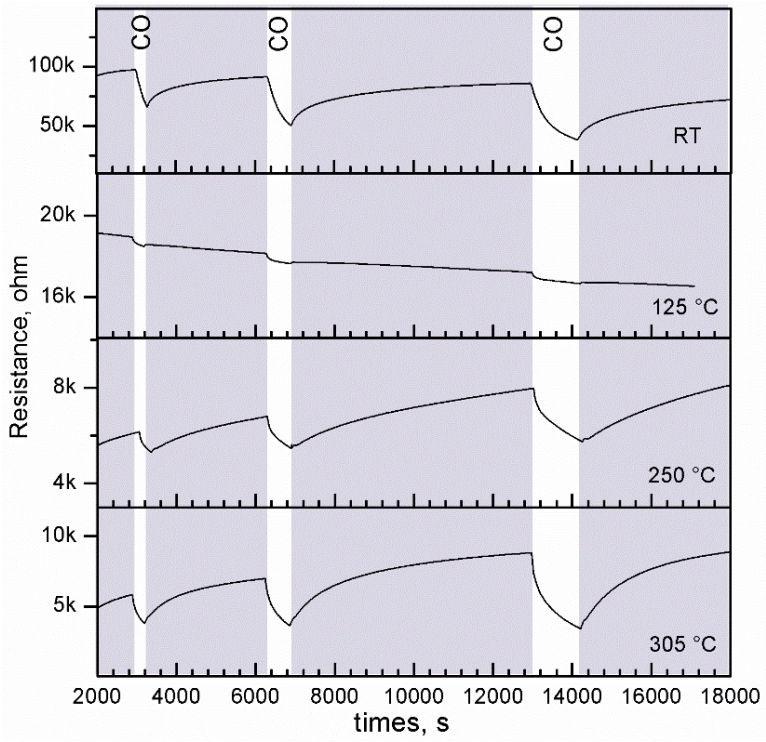

Figure S5. Film resistance changes towards 100 ppm of CO at RT (photoactivated response) and 125 – 305 °C (thermoactivated response).

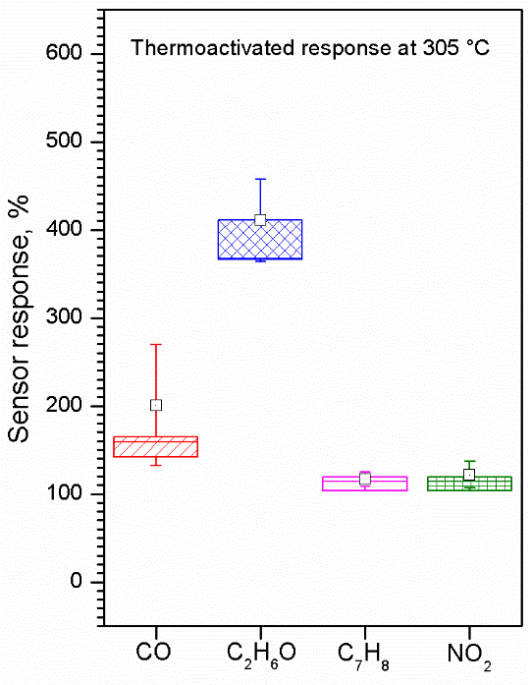

Figure S6. Box plots of the sensor response to 100 ppm of CO, C_2H_6O, C_7H_8 and NO_2 obtained from the thermoactivated tests at 305 °C. Each box displays the median, mean, and upper and lower quartiles (first and third) of the respective distribution. Box whiskers indicate the standard error.

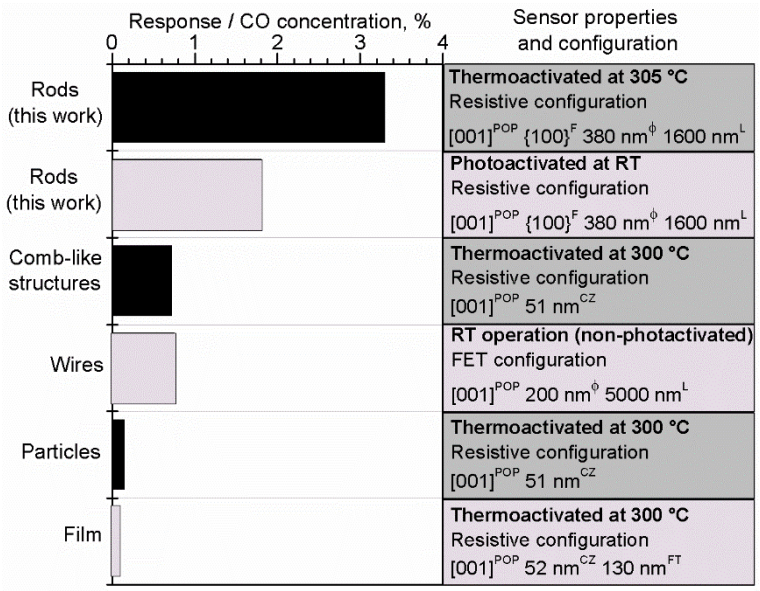

Figure S7. Relative sensor response to ppm concentration of CO and selected sensing test conditions for different chemical vapor deposited ZnO morphologies, including film,[1] particles,[2] wires[3] and comb-like structures.[4] Data is based on the maximum response for the minimum concentration reported in each work, with the response calculated for comparison purposes as R_a/R_g where R_a and R_g, represent the resistance in air and CO, respectively). POP: crystal preferred orientation, F: facets, ϕ: diameter, L: length, CZ: crystalline size, FT: film thickness.

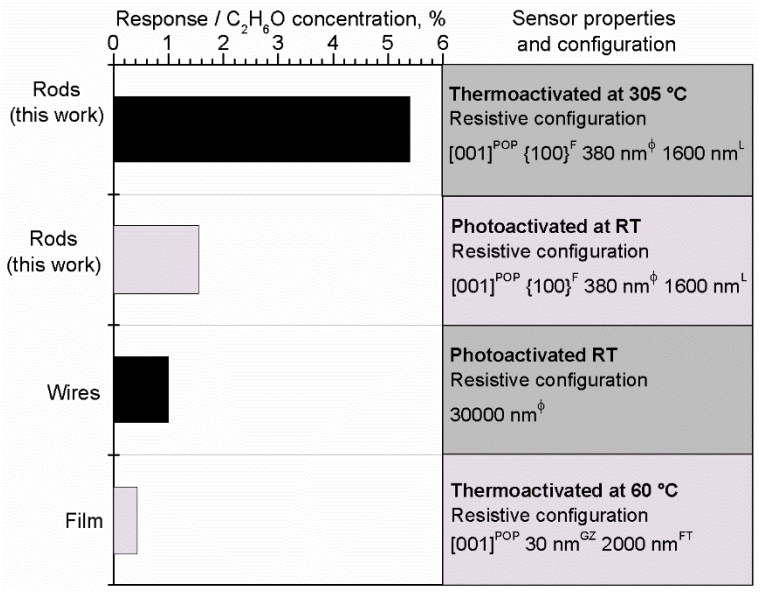

Figure S8. Relative sensor response to ppm concentration of C_2H_6O and selected sensing test conditions for different chemical vapor deposited ZnO morphologies, including film[5] and wires.[6] Data is based on the maximum response for the minimum concentration reported in each work, with the response calculated for comparison purposes as R_a/R_g where R_a and R_g, are the resistance in air and CO, respectively). POP: crystal preferred orientation, F: facets, ϕ: diameter, L: length, GZ: grain size, FT: film thickness.

REFERENCES

(1) Pati, S.; Banerji, P.; Majumder, S. B., MOCVD Grown ZnO Thin Film Gas Sensors: Influence of Microstructure. *Sens. Actuators, A* **2014**, 213, 52-58.
(2) Pati, S.; Maity, A.; Banerji, P.; Majumder, S. B., Qualitative and Quantitative Differentiation of Gases Using ZnO Thin Film Gas Sensors and Pattern Recognition Analysis. *Analyst* **2014**, 139, 1796-1800.
(3) Hung, S. C.; Woon, W. Y.; Lan, S. M.; Ren, F.; Pearton, S. J., Characteristics of Carbon Monoxide Sensors Made by Polar and Nonpolar Zinc Oxide Nanowires Gated AlGaN/GaN High Electron Mobility Transistor. *Appl. Phys. Lett.* **2013**, 103, 083506, 1-4.
(4) Zhang, H.-D.; Long, Y.-Z.; Li, Z.-J.; Sun, B., Fabrication of Comb-Like ZnO Nanostructures for Room-Temperature CO Gas Sensing Application. *Vacuum* **2014**, 101, 113-117.
(5) Hussain, M.; Mazhara, M.; Hussainb, T.; Khan, N. A., High Efficiency ZnO Nano Sensor, Fabrication and Characterization. *J. Iran. Chem. Soc.* **2010**, 7, S59-S69.
(6) Zou, A. L.; Hu, L. Z.; Qiu, Y.; Cao, G. Y.; Yu, J. J.; Wang, L. N.; Zhang, H. Q.; Yin, B.; Xu, L. L., High Performance of 1-D ZnO Microwire with Curve-Side Hexagon as Ethanol Gas Sensor. *J Mater Sci: Mater Electron* **2015**, 26, 4908-4912.