Supporting Information

Hierarchical Nanostructured WO_3–SnO_2 for Selective Sensing of Volatile Organic Compounds

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Limit of Detection (LOD) calculations:

Our present experimental set up limited the lowest detectable concentration of analytes to 400 ppm for ammonia, 180 ppm for ethanol and 1000 ppm for acetone. In order to predict the miniumum detection limit of our sensors, LOD was statistically calculated. The noise of the sensor can be calculated using the variation in the relative resistance change ($R_{air}/R_{analyte}$) of the sensor before it is exposed to any of the three volatile organic compounds (VOCs). We took 20-24 such data points in all three cases (ammonia, ethanol, and acetone) for the calculation. The data was plotted and linearly fitted for ammonia to obtain the curve-fitting equation. The statistical parameters of the linear fit is shown in Figure S1(a). For ethanol and acetone, the $R_{air}/R_{analyte}$ values were fourth order polynomially fitted as can be seen in Figure S1(b,c)

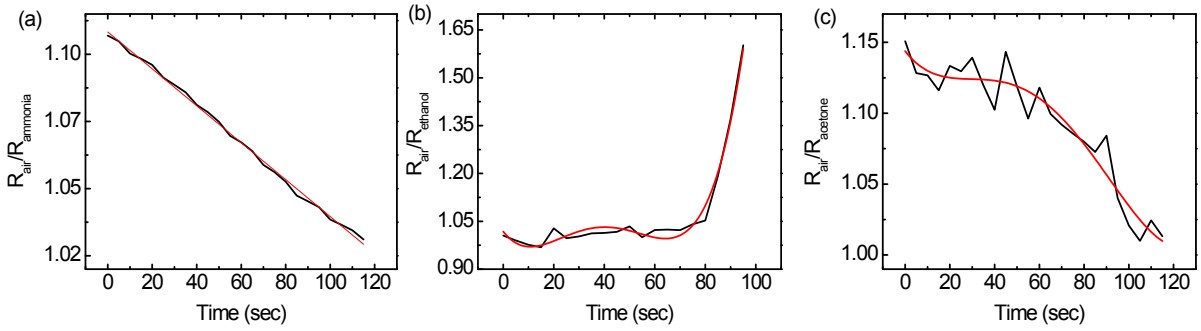

Figure S1. (a) Linear fitted $R_{air}/R_{analyte}$ values for ammonia (b,c)Fourth order polynomial fitted values of $R_{air}/R_{analyte}$ of samples showing optimum response towards ethanol and acetone.

The variations in $R_{air}/R_{analyte}$ for all the three samples were calculated as:

$V_{\chi}^2 = \sum (Y_i - Y)^2$

where Y_i is the measured $R_{air}/R_{analyte}$ values and Y is the value obtained by curve-fitting equations, linear fitted in case of ammonia and fourth order polynomial fitted for ethanol and acetone.

The root mean square noise was then calculated as:

$rms_{noise} = \sqrt{(V_{\chi}^2/N)}$

where N is the number of data points taken (in case of ammonia and acetone it is 24 and 20 for ethanol).

The rms_{noise} values were calculated to be 0.004848, 0.019227, and 0.011635 for ammonia, acetone and ethanol respectively. Further, LOD was calculated as:

$LOD = 3 \times rms_{noise}/ slope$

The value of slope was found from the linear fitted response vs. concentration plot [Figure 8(d−f)] in main manuscript. In our case the values of the slope were found to be 0.028 for ammonia, 0.43855 for ethanol, and 0.013 for acetone. Thus the LOD of the WO_3−SnO_2 mixed metal oxides were estimated to be 520 ppb, 131 ppb, and 2.6846 ppm for ammonia, ethanol and acetone, respectively.