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**Room temperature volatile organic compound gas sensor based on Vanadium oxide
1-Dimension nanoparticles**

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Abstract

We report the structural properties of Vanadium dioxide (VO₂) nanorods prepared using aqueous solution of vanadium pentoxide, as the starting material before hydrothermal synthesis at 240 °C for 2 days. The XRD data reveal sharp peaks and intense diffraction which demonstrates that the sample is crystallized with strong constructive interference. The conductometric alcohol sensor signal (5-100 ppm) was obtained at room temperature for acetone, methanol, toluene and formaldehyde. The sensor offered promising response characteristics towards alcohols where for 10 ppm of acetone, methanol, toluene and formaldehyde, response magnitude was observed to be 1.5%, 2.7%, 5.5% and 6%, respectively; while for high concentration, the response and recovery magnitude were dominant for methanol with 7.5 % and 8.0 % respectively. The selectivity of the sensor for methanol and formaldehyde are optimum with high and low concentrations. It can be seen that the sensitivity response of VO₂ at room temperature increases to the largest sensitivity for high concentrations of methanol while having higher sensitivity for formaldehyde vapor less than 10 ppm with dominant n-type behavior.

Keywords: Nanostructures; Sensitivity; Vanadium oxide; Volatile Organic Compounds; Nanorods; Sol-gel growth.

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