World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:11, No:07, 2017

Ordered Mesoporous WO_3-TiO_2 Nanocomposites for Enhanced Xylene Gas Detection

Authors : Vijay K. Tomer, Ritu Malik, Satya P. Nehra, Anshu Sharma

Abstract : Highly ordered mesoporous WO_3-TiO_2 nanohybrids with large intrinsic surface area and highly ordered pore channels were synthesized using mesoporous silica, KIT-6 as hard template using a nanocasting strategy. The nanohybrid samples were characterized by a variety of physico-chemical techniques including X-ray diffraction, Nitrogen adsorption-desorption isotherms, and high resolution transmission electron microscope. The nanohybrids were tested for detection of important indoor Volatile Organic Compounds (VOCs) including acetone, ethanol, n-butanol, toluene, and xylene. The sensing result illustrates that the nanocomposite sensor was highly responsive towards xylene gas at relatively lower operating temperature. A rapid response and recovery time, highly linear response and excellent stability in the concentration ranges from 1 to 100 ppm was observed for xylene gas. It is believed that the promising results of this study can be utilized in the synthesis of ordered mesoporous nanostructures which can extend its configuration for the development of new age e-nose type sensors with enhanced gas-sensing performance.

Keywords : nanohybrids, response, sensor, VOCs, xylene
Conference Title : ICCMS 2017 : International Conference on Chemistry and Materials Science
Conference Location : Zurich, Switzerland
Conference Dates : July 27-28, 2017