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Gas Sensing Properties of Hybrid SnO_2/Carbon Nanotubes AZLIN BIAGGI-LABIOSA, LAURA J. EVANS, JENNIFER C. XU, GARY W. HUNTER, NASA Glenn Research Center, GORDON BERGER, National Center for Space Exploration Research, FRANCISCO SOLA, NASA Glenn Research Center — Chemical sensors involving nanostructured materials can be developed into sensor systems with unique properties and improved performance. One approach is to combine different nanomaterials in order to form hybrid structures with properties different than that of the constituent materials. Hybrid nanostructures consisting of tin oxide (SnO_2) nanocrystals distributed on the surface of multiwalled carbon nanotubes (MWCNTs) and singlewalled carbon nanotubes (SWCNTs) were fabricated and incorporated on a sensor platform in a controlled and efficient manner with a novel approach that combines dielectrophoresis with standard microprocessing techniques. Current vs. voltage and current vs. temperature curves were taken at different concentrations of hydrogen (H_2), hydrocarbons and nitrogen oxides (NO_x) at various operating temperatures for the hybrid nanostructures and were compared with their counterparts without SnO_2 nanocrystals. The tests showed that the hybrid nanostructures exhibit room temperature sensing capability when exposed to low concentration gases in contrast to the high operating temperature typically required for SnO_2 nanocrystals alone. High resolution electron microscopy and electron energy-loss spectroscopy will also be presented.

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