NANOSTRUCTURED $ZnSnO_3$ FOR CONDUCTOMETRIC ROOM TEMPERATURE GAS SENSORS

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ABSTRACT

Over the last few decades, the health effects of air pollution have been extensively studied. The contemporary way of life, characterized by the combustion of fossil fuels and emissions from transportation constitutes the primary reason for changes in atmospheric composition. Among the toxic, explosive, and corrosive gases, ozone in the lower atmospheric layer is produced through the photochemical degradation of carbon monoxide and volatile organic compounds (VOCs) in the presence of NO2, leading to health problems for humans, animals, and vegetation.

In the present work, we describe a simple hydrothermal process for the synthesis of $ZnSnO_3$ nanoparticles. Furthermore, we prepared inks and pastes based on these nanoparticles. The gas sensing performance of the $ZnSnO_3$ was investigated, while the physicochemical properties of $ZnSnO_3$ nanoparticles were studied to determine their contribution to the gas sensing mechanism. The $ZnSnO_3$-based gas sensor was tested for low concentrations of carbon dioxide, hydrogen, methane, and ozone gases, demonstrating high response, fast sensing rates, full reversibility, low detection limits and an enhanced selectivity towards O_3.

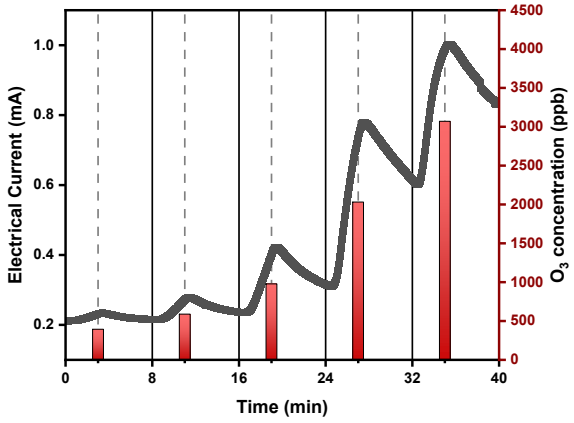

Figure 1. *Electrical current variations under different ozone concentrations.*

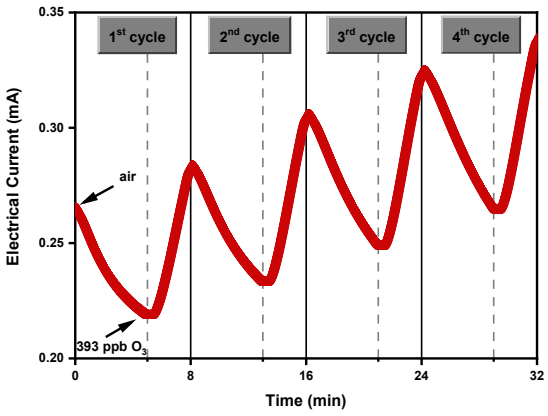

Figure 2. *The repeatability of the $ZnSnO_3$ -based sensor towards 343 ppb ozone.*

KEYWORDS: ozone, gas sensor, $ZnSnO_3$, room temperature

ACKNOWLEDGEMENTS

The project “Interconnected Smart Cities for Greece 2.0” (project code: TAEDR-0536642) is being implemented within the framework of the Action “Flagship Actions in interdisciplinary scientific areas with special interest in connecting with the productive fabric,” Greece 2.0 – National Recovery and Resilience Plan.

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