

An Empirical Approach to NO₂ Gas Sensing Properties of Carbon Films Fabricated by Arc Discharge Methane Decomposition Technique

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Abstract : Today, the use of carbon-based materials such as graphene, carbon nanotubes, etc. in various applications is being extensively studied by researchers in the field. One of such applications is using them in gas sensors. While analytical investigations on the physical and chemical properties of carbon nanomaterials are the focal points in the studies, the need for experimental measurements on various physical characteristics of these materials is deeply felt. In this work, a set of experiments has been conducted using arc discharge Methane decomposition attempting to obtain carbonaceous materials (C-strands) formed between graphite electrodes. The current-voltage (I-V) characteristics of the fabricated C-strands have been investigated in the presence and absence of two different gases, NO₂ and CO₂. The results reveal that the current passing through the carbon films increases when the concentrations of gases are increased from 200 to 800 ppm. This phenomenon is a result of conductance changes and can be employed in sensing applications such as gas sensors.

Keywords : carbonaceous materials, gas sensing, methane arc discharge decomposition, I-V characteristics

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