

Abstract

Humidity and CO₂ Sensing Using a Graphene Film-Based Sensor Obtained by Using Liquid-Phase Exfoliation [†]

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Detection of humidity levels is a very important and ubiquitous process in the many fields of human activity. Medicine, various types of industry, weather forecasts and everyday life require humidity sensing to obtain important information for decision making and monitoring of future trends. We present our work in the development of a humidity sensor based on an ultra-thin graphene layer obtained by using liquid-phase exfoliation. The fabricated sensor showed very good responsivity at various humidity levels, while at the same time, having very short response and recovery times [1]. The sensor was also capable of detecting human finger proximity, thus opening the possibility of use in touch screen applications. The detection of CO₂ levels was achieved using a sensor made out of a sulfonated polyaniline (PANI)-functionalized graphene layer [2]. The sensor was capable of detecting low CO₂ levels, between 300 ppm and 10,000 ppm, while at the same time, showing a full dynamic range, from zero to 100% CO₂ in the atmosphere under normal conditions (1 bar, 20 °C). In the same development process, we applied a specially devised numerical analysis by which it was possible to obtain a real-time read-out of the adsorption-based sensor.

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