

A facile growth of few-layer Graphene using chemical vapour deposition for gas sensing applications

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Abstract

A two-dimensional (2D) atomically thin layer novel material called Graphene, having a high surface to volume ratio due to its planar structures in which carbon atoms are arranged in a honeycomb hexagonal lattice [1,2]. Graphene having the large active surface area which is widely useful for gas sensing applications. Toxic gases are harmful to human beings and animal life, to tackle this problem we need a sensor to detects the minutes of gases. In gas sensing process, absorption and desorption mechanism takes place on the surface of Graphene, it is known as surface phenomena [3]. In this work, we have followed the bottom-up approach for the synthesis of graphene using the low-pressure chemical vapour deposition (LP-CVD). We have fabricated the pristine Graphene (Gr) and Graphene-Ag NPs (silver nanoparticles)(Gr-Ag NPs) sensors. In characterizations, we have performed the Scanning electron microscope (SEM) and transmission electron microscope (TEM) for the analysis of morphology and internal structure. Raman spectroscopy, to investigate the quality and graphitic nature along with the electronic properties of the as-synthesized sensors [4]. When analyte particles are attached on the surface of graphene then it changes the electronic properties of the graphene sheet. In gas sensing, we measure the responsivity, recovery time, sensitivity, stability, and repeatability of the as-synthesized sensors.

References

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Figures

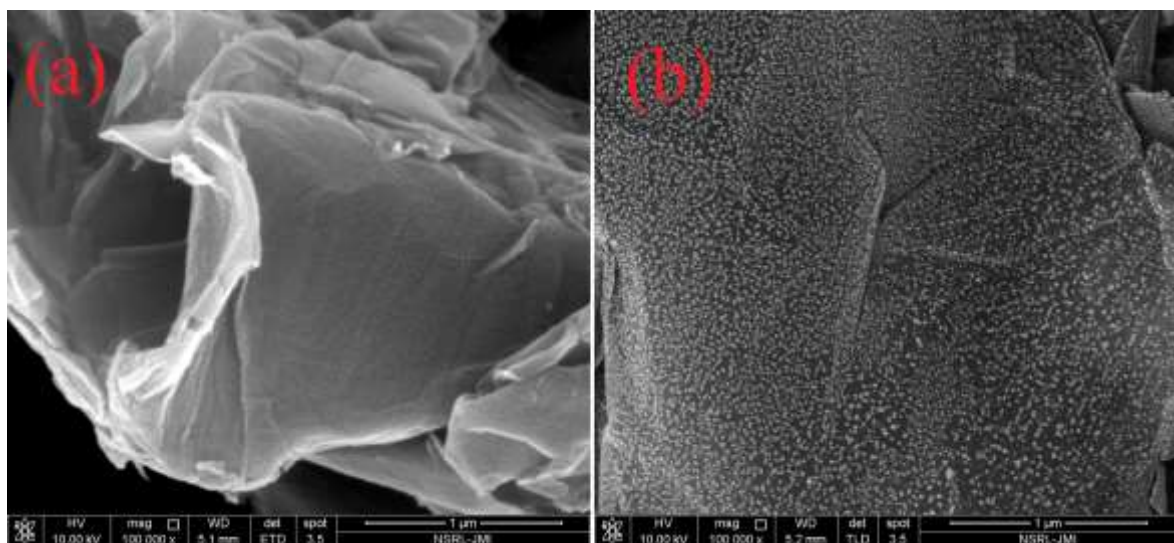


Figure 1: SEM micrograph of as-synthesized (a) pristine graphene (Gr) and (b) graphene with silver nanoparticles (Gr-Ag NPs) at 1µm scale bar.