Tin Oxide-reduced Graphene Oxide Nanocomposites for Chemiresistive E-nose Application

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Abstract

Gas sensors are the vital components in various fields such as environmental monitoring, industrial safety, and human safety. The simultaneous detection of multiple gases using individual gas sensor face the limitation to monitor the individual gas concentration, which is being overcome by implementing the array of sensors. The use of multiple sensors offers the improved classification efficiency, as the information missed by one sensor can be compensate by the others by providing the sanity check. The development of the electronic nose (E-nose) and its various configurations is being taken place in diverse applications. Chemiresistive metal oxides-based gas sensors serve as a promising candidate for gas detection due to their low cost, simplicity and high sensitivity [1,2]. The present work reports the synthesis of SnO_2-rGO nanocomposites towards chemiresistive gas sensors development for E-nose application. The SnO_2-rGO nanocomposites was synthesized by hydrothermal route. The XRD pattern of the synthesized SnO_2-rGO nanocomposites shows characteristics peaks for tetragonal structure of SnO_2. The hydrothermal reduction of GO was confirmed by analysing the Raman analysis with characteristics D-band and G-band observed at1350 cm^{-1} and 1605 cm^{-1} respectively. The fabricated sensors are further being tested at lower temperature gas sensing, i.e. below 50°C.

References

[1] A. Shakoor, J. Hussain, S. Siddique, M. Arshad, I. Ahmad, Y. A. Haleem, A. Abrar, and S. A. Shah, *Applied Nanoscience*, 14(12) 2024) 1125–1137.
[2] Y. Chen, M. Yuan, Y. Zhang, X. Wang, F. Ke, and H. Wang, *Journal of Alloys and Compounds*, 931 (2023) 167585.

Figures

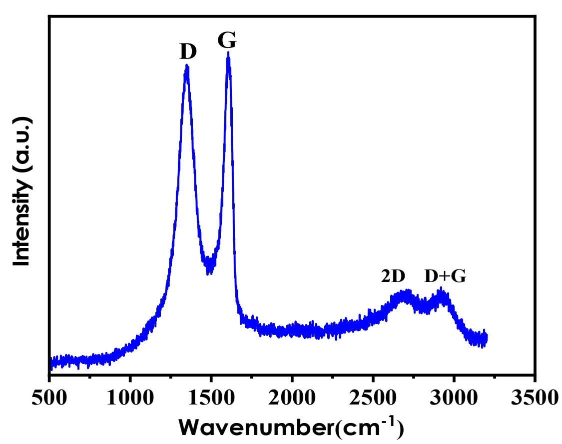

Figure 1: Raman spectra of SnO_2-rGO Nanocomposite.