Studies on Tungsten Trioxide Nanosheets Synthesized via Precipitation Route for NO_x Sensing Application

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Abstract
Tungsten oxide (WO_3) is a semiconducting material with significant potential for gas sensing application. In this study, we report a straightforward method for synthesizing 2D nanosheets of tungsten trioxide (WO_3) via a precipitate route. Furthermore, the systematic investigations were made towards the improved gas sensing capabilities of these 2D nanostructures for NOx vapours. The use of WO_3 nanosheets demonstrate the provision of efficient gas diffusion routes via a meticulously arranged mesoporous framework. Hence, it leads to a significant improvement in the sensing response towards NOx. The analysis of the sensing capabilities demonstrates that the response of the sensor is influenced by variations in operating temperature and gas concentration. The gas sensing properties are explained through the structural and morphological properties of the developed 2D nanostructures. The present work provides foundational insights into the influence of synthesis and deposition methods on the gas sensing behaviour of WO_3 and highlights potential strategies for improving sensor sensitivity and selectivity for practical applications.

References

[1] Comini, E., Faglia, G., Sberveglieri, G., Chemical Society Reviews, 49, (2020) 2233–2249.
[2] W. Fang, Y. Yang, H. Yu, X. Dong, T. Wang, J. Wang, Z. Liu, B. Zhao, M. Yanga, RSC Adv., 6, (2016), 106880-106886.

Figures

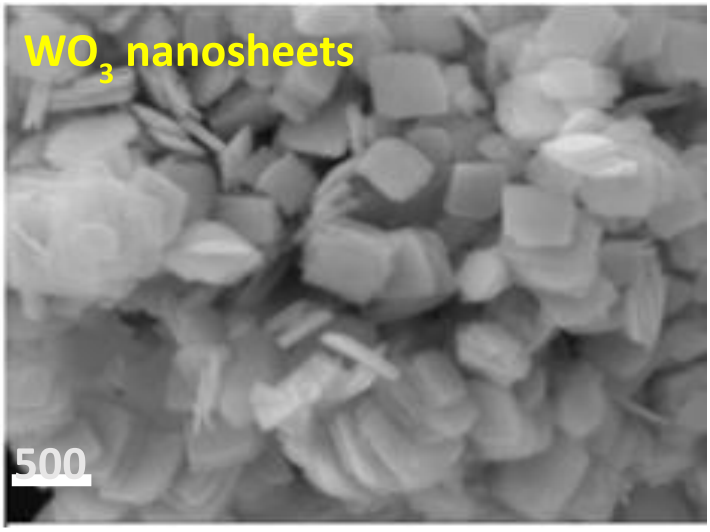

Figure 1: FE-SEM micrographs of WO_3 nanostructures.