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Impedimetric detection of alcohol vapours using nanostructured zinc ferrite

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Abstract

A comparative study on the sensing characteristics of nanostructured zinc ferrite to three primary alcohols *viz.* methanol, ethanol and propanol has been carried out. The zinc ferrite has been prepared by combustion method and characterized by XRD, FTIR, AFM and SEM. Impedance studies in the alcohol concentration range varying from 100 to 1000 ppm show definite variations in response to both the nature of the alcohol and its concentration. The nanostructured zinc ferrite shows the highest sensor response to methanol and least to propanol. Equivalent circuit modelling and calibration have been made for all the three alcohol sensors. The material shows a better selectivity to the alcohols compared to formaldehyde, ammonia and acetone vapours.

Highlights

- Zinc ferrite nanopowder was prepared by combustion method and characterized by XRD, FTIR, SEM and AFM techniques.
- Impedance technique was used to develop sensors for methanol, ethanol and propanol.
- The material shows a higher sensitivity to methanol than to ethanol and propanol.

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