ZnO-P3MT NANOCOMPOSITE FOR VOLATILE TOXIC COMPOUNDS AND DISEASE MARKERS SENSING

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Keywords

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Actuality and aim

Monitoring of toxic volatile organic (VOC) and inorganic compounds and disease markers concentrations to ensure that they are within safe limits is important for chemical safety and maintaining health of leaving organisms. Based on their concentration in a surrounding air and person's breath, it is possible to estimate both the chemical threats in the environment and lung cancer [1], diabetes, the rate of body fat loss, the state of metabolism, etc. [2] of a human. Therefore, it is very important to prepare a gas sensor that can monitor the volatile compounds at low levels of concentration. In this work, a highly sensitive ZnO-P3MT nanocomposite was synthesized and studied for the fast detection of low concentrations isopropanol, acetone and ammonia.

Methods

FTIR, TEM, thermogravimetry, conductivity and gas sensing

Results

The nanocomposites ZnO-P3MT with different ratio of metal oxide to monomer were synthesized. The molecular structure, morphology, thermal properties, conductivity and sensory properties of P3MT in these nanocomposites were confirmed and studied by FTIR spectroscopy, transmission electron microscopy (TEM), thermogravimetry and conductivity measurements. It was found that the composition of the ZnO/P3MT nanocomposites made a huge impact on their conductivity and sensory characteristics. The ability of a gas sensor based on this composite to detect isopropanol, acetone and ammonia at a level of several ppm has been demonstrated.

Conclusions

The new sensing ZnO-P3MT nanocomposites have been synthesized These nanocomposites reveal the strong dependence of their morphology, molecular structure, conductivity, thermostability and sensor behavior on the contents of the P3MT. Sensor characteristics potentially suitable for monitoring VOC in environmental and medical applications have been achieved.

References

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