Synthesis and Characterizations of Ferrite Nanomaterials for Phenyl Hydrazine Chemical Sensor Applications

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Abstract

This paper presents the synthesis, characterization and phenyl hydrazine chemical sensing applications of Cd0.5Mg0.5Fe2O4 ferrite nanoparticles. The nanoparticles were synthesized by facile and simple co-precipitation method and characterized in detail in terms of their morphological, structural, compositional and electrical properties. The detailed characterization studies revealed that the prepared nanoparticles are grown in high density, possessing Cd0.5Mg0.5Fe2O4 composition and exhibiting spinel cubic structure. Moreover, the prepared Cd0.5Mg0.5Fe2O4, ferrite nanoparticles were used as efficient electron mediators for the fabrication of high-sensitive, robust, reliable and reproducible phenyl hydrazine chemical sensor by simple I V technique. The fabricated chemical sensor exhibits a highsensitivity of 7.01 mu A mM(-1) cm(-2) with an experimental detection limit of 3.125 mM in a short response time of similar to 10.0 s. This work demonstrates that Cd0.5Mg0.5Fe2O4 ferrite nanoparticles can efficiently be utilized for the fabrication of highly sensitive and reliable chemical sensors.

Keywords

Author Keywords: Ferrite; Nanomaterial; Sensor; Phenyl Hydrazine
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