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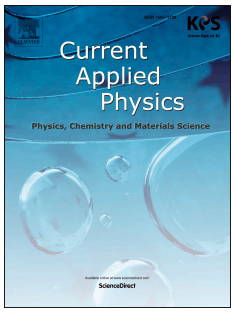

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Liquid petroleum gas sensing performance of Polyaniline-Carboxymethyl cellulose composite at room temperature

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Abstract

In the present research, liquid petroleum gas (LPG) sensing properties of polyaniline-carboxymethyl cellulose (PANI-CMC) composite have been investigated. For the purpose of investigation, PANI and PANI-CMC composite are synthesized at room temperature by chemical polymerization of aniline without/with CMC. The prepared materials are characterized by X-ray diffraction (XRD) and Scanning electron microscopy (SEM) techniques. Shift in d-space of PANI in the composite as confirmed by its XRD analysis suggests ordered PANI chain arrangement in the composite. Surface morphology and size of the particles are studied by SEM technique. Nature of the material and mechanism of conduction of both PANI and PANI-CMC composite are investigated by studying complex plane impedance plot in the frequency range of 10^2 - 10^6 Hz. Based on structural characterizations and impedance studies, sensitivity of PANI and PANI-CMC composite to LPG at room temperature are tested and compared. Further, to examine the efficiency of the composite as a sensor, its stability, recovery and response time have also been studied with a special focus on its ability to work at room temperature.

Keywords: Polyaniline, Carboxymethyl cellulose, Liquid petroleum gas, Complex plane impedance plot, Sensitivity.

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