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Synthesis of polymer composites thin films of Cr₂O₃ nanoparticles and study of its optical and electrical properties

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Cr₂O₃ nanoparticles were synthesized by biological method using neem plant extract. The synthesized nanoparticles are characterized by SEM, UV-Vis, FT-IR and XRD methods. The size of the nanoparticles were shown to be 35.5nm. This synthesized Cr₂O₃ nanoparticles were embedded in PVA polymert. The strustural, electrical and optical properties of nanocomposite films were studied experimentally. The effect of concentration of PVA on PVA films and concentration of Cr₂O₃ nanoparticles were studied. The structural properties are studied using X-ray diffraction, SEM and FT-IR spectra. Optical property is studied using UV-Vis spectroscopy. Results showed number of Braggs planes in the structure of polymer and its crystallinity are increased noticebly. The λ max of Cr₂O₃ nanoparticles undergoes a blue shift toward the lower wavelength after embedding. Scanning electron microscopy shows that the prepared Cr₂O₃ nanoparticles were dispersed and nearly uniform in diameter within the polymeric matrix. Frequency dependent conductivity, photo-voltaic activity and viscosity measurements of PVA and PVA/Cr₂O₃ nanocomposites films/ solutions are also compared. The induced structural changes are revealed through XRD and FT-IR spectroscopy. The synthesized Cr₂O₃ nanoparticles showed very good biological activity and acts as a catalyst for KMnO₄ decomposition with the evolution of O₂, which plays an important role in renewable source of energy.

Biography

Venkatesha B. M. has completed his PhD at the age of 30 years from University of Mysore and joined as lecturer in Chemistry University of Mysore. At present, he is the Associate professor and co-ordinator for post graduate dept of Chemistry, Yuvaraja's college, University of Mysore, Mysuru. He has served as Head of the Department of Chemistry, Chairman and Member of BOS and BOE for Yuvaraja's college (Atonomous), University of Mysore as well as other universities like Bangalore University, Tumkur University and Kuvempu University. He has successfully guided three candidates towards their PhD degree and published more than 32 research papers in reputed journal.

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