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Synthesis and preparation of nanocomposites of metal oxide and metal sulphide by electrochemical, hydrothermal and biological method: Its application for polymer nanocomposites, antibacterial, photo-voltaic and as photocatalyst

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Different doped metal oxides and metal sulphides like Ru:ZnS, Nb_2O_5/ZnO, Se:ZnS, Co:ZnO, Mo:ZnO, In_2O_3/SnO/ZnO are synthesized by electrochemical, hydrothermal and Cr_2O_3 by biological method which offers precise particle size, crystallinity and reduced band gap. All the synthesized Nanomaterials were characterized by XRD, SEM-EDS, UV-Vis, EDAX, IR, DLS and impedance spectroscopy. The photocatalytic activity for these nanocatalysts was evaluated by the degradation of textile dyes and textile industry effluents in aqueous solutions under UV and sunlight. Optimal catalyst loading, dye concentration, effect of temperature, pH and degradation by re-used samples were studied. The synthesized materials showed enhanced electrical, photo-voltaic and biological effect. A few synthesized nanocatalysts were used in the synthesis of organic compounds. The kinetics of photodegradation was studied with respect to measurement of COD. Anti-bacterial study was carried out by zone inhibition and fluorometric method. The polymer composites (PEO:Se/ZnS, PVA:Cr_2O_3, PVA:Mo/ZnO, PVA:Co/ZnO and PEO:Cd/ZnO etc.,) were prepared by casting method and its electrical, optical and viscosity properties were studied. The synthesized materials play an important role in waste treatment, photo-voltaic and biological applications.

Biography

Sannaiah Ananda MSc, PhD, has more than 30 years of teaching and research experience. Presently, he is working as a Professor in Department of Chemistry, University of Mysore, Karnataka, India. He has published about 140 research articles in reputed international journals in the area of Chemical Kinetics, Bio-physical Chemistry and Nano Chemistry. At present, he is working on the synthesis of nano materials by Solvothermal, hydrothermal, electrochemical and biological, sol-gel method. He worked as a Research Associate in Tokyo Institute of Technology, Japan. He has visited several countries like China, France, Japan and Singapore for paper presentation in conferences. He is principle Investigator and Co-investigator for many projects sponsored by UGC, DST-PURSE, UPE, CPEPA and IOE. He has guided 15 candidates for PhD degree and 04 candidates towards MPhil degree. He has been the Academic Council Member, Chairman and Member of Board of Education (BOE), Board of Studies (BOS) for University of Mysore and Governing Council Member for many colleges.

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