

Chemistry 2016: Catalytic, Biological Activity and Thermal Behaviour of Triphenylphosphine Capped Zinc Sulfide Nanoparticles - S.K.Mehta, Shashi Bala Kalia, Manjeet Sharma, Punjab University and Himachal Pradesh University, India

S.K.Mehta, Shashi Bala Kalia, Manjeet Sharma, Punjab University and Himachal Pradesh University, India

E-mail: skmehta@pu.ac.in

Abstract

Synthesis of ZnS nanoparticles in toluene solution using triphenylphosphine as capping agent has been carried out. EDAX analysis confirmed the composition of zinc sulphide nanoparticles. Field Emission Scanning electron microscope images revealed that zinc sulphide nanoparticles are of spherical shape. TEM study showed spherical mono dispersed particles ranging in size 13-19 nm. XRD spectrum peaks corresponding to (111) and (220) show that the zinc sulphide nanoparticles are crystalline in nature having zinc blende structure. FTIR spectroscopy shows the presence of triphenylphosphine as capping agent. Surface plasmon resonance peak at 293 nm in the UV spectrum indicates presence of zinc sulphide nanoparticles which correspond to band gap of 4.23 eV. Room temperature photoluminescence spectrum of the powder showed three peaks centred on 325 nm (3.81 eV), 397 nm (3.12 eV) and 425 nm (2.91 eV). Thermal behaviour of nanoparticles exhibited single step decomposition (84 %) between 250 oC to 350 oC and ZnS as final residual product (16%). Degradation efficiency of the nanoparticles for dyes methyl orange, Congo red and rodamine G6 after 3 h irradiation time was more than 90 % thus acting as a highly efficient photo catalyst. Nanoparticles also exhibited antipolytic activity. Antibacterial potential was studied on four bacterial strains, viz. Escherichia Coli, Pseudomonas aeruginosa, Staphylococcus aureus, and Staphylococcus mutants. For all the strains minimum inhibitory concentration (MIC) varied from 25 to 50 µg/ml.

Biography

Shashi.Bala.Kalia has completed her PhD at the age of 28 years from Punjabi University Patiala and worked as Post Doctor Fellow at Himachal Pradesh University, Shimla. She is Chairperson of Chemistry Department of Himachal Pradesh University, Shimla. She has published more than 60 papers in reputed journals of national and international repute.

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