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## Catalytic, biological activity and thermal behaviour of triphenylphosphine capped zinc sulfide nanoparticles

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Synthesis of ZnS nanoparticles in toluene solution using triphenylphosphine as capping agent has been carried out. EDAX analysis confirmed the composition of zinc sulfide nanoparticles. Field Emission Scanning Electron Microscope images revealed that zinc sulfide nanoparticles are of spherical shape. TEM study showed spherical mono dispersed particles ranging in size 13-19nm. XRD spectrum peaks corresponding to (111) and (220) show that the zinc sulfide 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 sulfide nanoparticles which correspond to band gap of 4.23eV. Room temperature photoluminescence spectrum of the powder showed three peaks centred on 325nm (3.81eV), 397nm (3.12eV) and 425nm (2.91eV). Thermal behaviour of nanoparticles exhibited single step decomposition (84%) between 250oC to 350oC and ZnS as final residual product (16%). Degradation efficiency of the nanoparticles for dyes methyl orange, congo red and rodamine G<sub>6</sub> after 3h irradiation time was more than 90% thus acting as a highly efficient photocatalyst. Nanoparticles also exhibited antilipolytic activity. Antibacterial potential was studied on four bacterial strains, viz. *Escherichia Coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Staphylococcus mutans*. For all the strains minimum inhibitory concentration (MIC) varied from 25 to 50µg/ml.

### Biography

Shashi Bala Kalia has completed her PhD from Punjabi University, Patiala and worked as Post-doctoral Fellow at Himachal Pradesh University, Shimla. She is Chairperson of Chemistry at 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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