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BAND GAP TUNING OF ZINC OXIDE NANOPARTICLES BY THE ADDITION OF (1-4%) STRONTIUM. SYNTHESIS, CHARACTERIZATION OF THE CATALYST AND ITS USE FOR THE PHOTOCATALYTIC DEGRADATION OF ACID VIOLET-17 DYE IN AQUEOUS SOLUTION

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Abstract

Zinc oxide and strontium doped zinc oxide nanoparticles were synthesized through hydrothermal route. The synthesized nanoparticles were characterized by UV, FTIR, SEM, X-Ray diffraction (XRD) and energy dispersive x-ray (EDX) spectroscopic techniques. The optical band gaps were calculated to be 3.16EV and 2.90EV for ZnO and Sr-ZnO nanoparticles, respectively. FTIR confirmed the incorporation of the Sr into ZnO nanoparticles. Average particles size of undoped ZnO and Sr-doped ZnO nanoparticles was also calculated and found to be 16 nm and 21 nm, respectively. ZnO and Sr-doped ZnO nanoparticles were found to have spherical shape while in the last case, the particles were smaller in size and with more agglomeration. The synthesized nanoparticles were also applied as photo catalyst for the degradation of Acid violet- 17 dye in aqueous solution. The photo catalysis was performed both in UV-light and sun light irradiation. Undoped ZnO nanoparticles were found to have high photo catalytic activity as compared to its counterpart Sr-doped nanoparticles. The degradation rate of Acid violet- 17 was found to increase with increase in irradiation time, initial concentration of the dye and weight of catalyst. By increasing the pH of the medium, the rate of degradation also increased.

Key words: acid violet, band gap, catalytic degradation, EDS, nanoparticles, Sr-doped ZnO

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