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Synthesis and characterization of highly efficient visible light active sulfur doped zinc oxide and its composite with graphene oxide for degradation of toxic pollutants

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With the development of dye manufacturing industries, the level of toxic organic pollutants is increasing very rapidly and causing irreparable damage to environment. Herein, we report sulfur doped zinc oxide-graphene oxide composites as simple, efficient and eco-friendly photocatalyst for degradation of toxic dyes. Sulfur doped zinc oxide nanoparticles were prepared by mechanochemical process followed by Graphene Oxide (GO) synthesis by modified hummer's method. The synthesized nanoparticles were decorated on graphene oxide sheets with different weight percentages to obtain various concentrations of dopant in composite and characterized by various like spectroscopic and microscopic techniques such as TEM, SEM, EDXS, FTIR and UV spectrophotometry. Photocatalytic activity of the composites was evaluated by methylene blue dye degradation. The enhanced efficiency of photocatalyst can be attributed to synergistic effect between doped nanoparticles and GO which not only promoted effective photogenerated electron and hole pairs separation but also engineer band gap to visible light range. This work not only offers insight into designing cost effective and visible light responsive photocatalyst but also investigates various parameters effecting dye degradation such as catalyst loading, pH, substrate concentration and the irradiation time for dye degradation.

Biography

Humaira Khan is an Electro-Photocatalyst Designer for hydrogen energy production and dye degradations. She has completed her MS degree from Lahore University of Management and Sciences following BS degree from Hacettepe University, Ankara, Turkey. Escalating curiosity towards latest technology and global exposure urged her to achieve Erasmus Exchange Program Scholarship to Ruhr University Bochum. She is currently working as a Research Associate/Lab Instructor and Assistant to Director Foreign Relations at University of Management and Technology Lahore, Pakistan. She enjoys diverse career, continues to works as translator, offers consultancy, voluntary services to Pak Türkiye Miras Kulübü (Pak-Turkey Heritage Club).

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