DR-19. HYDROTHERMAL SYNTHESIS OF ZnO NANOPOWDER AND ITS PHOTOCATALYTIC PERFORMANCE UNDER UV AND VISIBLE LIGHT IRRADIATION

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Nanostructured semiconducting materials open up new opportunities in the field of photocatalysis and have an enormous impact on the energy and environmental sectors. Several nanostructured metal oxides including TiO_2, ZnO, MoO_3 and binary metal oxides have been studied for photocatalytic applications. Among them, ZnO has been extensively investigated for energy conversion devices due to its high carrier mobility, ease of synthesis, and nontoxicity. However, several unfavorable drawbacks, such as a wide bandgap of 3,37 eV and fast internal recombination of charge carriers, lead to low quantum yields and poor solar conversion efficiency. In this regard, it is highly desirable to improve the photocatalytic efficiency of ZnO under visible light irradiation.

Herein, we reported the hydrothermal synthesis of ZnO nanopowder for enhanced visible light photocatalytic performance. The prepared nanopowder was characterized by various experimental techniques like Powder XRD, SEM with EDS, TEM, Optical absorption, PL, FT-IR and photocatalytic activity studies. XRD pattern confirmed that the synthesized nanopowder exhibited hexagonal wurtzite structure with the average crystallite size of 16 nm. SEM and TEM micrographs reveal the spherical like structures with little agglomerates. EDS pattern confirmed the purity of the sample by exhibiting only the target elements, Zn and O. Optical absorption spectrum exhibited the characteristic band at 363 nm due to the excitonic absorption of ZnO. Photoluminescence spectrum exhibits less intense near band edge emission at 381 nm. FT-IR spectrum exhibited symmetric stretching vibrational mode centered at 482 cm^{-1}. The photocatalytic activity of the prepared ZnO nanopowder has been examined for methylene blue dye under UV and visible light irradiation.