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Doped and Co-doped ZnO Based Nanoparticles and their Photocatalytic and Gas Sensing Property

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Abstract : Statement of the Problem: Nowadays, a tremendous increase in population and advanced industrialization augment the problems related to air and water pollutions. Growing industries promoting environmental danger, which is an alarming threat to the ecosystem. For safeguard, the environment, detection of perilous gases and release of colored wastewater is required for eutrophication pollution. Researchers around the globe are trying their best efforts to save the environment. For this remediation advanced oxidation process is used for potential applications. ZnO is an important semiconductor photocatalyst with high photocatalytic and gas sensing activities. For efficient photocatalytic and gas sensing properties, it is necessary to prepare a doped/co-doped ZnO compound to decrease the electron-hole recombination rates. However, lanthanide doped and co-doped metal oxide is seldom studied for photocatalytic and gas sensing applications. The purpose of this study is to describe the best photocatalyst for the photodegradation of dyes and gas sensing properties. Methodology & Theoretical Orientation: Economical framework has to be used for the synthesis of ZnO. In the depth literature survey, a simple combustion method is utilized for gas sensing and photocatalytic activities. Findings: Rare earth doped and co-doped ZnO nanoparticles were the best photocatalysts for photodegradation of organic dyes and different gas sensing applications by varying various factors such as pH, aging time, and different concentrations of doping and codoping metals in ZnO. Complete degradation of dye was observed only in min. Gas sensing nanodevice showed a better response and quick recovery time for doped/co-doped ZnO. Conclusion & Significance: In order to prevent air and water pollution, well crystalline ZnO nanoparticles were synthesized by rapid and economic method, which is used as photocatalyst for photodegradation of organic dyes and gas sensing applications to sense the release of hazardous gases from the environment.

Keywords : ZnO, photocatalyst, photodegradation of dye, gas sensor
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