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Topic- Synthesis Characterization and photocatalytic activities of metal oxide/conjugated polymer nanohybrids

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Finding

In this chapter we describes the general background of water pollutions, types of water pollutants and detail study of the photocatalytic degradation technologies for waste water treatment. Discuss the photocatalytic degradation of toxic pollutants using CPs and CP based nanohybrids nanohybrids as photocatalysts. Chapter also provides detail information of photocatalysis mechanism under UV, visible and microwave irradiations using CPs and CP based nanohybrids, and cover the Literature work on conducting polymer based nanohybrids as photocatalysts in photocatalytic degradation process.

My thesis entitled “Synthesis, Characterization and Photocatalytic Studies of Metal oxides/Conjugated polymer Nanohybrids”, thesis divided into 7 chapters which cover the literature and experimental work on metal oxide, conducting polymers, Metal oxides/Conducting polymers-based nanohybrids, and its photocatalytic activities for degradation of a toxic pollutant under different light irradiations. Aims and Objectives of thesis: Literature survey reveals that a great deal of work has been reported on the design of CPs based photocatalysts for improving the degradation of organic pollutants under visible light irradiation. We have attempted to formulate nanocomposites of some seldom explored semiconducotrs with CPs to improve the photocatalytic performance of these materials under UV-visible as well as microwave irradiation. We have also chosen some toxic organic pollutants to investigate the mechanism of degradation under different conditions used. The peresnt thesis work has been divided into 7 chapters: Chapter 1: Introduction and Literature Review: describes the general background of water pollutions, types of water pollutants and detail study of the photocatalytic degradation technologies for waste water treatment. Discuss the photocatalytic degradation of toxic pollutants using CPs and CP based nanohybrids nanohybrids as photocatalysts. Chapter also provides detail information of photocatalysis mechanism under UV, visible and microwave irradiations using CPs and CP based

nanohybrids, and cover the Literature work on conducting polymer based nanohybrids as photocatalysts in photocatalytic degradation process. (This chapter was published in the journal of molecular liquids in 2021). Chapter 2: Synthesis, Characterization, and Sonophotocatalytic Activity of Polypyrrole/ V_2O_5 Nanohybrids against Degradation of Ciprofloxacin and Erythromycin Drugs under Visible Light Irradiation: deals with the synthesis of V_2O_5 /PPy nanohybrids via ultrasound-assisted in-situ polymerization method and their corresponding sonophotocatalytic activity against the degradation of the antibiotic drugs ciprofloxacin (CIP) and erythromycin (E-mycin). (This chapter was published in the journal of molecular liquids in 2018). Chapter 3: Synthesis, Characterization and Photocatalytic Activity of Poly(ophenylenediamine)/ Sb_2O_3 Nanohybrids against Degradation Ibuprofen Drug under Solar Light Irradiation: reports synthesis of the POPD/ Sb_2O_3 nanohybrids via in-situ oxidative polymerization method and their photocatalytic activity against the degradation of nonsteroidal anti-inflammatory drug (NSAID), Ibuprofen (IB) under solar light. (This chapter was published in Journal of Materials Research and Technology in 2019). Chapter 4: Synthesis, Characterization, and Catalytic Activity of Polythiophene/Ag-Ag₂O Nanohybrids against the Degradation of Paracetamol Drug under Microwave Irradiation: discusses the green synthesis of nanocomposites of polythiophene with Ocimum Sanctum derived Ag-Ag₂O nanoparticles and its microwave-assisted catalytic activity against paracetamol drug degradation. (This chapter was published in the ACS Omega in 2020). Chapter 5: Synthesis, Characterization and catalytic Activity of Polycarbazole/ α - MnO_2 Nanohybrids against the degradation of Bactrim DS drug: A Comparison of Microwave-assisted and Photocatalytic Degradation Processes: deals with the development of an eco-friendly method for the synthesis of α - MnO_2 nanoparticles using natural extract of Brassica Oleracea (Cabbage). To enhance the photocatalytic activity of the synthesized α - MnO_2 nanoparticles, its nanohybrids were formulated using polycarbazole (PCz) and were tested via the degradation of aqueous solutions of Bactrim DS antibiotic drug under the microwave (MW) as well as UV light irradiation. (This chapter was published in the Environmental science and pollution research in 2020). Chapter 6: Synthesis, Characterization and Catalytic Activity of Polyaniline/ SnO_2 Nanohybrids against DDT Degradation under Microwave Irradiation: focuses on the synthesis of SnO_2 nanoparticles via green route using natural extracts of Psidium Guajava leaves. Further to improve the catalytic