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ORIGINAL ARTICLE

Sunlight assisted photocatalytic degradation of organic pollutants using g-C_3N_4-TiO_2 nanocomposites

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Bisphenol A;
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Abstract The photocatalytic degradation of environmentally non-benign, toxic organic pollutants such as bisphenol A (BPA), brilliant green (BG), or mixture of dyes have been carried out using g-C_3N_4-TiO_2 (GNT) nanocomposites. The GNT nanocomposites were synthesized by using hydrothermal method with different compositions and these nanocomposites were characterized using the different techniques. X-ray diffraction revealed that the anatase phase of TiO_2 has been retained in composites; while characteristic reflection of g-C_3N_4 at 27.07° (d = 3.22 Å) is not observed due to its lower content in the nanocomposites. Raman spectra confirms the formation of composites between TiO_2 with g-C_3N_4. Furthermore nano-scale dimensions of the bare or composites have been proved by FE-SEM and HR-TEM analysis. X-ray photoelectron spectroscopy (XPS) shows the presence of C, N, Ti and O as a constituents, with peaks due to C—C, N—C=N of g-C_3N_4. Among the different nanocomposites, g-C_3N_4-TiO_2 catalyst having 30% g-C_3N_4 and 70% TiO_2 in molar proportion (i.e. 30-GNT) is exhibiting the highest efficiency for degradation of the different dyes in correlation to its higher surface area, lower optical band gap as well as more visible-light absorption (i.e., $\lambda > 400$ nm) in the electromagnetic spectrum.

1. Introduction

Among the various environmental issues, the contamination of toxic waste into the atmosphere is one of the major challenge of the globe and it forms the various ecological problems to be very harmful to living organisms. The majority of environmental pollutants are the carcinogenic natured and non-degradable coloured dye effluents, to be discharged by the textile, leather, printing and paper industries, etc. Most of the industries use color dyes for uplifting the features of goods

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