# PREPARATION, CHARACTERIZATION, and PHOTOCATALYTIC ACTIVITY of SOLAR LIGHT SENSITIVE g-$C_3N_4$/$TiO_2$ HETEROJUNCTION NANOCOMPOSITES

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Solar light sensitive 2-dimensional (2D) graphite carbon nitride (g-$C_3N_4$)/titanium dioxide ($TiO_2$) heterojunction nanocomposites were prepared to enhance visible light activity of $TiO_2$. Preparation of the nanocomposites was accomplished by hydrothermal growth of $TiO_2$ nanoparticles on the surfaces of g-$C_3N_4$ particles in one step. The g-$C_3N_4$ content of the composites varied from 20 to 90 wt%. The composite containing 80 wt% g-$C_3N_4$ was additionally subjected to a regulated heat treatment at temperatures in the range from 350 to 500 $^oC$ for 1 h to improve the photocatalytic activity. The interface and microstructural features of the nanocomposites were characterized by X-Ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FESEM), and Diffuse Reflectance Spectra (DRS) techniques. The Methylene Blue (MB) degradation tests were performed to evaluate the photocatalytic activity of the powders under solar light illumination using a UV-vis spectrophotometer. Results were compared with the results of the pristine $TiO_2$ and g-$C_3N_4$ powders. The g-$C_3N_4$/$TiO_2$ heterojunction nanocomposites exhibited better photocatalytic activity for the degradation of MB than pristine $TiO_2$ and g-$C_3N_4$ powders. An improvement in photocatalytic activity due to the generation of reactive oxidation species induced by photogenerated electrons and to the reduced recombination rate for electron-hole pairs was recognized.

**Key words:** Solar light, Hydrothermal process, heterojunction, nanocomposite, photocatalytic activity.