

## Amalgamation of N-graphene quantum dots with nanocubic like TiO<sub>2</sub> : an insight study of sunlight sensitive photocatalysis

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### ABSTRACT

In this work, a sunlight-sensitive photocatalyst of nanocubic-like titanium dioxide (TiO<sub>2</sub>) and N-doped graphene quantum dots (N-GQDs) is developed through a simple hydrothermal and physical mixing method. The successful amalgamation composite photocatalyst characteristics were comprehensively scrutinized through various physical and chemical analyses. A complete removal of bisphenol A (BPA) is attained by a synthesized composite after 30 min of sunlight irradiation as compared to pure TiO<sub>2</sub>. This clearly proved the unique contribution of N-GQDs that enhanced the ability of light harvesting especially under visible light and near-infrared region. This superior characteristic enables it to maximize the absorbance in the entire solar spectrum. However, the increase of N-GQDs weight percentage has created massive oxygen vacancies that suppress the generation of active radicals. This resulted in a longer duration for a complete removal of BPA as compared to lower weight percentage of N-GQDs. Hence, this finding can offer a new insight in developing effective sunlight-sensitive photocatalysts for various complex organic pollutants degradation.

### KEYWORDS

N-Graphene quantumdots; Nanocubic-like; TiO<sub>2</sub>; Bisphenol A; Sunlight; Visible light; Near infrared

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