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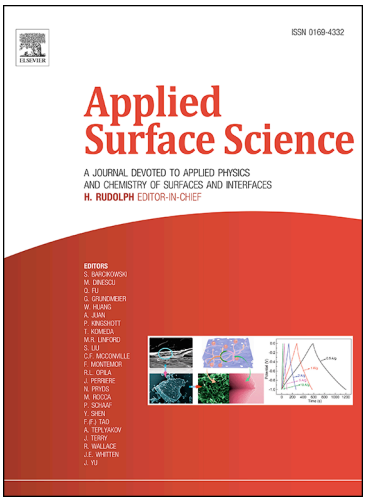

Full Length Article

High-yield and low-cost method to synthesize large-area porous g-C_3N_4 nanosheets with improved photocatalytic activity for gaseous nitric oxide and 2-propanol photodegradation

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High-yield and low-cost method to synthesize large-area porous g-C_3N_4 nanosheets with improved photocatalytic activity for gaseous nitric oxide and 2-propanol photodegradation

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Abstract

A high-yield and low-cost method was developed for preparing graphitic carbon nitride (g-C_3N_4) with high photocatalytic activity. A trace amount of glyoxal-treated melamine was used as the precursor for g-C_3N_4. Glyoxal played a remarkable role in the thermal condensation of g-C_3N_4 as it improved the yield, inhibited the grain growth, and increased the specific surface area (up to 119 m^2g^{-1}). The yield of g-C_3N_4 obtained with this method was 10 times higher than that in the traditional method. SEM, TEM, and EPR results showed that the prepared photocatalysts have a porous nanosheet structure with nitrogen vacancy defects. The photocatalytic activity of the obtained g-C_3N_4 was estimated by using it for the photodegradation of gaseous nitric oxide (NO) and isopropyl alcohol (IPA) under visible light (λ> 420 nm). The photocatalytic activity of the porous g-C_3N_4 nanosheets was well improved as compared with that of bulk g-C_3N_4. The addition of trace amounts of glyoxal improved the photocatalytic activity remarkably, so this method could open up a new channel for the development of low-cost, high-activity g-C_3N_4 photocatalysts for green chemistry.

Keywords: g-C_3N_4; porous sheet; glyoxal; photocatalysis; nitric oxide removal;