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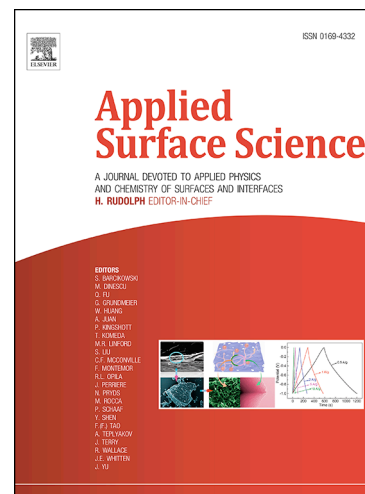
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High-yield and low-cost method to synthesize large-area porous g-C₃N₄ nanosheets with improved photocatalytic activity for gaseous nitric oxide and 2-propanol photodegradation

Dongyuan Han,^a Jing Liu,^a He Cai,^a Xue Zhou,^a Lingru Kong,^a Jiwei Wang,^{a, c} Haifeng Shi,^d Qiang Guo^{b, #} and Xiaoxing Fan^{a, b, c, *}

^aSchool of Physics, Liaoning University, Shenyang, 110036. P. R. China.

^bLvyuan Institute of Energy&Environmental Science and Technology, Liaoning University, Shenyang110036, P. R. China

^cLiaoning Key Laboratory of Semiconductor Light Emitting and Photocatalytic Materials, Liaoning University, Shenyang 110036, P. R. China.

^dSchool of science, Jiangnan University, Wuxi, P. R. China, 214122

[#] Corresponding author. Tel: +86-24-62202306; gq.ly@126.com

^{*} Corresponding author. Tel: +86-24-62202306; xxfan@lnu.edu.cn.

Abstract

A high-yield and low-cost method was developed for preparing graphitic carbon nitride (g-C₃N₄) with high photocatalytic activity. A trace amount of glyoxal-treated melamine was used as the precursor for g-C₃N₄. Glyoxal played a remarkable role in the thermal condensation of g-C₃N₄ as it improved the yield, inhibited the grain growth, and increased the specific surface area (up to 119 m²g⁻¹). The yield of g-C₃N₄ 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-C₃N₄ was estimated by using it for the photodegradation of gaseous nitric oxide (NO) and isopropyl alcohol (IPA) under visible light ($\lambda > 420$ nm). The photocatalytic activity of the porous g-C₃N₄ nanosheets was well improved as compared with that of bulk g-C₃N₄. 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-C₃N₄ photocatalysts for green chemistry.

Keywords: g-C₃N₄; porous sheet; glyoxal; photocatalysis; nitric oxide removal;

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