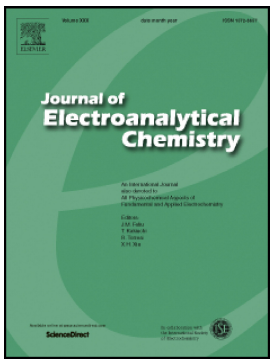

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PII: S1572-6657(18)30543-5
DOI: doi:10.1016/j.jelechem.2018.08.012
Reference: JEAC 12551

To appear in: *Journal of Electroanalytical Chemistry*

Received date: 24 June 2018
Revised date: 7 August 2018
Accepted date: 9 August 2018

Please cite this article as: Xi Zhang, Yaya Chang, Xiaoxia Jian, Zhida Gao, Yan-Yan Song , Filling foaming agent into stacked layers: Rapid synthesis of graphitic carbon nitride nanosheets decorated with ultrafined MXY (X=O, S) nanoparticles for enhanced photoresponsive abilities. Jeac (2018), doi:10.1016/j.jelechem.2018.08.012

Filling foaming agent into stacked layers: rapid synthesis of graphitic carbon nitride nanosheets decorated with ultrafined MX_Y (*X=O, S*) nanoparticles for enhanced photoresponsive abilities

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Abstract

Exfoliation of graphitic carbon nitride (g-C_3N_4) into ultra thin nanosheets is usually the first step for its perspective applications. In contrast to the traditional time-consuming ultrasonication approach, a rapid and high-yield method to synthesis g-C_3N_4 nanosheets is desirable. In this study, we develop an efficiency and versatile strategy to exfoliate bulk g-C_3N_4 into 2D ultrathin nanosheets by combining foaming agent inserting with microwave digestion method. The proposed method significantly reduces the exfoliation time and can be further utilized to produce metal oxides (MO_Y) or metal sulfide (MS_Y) decorated g-C_3N_4 nanosheets. The as-formed ultra fined ZnO nanocrystals decorated g-C_3N_4 nanosheets (ZnO/g-C_3N_4) exhibit excellent solubility and dual-emission optical property, which can be served as fluorescence probes for metal ion sensing. The resulted CdS/g-C_3N_4 decorated nanosheets demonstrate efficient photocatalytic properties, having great potentials in photodegradation application. This protocol can be a general strategy for the synthesis of g-C_3N_4 nanosheets as well as attractive in preparing a lot of functional hybrid nanosheets for future applications in sensing probes, solar cells, photoelectrical devices and water treatment.

Keywords: g-C_3N_4 nanosheets; exfoliation; foaming agent; dual-emission fluorescence; photocatalytical activity