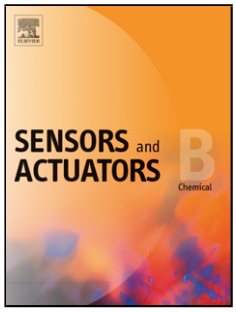

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PII: S0925-4005(18)30705-6
DOI: https://doi.org/10.1016/j.snb.2018.04.016
Reference: SNB 24491

To appear in: *Sensors and Actuators B*

Received date: 23-12-2017
Revised date: 1-4-2018
Accepted date: 3-4-2018

Please cite this article as: Dandan Song, Yuanzhe Wang, Xiong Lu, Yukun Gao, Yan Li, Faming Gao, Ag nanoparticles-decorated nitrogen-fluorine co-doped monolayer MoS2 nanosheet for highly sensitive electrochemical sensing of organophosphorus pesticides, Sensors and Actuators B: Chemical https://doi.org/10.1016/j.snb.2018.04.016

Ag nanoparticles-decorated nitrogen-fluorine co-doped monolayer MoS_2 nanosheet for highly sensitive electrochemical sensing of organophosphorus pesticides

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Highlights

- Ag NPs-N-F-MoS_2 nanocomposite is prepared.
- it exhibits superior conductivity and high electroactive surface area.
- CNTs-NH_2/Ag NPs-N-F-MoS_2 bioelectrode is superior in sensing performances.

Abstract

Two-dimensional (2D) MoS_2 shows great potential in the areas of electrochemical sensors due to their ultrathin structure and predominant physicochemical properties. However, pristine 2D MoS_2 nanostructure exists inherent disadvantages such as the limited electrical conductivity, surface area and easy aggregation or restacking. Here, nitrogen-fluorine co-doped monolayer 2D MoS_2 nanosheet decorated with Ag nanoparticles (Ag NPs-N-F-MoS_2) nanocomposite is prepared and it exhibits superior conductivity, remarkable electron mobility and high electroactive surface area. The obtained Ag NPs-N-F-MoS_2 are employed as a sensing platform for the electrochemical determination of organophosphate pesticide, coupled with enzymatic inhibition. Under optimized conditions, the acetylcholinesterase (AChE)/amino