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# Ag nanoparticles-decorated nitrogen-fluorine co-doped monolayer MoS<sub>2</sub> nanosheet for highly sensitive electrochemical sensing of organophosphorus pesticides

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## Highlights

- Ag NPs-N-F-MoS<sub>2</sub> nanocomposite is prepared.
- it exhibits superior conductivity and high electroactive surface area.
- CNTs-NH<sub>2</sub>/Ag NPs-N-F-MoS<sub>2</sub> bioelectrode is superior in sensing performances.

## Abstract

Two-dimensional (2D) MoS<sub>2</sub> shows great potential in the areas of electrochemical sensors due to their ultrathin structure and predominant physicochemical properties. However, pristine 2D MoS<sub>2</sub> 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<sub>2</sub> nanosheet decorated with Ag nanoparticles (Ag NPs-N-F-MoS<sub>2</sub>) nanocomposite is prepared and it exhibits superior conductivity, remarkable electron mobility and high electroactive surface area. The obtained Ag NPs-N-F-MoS<sub>2</sub> are employed as a sensing platform for the electrochemical determination of organophosphate pesticide, coupled with enzymatic inhibition. Under optimized conditions, the acetylcholinesterase (AChE)/amino

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