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An ultrasensitive fluorescent sensor for organophosphorus pesticides detection based on RB-Ag/Au bimetallic nanoparticles

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Highlights:

- The fabrication of organic with inorganic nanohybrids fluorescent sensors has been produced by Rhodamine B (RB) and silver/gold bimetal nanoparticles (Ag/Au NPs), which could be used for the determination of organophosphorus pesticides (OPs).
- The method exhibits ultra-sensitivity and high-selectivity toward OPs with the detection limit of 0.0018 ng/mL, and has been used to assay OPs in the water and fruit samples with the satisfactory results.

Abstract:

A simple strategy for the fabrication of a highly selective and sensitive fluorescence probe based on Rhodamine B (RB) modified silver/gold bimetal nanoparticles (RB-Ag/Au NPs) was developed. The fluorescence of RB-Ag/Au NPs remains quenched until exposure to organophosphorus pesticides (OPs). This is because that the coordination ability of Ag/Au NPs with OPs is stronger than that of Ag/Au NPs with RB. So RB would be displaced from the surface of the Ag/Au NPs, accompanying the fluorescence recovery of RB. The RB-Ag/Au NPs were characterized by transmission electron microscope (TEM) and fluorescence spectra. It can be applied to the determination of OPs in real fruit and water samples with the limit of detection (LOD)

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