

Nanoscale enzyme reactors of organophosphorous hydrolase in mesoporous carbons for reliable and sensitive detection of organophosphate nerve agents

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It has been demonstrated that the approach of nanoscale enzyme reactors (NERs), consisting of enzyme adsorption and crosslinking, can improve both the enzyme stability and loading in mesoporous materials with a bottle-neck structure. These advantageous features of NERs result from the ship-in-a-bottle mechanism, in which crosslinked enzymes in larger-sized mesocellular pores cannot be leached out through smaller-sized bottle-neck mesopores. In the present presentation, we prepared the NERs of organophosphate hydrolase (NER-OPH) in conductive mesoporous carbons for the electrochemical detection of paraoxon. The improved performance of NER-OPH in activity, stability, sensitivity, and sensitivity stability will be presented in comparison with free and adsorbed OPH.