

عنوان مقاله:

A Copper-Based Metal-Organic Framework/Molecularly Imprinted Polymer-Modified Graphite Epoxy Composite Electrode for the Electrochemical Detection of Chlorpyrifos and Investigating Optimum Conditions with the aid of Quantum-Mechanical DFT Calculations

محل انتشار:

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خلاصه مقاله:

In this study, a new electrochemical sensor using MIPs coated on the surface of Cu-MOF was developed for the selective determination of chlorpyrifos (CPF). Cu-MOF (HKUST-1) was synthesized based on a solvothermal method. Molecularly imprinted polymers (MIPs) were prepared using chlorpyrifos as the template molecule, methacrylic acid as the functional monomer, and ethylene glycol dimethacrylate as the cross-linker. The optimum pH value of the rebinding solution was verified with computational calculations obtained by Gaussian software. The HKUST-1 @MIP was characterized by several technique include, Fourier-transform infrared spectroscopy (FT-IR), field-emission scanning electron microscopy (FESEM), and X-ray diffraction (XRD). HKUST-1 @MIP/GEC electrode showed an excellent linear range of 0.01 to 1.00 μM , with RSD% and LOD of 5.37% and 3 nM, respectively. The modified electrode presents a simple, selective, sensitive, stable and environmentally friendly strategy for the determination of CPF. The proposed method was successfully used to measure CPF in apple and tomato samples.

کلمات کلیدی:

Electrochemical sensor, HKUST-1@MIPs, Quantum mechanic-DFT, Chlorpyrifos

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