

عنوان مقاله:

Electrochemical Sensor Based on Ce-MOF Modified Screen Printed Electrode for Metronidazole Determination

محل انتشار:

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خلاصه مقاله:

In the present study, a fast, sensitive, and simple electrochemical sensor based on screen-printed graphite electrode (SPGE) modified with Ce-1,3,5-benzenetricarboxylic acid (Ce-BTC) metal-organic framework (MOF) has been prepared for determination of metronidazole (MNZ). The electrochemical studies and measurements were done using cyclic voltammetry (CV), linear sweep voltammetry (LSV), differential pulse voltammetry (DPV), and chronoamperometry techniques. Comparison study of electrochemical performance of unmodified SPGE and Ce-BTC MOF/SPGE toward the reduction of MNZ was evaluated by using CV. The CV studies show that modification of SPGE surface with Ce-BTC MOF enhances the reduction peak current but the peak potential of MNZ has shifted to the lower potential. Using the effects of Ce-BTC MOF, the developed modified SPGE showed good electrochemical sensing performance for detecting MNZ in phosphate buffer solution (PBS) ($\text{pH} = 7.0$) with wide linear range ($0.05\text{--}400.0 \mu\text{M}$), high sensitivity ($-0.0304 \mu\text{A}/\mu\text{M}$), and low limit of detection (LOD) ($0.02 \mu\text{M}$). Finally, for the MNZ analysis in real samples, the Ce-BTC MOF/SPGE sensor exhibited good MNZ determination performance with acceptable recoveries of $96.7\%\text{--}103.6\%$ and low relative standard deviation (RSD) values of $1.8\%\text{--}3.5\%$.

کلمات کلیدی:

Ce-BTC metal-organic framework, Screen-printed graphite electrode, Electrochemical sensor, Metronidazole

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