

Uric Acid Detection Using Quartz Crystal Microbalance Coated with Uricase Immobilized on ZnO Nanotetrapods

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The sensing properties of uricase immobilized on ZnO nanotetrapods for uric acid detection were studied using a quartz crystal microbalance (QCM). The ZnO nanotetrapods were synthesized by thermally evaporating high-purity zinc pellets (99.999%) at 900°C in air. The sensors were constructed by distributing the ZnO nanotetrapods onto the electrode surfaces of the QCM at room temperature. Then uricase was directly immobilized on the ZnO nanotetrapods for uric acid detection. Our results indicated that this QCM sensor shows high sensitivity (10^6 Hz/mol/L) for uric acid detection in a liquid environment. The frequency response of the sensor showed a linear ($r = 0.99872$) dependence on uric acid concentration ranging from 5.0×10^{-6} to 1.0×10^{-3} mol L⁻¹ with a detection limit of 2.0×10^{-6} mol L⁻¹. All the results demonstrated that the one-dimensional ZnO structure is a good material for biosensor application.

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