

## Chitosan anchored zinc oxide nanocomposite as modified electrochemical sensor for the detection of Cd(II) ions

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Received 30 August 2017; Accepted 8 November 2017

## ABSTRACT

The chitosan anchored zinc oxide nanocomposite (NC) has been prepared using chemical approach. The obtained NC was used as modified electrode for selective detection of Cd(II) ions using square wave voltammetry under pH 6 phosphate buffer solution. Surface area and porous nature of NC were found by using Brunauer–Emmett–Teller isotherm analysis. The presence of functional groups was confirmed using Fourier transform infrared spectroscopic analysis. The results indicated that detection starts at 30 s with least concentration along with rise in peak current and optimized potential at 0.6 V. Upon increasing the ionic concentration, intensity of the current peaks decreases due to strong porous nature of the obtained product disturbing electron transport. Under optimal conditions, the calibration plot for Cd(II) is found to be linear with concentration range of 0.2–1.5  $\mu$ M and also compared with calibration plot with accumulation time. Combining the high surface area, more active sites, and reduction in particle size the absorption ability toward Cd(II) ions was found to be fast and sensitive with limit of detection 1.39 nM. Hence, the obtained product shows adequate sensing drive and it can also be used for real-time analysis.

*Keywords:* Chitosan; Zinc oxide nanoparticles; Current; Peak response; Cadmium ions; Electrochemical sensor

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