Accepted Manuscript

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PII: S0013-4686(18)30234-2

DOI: 10.1016/j.electacta.2018.01.187

Reference: EA 31169

To appear in: *Electrochimica Acta*

Received Date: 25 November 2017

Revised Date: 22 January 2018

Accepted Date: 28 January 2018

Please cite this article as: D. Sathiyaseelan, M.B. Gumpu, N. Nesakumar, J.B.B. Rayappan, G. Hariharan, Wavelet based spectral approach for solving surface coverage model in an electrochemical arsenic sensor - An operational matrix approach, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.01.187.

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Abstract

Surface coverage parameter of an electrochemical sensor plays a vital role in enhancing the figure of merits of the sensor. Developing a theoretical model for the surface coverage will help to standardize the fabrication of working electrodes used in electrochemical sensors. In this background, a wavelet based spectral algorithm has been developed to model the surface coverage of an arsenic sensor. For the model, Michaelis-Menten constant of fluorine doped cadmium oxide (F-doped CdO) working electrode based arsenic sensor was used as the seed fount. Theoretical analysis for the estimation of surface coverage based on Michaelis-Menten constant with nonlinear reaction-diffusion equation is considered. In order to estimate the Michaelis-Menten constant and maximum current response, the measured current values are linearized with the help of Hanes-woolf plot. Using the Legendre wavelet spectral approach, the nonlinear reaction-diffusion equation is converted into a system of algebraic equations through operational