

A Novel Glassy Carbon Electrode Modified with Multi-Walled Carbon Nanotubes for Potentiometric Xipamide Determination

Amr Mohamed Badawy, Haitham Abbas Ali El Fiky, Mahmoud A. Tantawy, Haitham A. El Fiky, Maha F. Abd El Ghany and Nermin V. Fares

Abstract

Solid contact electrodes are widely used in analytical fields due to their outstanding performance over classical ones. However, they showed formation of a water layer affecting stability of those electrodes' type. Herein, we develop a solid contact ion selective electrode to overcome this common drawback through application of multi-walled carbon nanotubes as a hydrophobic layer between the ion sensing membrane and a glassy carbon electrode. This fine modification improved stability of the electrode via preventing the formation of this water layer. The obtained potential was steady over 30 days with a drift of 0.8 mV h^{-1} . The MWCNTs-modified electrode was used for determination of xipamide with a Nernstian slope of 56.01 over a linearity range of 1.0×10^{-8} to $1.0 \times 10^{-4} \text{ mol l}^{-1}$ and detection limit of $6.0 \times 10^{-8} \text{ mol l}^{-1}$. The proposed sensor was effectively applied for determination of the cited drug in its marketed pharmaceutical dosage form and spiked human plasma.

Journal of The Electrochemical Society 2021, May