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**A new electrochemical sensor based on carbon paste electrode/Ru(III) complex for
determination of nitrite: Electrochemical impedance and cyclic voltammetry
measurements.**

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Abstract

The modified carbon paste electrode with Ru(III) complex was studied as a novel sensor for the determination of nitrite. The behavior of NO_2^- at the electrode surface was investigated using electrochemical impedance spectroscopy (EIS) and cyclic voltammetry (CV).

EIS provided useful information on the charge transfer resistance (R) at the electrode/solution. The EIS measurements showed that R is low at oxidation potentials, and decreases with increasing temperature. The increase of the constant phase element with temperature is due to the accumulation of nitrite on the electrode, thus, facilitating the electron transfer between electrode and NO_2^- .

CV was used to study the effect of pH on the electro-catalytic oxidation of NO_2^- and to determine the limit of detection (LOD). CV measurements showed a good linear relationship between the oxidation current and the concentration of NO_2^- over a wide concentration range $0\text{--}1.38 \times 10^{-2} \text{ mol L}^{-1}$. Low detection limit of $1.39 \times 10^{-6} \text{ mol L}^{-1}$ towards NO_2^- was obtained. LOD decreased by 23.2% compared to that determined using cavity microelectrode.

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