Voltammetric Behavior of Zinc Hexacyanoferrate (III) Nanoparticles and Their Application in the Detection of N-Acetylcysteine

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The present work reports the voltammetric behavior of Zinc hexacyanoferrate (III) nanoparticles and their application in the detection of N-acetylcysteine. Two distinct ratios of water/formamide 10:0 (ZnH-1) and 4:6 (ZnH-2) were studied in the complexation reaction of Zn^{2+} with $[\text{Fe}^{\text{III}}(\text{CN})_6]^{3-}$. The materials were characterized by Transmission Electron Microscopy (TEM) and Cyclic Voltammetry. The cyclic voltammograms of ZnH-1 and ZnH-2 showed a well-defined redox couple with formal potential ($E^{\theta'}$) = 0.94 ± 0.01 V ($v=20$ mVs⁻¹; KCl 1.0 M) attributed to the redox process $[\text{Fe}^{\text{II}}(\text{CN})_6]/[\text{Fe}^{\text{III}}(\text{CN})_6]$ in the presence of Zn^{2+} . The graphite paste electrode modified with ZnH-1 and ZnH-2 presents a sensitive and catalytic oxidation response for the determination of N-acetylcysteine respectively.

Keywords: Zinc Hexacyanoferrate (III) Nanoparticles, Voltammetry, Graphite Paste Electrode, N-acetylcysteine.

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