



Characterization of Oxidation Product of N¹⁰-[3'-[N-Bis-(Hydroxyethyl)Amino]Propylphenoxazine by Spectral and Cyclic Voltametric Methods and Its Applications in Redox Titrimetry

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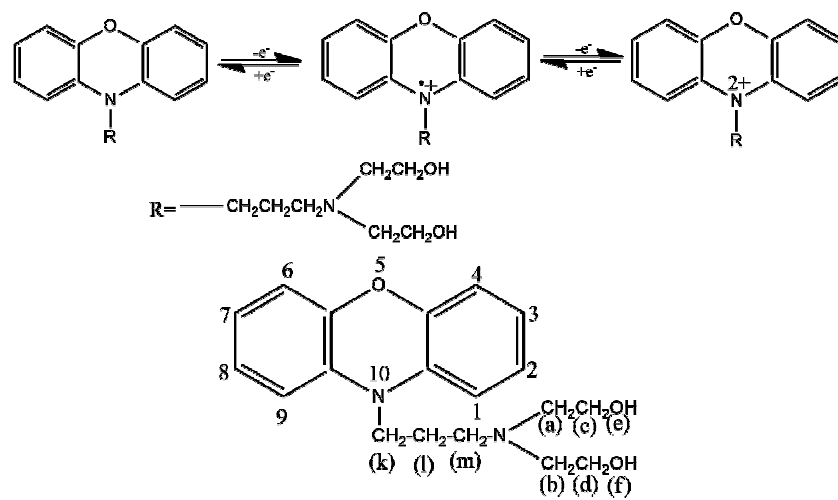
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ABSTRACT

Cerium (IV) sulfate oxidizes N¹⁰-[3'-[N-Bis(hydroxyethyl)amino]propylphenoxazine [BPP] to form a pink colored radical cation to undergo a reversible one-electron oxidation [BPP^{•+}] in the presence of stoichiometric concentrations of the reactants (BPP: Ce(IV)=1:1). Ce(IV) concentration was increased and the radical cation underwent a second one-electron oxidation in the presence of more than one equivalent of Ce(IV) to form a brownish yellow colored dication [BPP²⁺]. The dictation was established by UV-vis, IR and mass-spectral techniques. Two reversible anodic waves at 664 mV and 1122 mV and two cathodic waves at 608 mV and 968 mV were shown by the BPP cyclic voltammogram at a 24 mV/s scan rate. The peak at 664 mV corresponds to the radical cation [BPP^{•+}] oxidation of BPP. The second anodic peak at 1122 mV reflects dication [BPP²⁺] oxidation. The cyclic voltametric parameters were estimated. As demonstrated by HPLC, bromine oxidizes BPP into 4 materials. Based on mass-spectral data, the tentatively predicted structures support the development of four brominated oxidized products. The respective first and second formal BPP potentials were found to be 410-407 mV and 559-508 mV, and 762 mV in 0.5M sulphuric acid was found to be the transition potential of BPP in the titration of ascorbic acid with chloramine-T.

The optimal conditions for the effective use of BPP as a redox indicator in macro and micro estimations of ascorbic acid, methionine, isoniazid, phenylhydrazine hydrochloride and biotin using chloramine-T as an oxidant have been developed in order to explore analytical applications. It's been created. Sharp and stoichiometric endpoints are given by the indicator. BPP initially undergoes reversible one-electron oxidation during titration to form a pink colored radical cation. The radical cation is reversibly oxidized to a blue colored dictation at the endpoint with the loss of one more electron with the progression of the titration. The use of BPP as an oxidation-reduction reaction indicator for the volumetric determination of bioanalytically relevant species in real samples, such as ascorbic acid, methionine and isoniazid, was significant.

Graphical Abstract

Structure of BPP

Keywords: Phenoxazine oxidation, Characterization, Spectral, Cyclic voltammetry Redox indicator.