Available online at **www.joac.info**

ISSN: 2278-1862

Journal of Applicable Chemistry

2022, 11 (4): 632-644

(International Peer Reviewed Journal)

Characterization of Oxidation Product of N^{10}-[3'-[N-Bis-(Hydroxyethyl)Amino]Propylphenoxazine by Spectral and Cyclic Voltametric Methods and Its Applications in Redox Titrimetry

C. M. Shivaprasad[1], B. C. Channu[2]*, K. N. Thimmaiah[3] and I. Mallikarjuna[1]*

1. Department of Chemistry, Government First Grade College for Women, Vijaynagar, Mysore – 570 032, Karnataka, **INDIA**
2. Department of Chemistry, Sri. D Devaraja Urs Govt. First Grade College, Hunsur - 571 105, Karnataka, **INDIA**
3. Department of Chemistry, Northwest Mississippi Community College, Senatobia, Mississippi, **USA**
4. Department of Chemistry, Smt.VHD Central Institute of Home Science, Sheshadri Road, Bengaluru–560 001, **INDIA**

Email: drchannubc@gmail.com; mallikarjunahiremath4@gmail.com

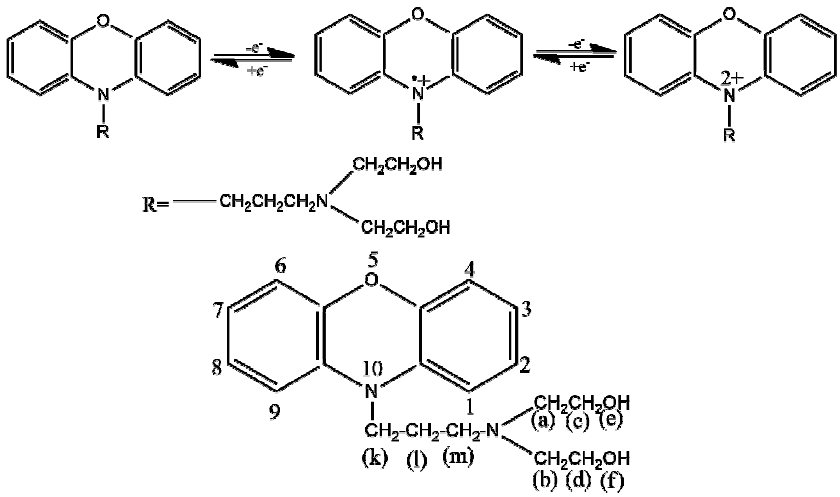
Accepted on 20th July, 2022

ABSTRACT

Cerium (IV) sulfate oxidizes N^{10}-[3'-[N-Bis(hydroxyethyl)amino]propylphenoxazine [BPP] to form a pink colored radical cation to undergo a reversible one-electron oxidation [$BPP^{+\cdot}$] 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 [BPP^{2+}]. 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 [BPP^{2+}] 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.