POLAROGRAPHIC STUDY OF IRON (III)—RESACETOPHENONEOXIME COMPLEX

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ABSTRACT

The polarographic behaviour of Iron (III)—Resacetophenoneoxime complex at pH 5.8 in a supporting electrolyte of 0.1 M sodium perchlorate was studied. The results indicated a diffusion controlled irreversible reduction of the complex. The composition of the complex corresponded to the ratio metal to oxime as 1:1. The stability constant of the complex was $2.78 \times 10^{-5}$.

INTRODUCTION

NEELAKANTAM AND SITARAMAN reported that resacetophenoneoxime gave a purple color with Iron (III), the color intensity was maximum at pH 3.6–7.0 and the reaction was highly sensitive. This reaction was investigated spectrophotometrically by Raja Reddy et al., at pH 7.0 in ammonium acetate medium. These authors reported the formation of a 1:1 complex. The present authors carried out a detailed study of the polarographic behaviour of Iron (III)—resacetophenoneoxime complex at pH 5.8. The results obtained are reported in the present paper.

EXPERIMENTAL

Reagents

1. Ferric chloride solution was prepared from B.D.H. sample and the solution was standardised by a volumetric method. Concentration of the Iron (III) was $10^{-2}$ M.

2. Resacetophenoneoxime solution (0.1 M) was prepared by dissolving the pure, dry, recrystallised solid in Methanol (E. Merck).

3. Sodium perchlorate (1.0 M) solution was prepared from Reidel sample.
Polarographic Study of Iron (III) Resacetophenoneoxime Complex

4. Sodium acetate—acetic acid buffer solution (pH 5.8) was prepared from 1.0 M solutions of AnalaR Sodium acetate and acetic acid.

Apparatus

A photographic recording polarograph (L.P. 55) was used for recording polarogram. A pyrex cell with an internal mercury pool anode and dropping mercury cathode was employed in the investigations.

Procedure

1. Polarogram of simple Iron (III).—1.5 ml. of Iron (III) solution, 2 ml. of buffer solution, 1.0 ml. of sodium perchlorate and 1.0 ml. of pure methanol were pipetted out into the polarographic cell. The total volume of the mixture was kept constant at 10 ml. by adding 4.5 ml. of water. The solution was then deaerated by bubbling pure dry hydrogen for about 20 minutes. The polarogram was recorded photographically. The experiment was repeated thrice for reproducibility. Typical polarogram obtained is presented in Fig. 1. The half wave potential is $-0.315$ volt versus Mercury pool. Plot of $\log \frac{i}{(i_d - i)}$ versus $E_{dme}$ is presented in Fig. 2.

![Fig. 1. Polarograms of (a) Iron (III), (b) Iron (III)—Resacetophenoneoxime complex.](image)

2. Polarogram of Iron (III)—resacetophenoneoxime complex.—The polarograms of the Iron (III)—resacetophenoneoxime complex were recorded at: (a) different concentrations of the complex, (b) at different heights of mercury reservoir, and (c) at different concentrations of the complexing agent as follows: (a) In the first series of experiments 2 ml. of