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Journal Name:	International Research Journal of Pure and Applied Chemistry
Manuscript Number:	2014_IRJPAC_10977
Title of the Manuscript:	Investigations of ferrous thiamine complex by cyclic voltammetry
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	In its current state, the level of English throughout the manuscript does not meet the journal's desired standard. There are a number of grammatical errors and instances of badly worded/constructed sentences. For example, “Vitamin B1”(first word in “Introduction”) used once and others are “thiamine”; Fig. 4. “...between Ipa verses ...” should be “...between Ipc verses ...”, and the horizontal ordinate should be “the mole ratio between ferrous and thiamine”... No clearly research objects. Why study the mole ratio between ferrous and thiamine in complex ? The electrochemical results why are not used in the discussion of mechanism? In order to be published, the manuscript should provide a novel approach and/or more in depth data analysis of the reaction mechanism. However, this submission did not do either.	I have corrected the grammatical error. Vit B1 is the second name of thiamine and replace as thiamine hydrochloride. Fig 4 is plotted again as fig 6 The detail studied of complexation of thiamine is reported with different biological active metals such as Zn^{2+}, Co^{2+}, Cd^{2+}, Hg^{2+}, Pt^{2+} and Pd^{2+} (Louloudi, et al., 1990; Ning, et al., 2001). But the interaction of iron with thiamine is not reported however it is more vitally required for human body. Iron plays very important roles in biological system such as oxidation and reduction reaction, bioenergetics and catalytic reactions. In present study, the involvement of thiamine in complexation with ferrous ion in acidic KCl medium is investigated. The mechanism of this type of reaction is also studied. Electrochemical results are discusses in discussion with mechanism. Such as Randles Sevcik equation is applied on that



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		complex formation reaction for determination the diffusion coefficient and reversibility of the reaction. $I_p = -2.69 \times 10^5 n^{3/2} C D^{1/2} v^{1/2} \text{ ----- Eq 1}$ The graph is plotted between I_{pa} or I_{pc} and $v^{1/2}$, and the linear dependence was obtained with 0.992 coefficient of regression (Fig. 5). It shows that the reaction is reversible and is occurring under diffusion control system. The average diffusion coefficient values were found between 400 to 500 for both I_{pa} and I_{pc} current by using Randles Sevcik equation (Eq-1). The equilibrium constant values of all complexes are calculated through the plot of I_{pc} (Fig 6-7) values versus variable concentrations of thiamine and ferrous ion at different scan rates. These values of equilibrium constants are increasing with variable concentration of metal ion upto 300 mV/s given in Table 1. The equilibrium constant values are calculated by using the following formulas $2M + A \leftrightarrow M_2A$ $K_{eq} = [M_2A]/[M]^2 [A]$ $i_d = a[M_2A]$
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		$[M] = [M]_{eq} - 2 [M_2A]_{eq}$ $[A] = [A]_{eq} - [M_2A]_{eq}$ The mechanism of complexation reaction could be suggested by the assumption that one electron transfer reaction may occur in one step at fast scan rate and in two steps at slow scan rate. Literature also shows that the one electron transfer reduction process of thiamine occurs in aqueous solution (Siddiquia and Pitre, 2001). In 1:1 mole ratio complex, AFe (where A is ligand) is oxidized at Pt electrode and converts into A^+Fe, which reduces with fast scan rate and it may be converted into A^+ and Fe at slow scan rate, then A^+ was reduced into A and reacted with Fe atom and converted into AFe complex. The charge balance of complexes is not considered here, they could be balanced by some counter ions. $[AFe] \xrightleftharpoons{k_o \text{ fast}} A^+Fe + e^-$ $A^+Fe + e^- \xrightarrow{k_1 \text{ slow}} A^+ + Fe$ $A^+ + e^- \rightarrow A$
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		$A + Fe \xrightarrow{k_1} [AFe]$ In case of AFe_2 complex, thiamine may oxidize and converts into $A^+ Fe_2$ which further reduces at fast scan rate. At slow scan rate $A^+ Fe_2$ may converted into $A^+ Fe$ and that reduces in the presence of Fe atom and converts into AFe_2 complex or may be converted into A^+ and Fe atom. A^+ reduces into A and reacted with two moles of Fe atoms and formed AFe_2 complex. $AFe_2 \xrightleftharpoons[k_o \text{ fast}]{} A^+ Fe_2 + e^-$ $AFe_2 \xrightleftharpoons[k_o \text{ fast}]{} A^+ Fe_2 + e^- \xrightarrow[k_{-1} \text{ slow}]{} A^+ Fe + Fe + e^- \rightarrow AFe_2$ $A^+ Fe \xrightarrow{k_{-2}} A^+ + Fe$ $A^+ + e^- \rightarrow A$ $A + 2Fe \xrightarrow{k_1} [AFe_2]$
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<u>Minor</u> REVISION comments		
<u>Optional/General</u> comments		