Cyclic and Square Wave Voltametric Studies of Mn(II) and Co(II) Dithiocarbamate Complexes

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The cyclic and square wave voltammetry of Mn(II) and Co(II) dithiocarbamate complexes have been investigated. The data obtained indicated one or two redox couple(s), with each redox couple associated with a sequential single electron transfer corresponding to metal center quasi-reversible redox processes. The Manganese(II) complexes (1 and 3) exhibited two redox couples in the range -0.4 to 0.6 V, the two oxidations and the corresponding reductions are assigned to $\text{Mn}^{\text{II}}/\text{Mn}^{\text{III}}$ and $\text{Mn}^{\text{III}}/\text{Mn}^{\text{IV}}$ redox processes. The cobalt(II) complexes (2 and 4) showed a single redox couple in the range 0.52 to 1.12 V, assigned to metal center one-electron quasi-reversible $\text{Co}(\text{II})/(\text{III})$ and $\text{Co}(\text{III})/(\text{II})$ oxidation and reduction respectively. The linear relationship of the plot of $I_{p,a}$ vs $v^{1/2}$ (Randles-Sevcik plot) suggested a diffusion controlled behaviour of all the complexes.

Keywords: Electrochemistry, Dithiocarbamates, Cyclic voltammetry, Manganese(II), Cobalt(II)

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