REACTIVITY OF THIRAM AT GLASSY CARBON ELECTRODE SURFACES

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Thiram [$(CH_3)_2N$-CS_2-CS_2-$N(CH_3)_2$], a commonly used fungicide in Sri Lanka, is electroactive at glassy carbon electrodes in aqueous medium giving rise to many oxidation and reduction reactions. The major oxidation and reduction peaks appear at +0.75 V and -0.47 V, respectively, vs. SCE in 0.1 M KCl, under N_2 saturated conditions.

The study reported here is on electrochemical investigation of the reactivity of thiram on glassy carbon surfaces, under aggressive conditions, in particular, extreme pH and applied potentials. Special attention was given to investigate adsorption characteristics of thiram on glassy carbon surfaces. Electrochemical activity of simple parent compounds and model compounds of thiram such as aliphatic amines, thiourea and carbondisulfide was also investigated in support of the interpretation of electrochemical responses of thiram.

Thiram does not show any activity at platinum or carbon paste electrodes, indicating that the surface condition of the electrode is crucial for its reactivity. Reactivity of thiram is also affected by the type of the supporting electrolyte. Effects of repetitive scans, the magnitude of the scan rate and the bulk concentration on the peak current of the major oxidation reaction of thiram suggest that both adsorption and diffusion be responsible for its electroactivity at glassy carbon surfaces. Investigation of electrochemical activity of simple model compounds, containing at least one functional group of thiram, such as amines, carbon disulfide and thiourea, as compared to that of thiram indicates that the main oxidation is associated with the amine group. Further, degradation of thiram is greatly facilitated by application of extreme electrochemical potentials.

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