

폐수/폐기물-6 A Study on the Chemical Properties of Environmental Pollutant

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1. Introduction

In 1999 a review of the preliminary data from the pilot studies, EPA's Science Advisory Board (SAB) said: "when completed, NHEXAS should provide a greatly improved understanding of human exposure to selected pollutants. This, in turn, will be helpful in determining the most effective strategies to reduce the public's risk to hazardous environmental chemicals." That SAB review pronounced NHEXAS "can excellent project that has significant promise for improving public health in a cost effective manner." Graham says NHEXAS will upgrade the scientific understanding of human exposure to pollutants¹. The kyunghyang shinmun was reported with statistical data(from 4. 1999 till 8. 2000) from research institute in korea. An according to the newspaper report expressed concern about limited resources that have been allocated to analyze data from research institute in korea. Researchers investigation was investigated where of Sum Jin river(Hadong in Kyung Nam) and Eui Am lake(Chum-Cheun in Kang Won). Researches also measured the level of the target chemicals in air, in foods, drinking water they consumed, and in soil, and dust around their houses.

2. Results and Discussion

2.1 Electrochemical Studies

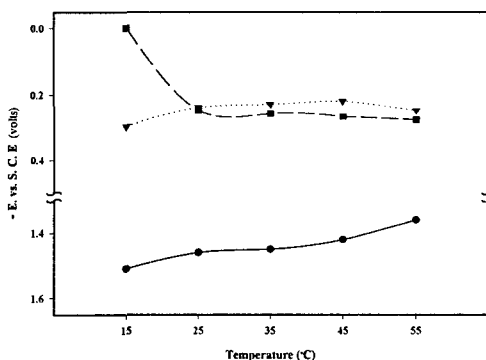


Fig. 1. Plot of $E_{1/2}$ vs. temperature for redox reaction with tributyltin (●: 1st reduction; ▼: 2nd reduction; ■: 1st oxidation potential).

Table 1. Electrochemical characteristics (C.V) of various conditions of TET in DMSO with 0.1 M TEAP(scan rate: 100 mV/s) at 25°C.

Parameter Redox steps	Temperature (°C)					Temperature (0.35% NaCl)					pH (25°C)				
	15	25	35	45	55	15	25	35	45	55	3.0	5.0	7.0	9.0	11.0
1st wave	-0.30	-0.24 (-0.25)	-0.23 (-0.26)	-0.22 (-0.27)	-0.20 (-0.28)	-0.25	-0.32	-0.30	-0.29	-0.29	-0.70 (0.20)	-0.10	-0.26 (0.12)	-0.25 (0.09)	-0.05 (0.09)
2nd wave	-1.50	-1.46	-1.45	-1.42	-1.36	-1.30	-1.42	-1.38	-1.32	-1.32	-0.40 (0.52)	-0.73 (0.55)	-1.40	-1.49	-1.40
3rd wave	.	.	.	.	.	.	.	.	.	.	-0.78	-1.40	.	.	.
4th wave	.	.	.	.	.	.	.	.	.	.	-1.50	.	.	.	.

Differential pulse polarographics(DPP) and cyclic voltammograms(CV) of the tributyltin were recorded in acetonitrile solution under a nitrogen atmosphere with 0.1M TEAP. The curves of the peak to peak separation in DPP and CV methods are presented to two step electrochemical charge transfer. To our knowledge, this Tin(II) compound exhibited to one step reduction and three step oxidation. Evidence of one electron charge from the redox processes was obtained $n = 1.03$ value by coulometric. Here, the techniques of differential pulse polarography and cyclic voltammetry have been applied to the determination of response on experimental data. As shown Fig. 1 and Table 1, $E_{1/2}$ and E_p values obtained from DPP and CV methods are not coincident to all the steps, but $(E_p)_2 - (E_{1/2})_1 = 0.83$ V values obtained by the two methods were found with good agreement clearly.

3. Conclusions

The compound exhibited only redox couples(1st and 2nd steps) and single(3rd step) reaction at 25°C. However, it appears only reduction waves at all temperatures with except for at 25°C. The 1st and 2nd redox waves were irreversible since the peak potentials difference(ΔE_p) was larger than 60 mV. Electron number of charge transfer from redox processes was obtained to one electron. Molar conductivity(Λ_M) indicated the non-electrolyte in acetonitrile. Comproportionation constant($K_c = 1.03$) is obtainable in the range -1.03 V < $\Delta E_{1/2}$ < -1.77 V.

The 1st and 2nd of redox tests exhibited distinctly an only negative and positive potential values at 25°C, but the 2nd wave was a break down when at the temperatures increasing an only(to 35°C till 55°C). The reduction potential of the temperature in 0.35% NaCl solution, it conclude that the product of nonelectroactive and either impedes the reduction of hydrogen ions in salt solution or exposed to a depleted of reactants in the diffusion layer adjacent to the electrode.