

## Electrochemical Behavior of Organosulfur Compound having various functional groups in an Organic Electrolyte Solution

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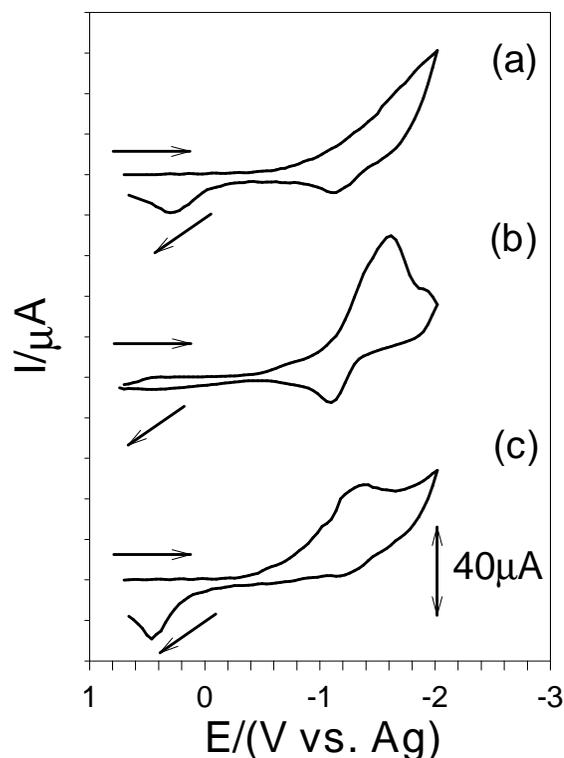
The scission and formation of the S-S bond of organic disulfides (RS-SR) have been reported [1-4]. The redox reaction for the scission and formation of disulfide bonds are related with the electron atmosphere of functional group (R).

The electrochemical behavior of various organosulfur compounds has been studied in an organic solvent using cyclic voltammetry (CV). Accordingly, the intermediates and final products of redox reaction have been characterized by UV/VIS absorbance spectroscopy. Organosulfur compounds contains alkyl, aryl disulfide, and thiolate ions. The purpose of this study is to investigate the redox reaction mechanism and electron-transfer kinetics for electrochemistry of organosulfur compounds.

CV curves of organosulfur compounds dissolved in solutions are obtained by using a Pt disk electrode (diameter: 1.6 mm) as a working electrode. Ag wire and Pt wire were used as pseudo-reference electrode and counter electrode, respectively. All experiments were performed at glove box under argon atmosphere.

Figure 1 shows a preliminary result that indicates the influence of the aromatic functional group on the redox reaction behavior of disulfide compound. Phenyl disulfide (PD) shows no distinct reduction peak as shown in Fig. 1(a), which means that the scission of disulfide occurs at more negative potential ( $-2300\text{mV}$ , not shown here). It shows a big separation of redox peak potential meaning the rather slow kinetics. Dithiosalicylic acid (DSA) shows a reduction peak at  $-1580\text{mV}$ . In the case of 4,4-dithiodipyridine (4DTP), it shows a reduction peak at  $-1320\text{mV}$ . As a result, the reduction peak potential showing the scission feasibility of disulfide bond is in the order of  $4\text{DTP} > \text{DSA} > \text{PD}$ . It is thought that the reduction has been influenced by the electronic atmosphere of aromatic structure. More detailed redox reaction mechanism and electron transfer kinetics will be discussed.

Figure. 1. Cyclic voltammograms of (a) 2mM PD, (b) 2mM DSA, and (c) 2mM 4DTP in 0.5M  $\text{LiCF}_3\text{SO}_3/\text{DMAc}$  (scan rate:  $500\text{mV/s}$ ).



## References

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