

CHAPTER 4

CONCLUSIONS

The polymeric salen containing di, tri and tetra ethyleneglycolic chain (7,8 and 9) were synthesized with the overall yield of 31%, 18% and 8%, respectively. The most problematic synthetic step was the double nucleophilic substitution reaction of ditosylated esters (1,2 and 3) with 2,4-dihydroxybenzaldehyde due to the incompleted and over substitution to give mono- and trisubstituted products. The molecular weights of all targeted polymers were determined by both $^1\text{H-NMR}$ and GPC methods. The differences in the molecular weights obtained by both method implied the occurrence of the cyclic oligomers during the polymerization.

The complexation of all synthesized polymers with various metal ions and their solubility tests were performed. All complexes, excepting cobalt, were soluble in some solvents when the flexible tetraethylene glycolic chains were incorporated into the polymer chains.

In the preliminary electrochemical study, the nickel-salen coated electrode displayed the negative shift of the voltammetric signal in the electrolyte containing pyridine, styrene oxide and methanol compared to the signal appeared in the free electrolyte. This voltammetric results implied the interaction between the central ion and analytes. Some analytes such as methylbenzylamine could be oxidized at the surface of modified manganese salen electrode with the higher sensitivity than that of a conventional glassy carbon electrode.

The linear range of these modified electrodes toward all analytes were observed. It was found that the linear range of pyridine, (*R,R*)- and (*S,S*)-1,2-diaminocyclohexane and methylbenzylamine was $2.48\text{-}1.48 \times 10^{-2}$ mol/L, $1.00\text{-}5.00 \times 10^{-3}$ mol/L and $2.36\text{-}5.50 \times 10^{-2}$ mol/L, respectively.

Suggestions for future works.

1. The optimization of the electrochemical condition such as scan rate, electrolyte selection, the film thickness of modified electrode must be performed to improve signal sensitivity.
2. The method to reactivate the surface of the used electrode should be studied.
3. Other reactive analytes such as nitric oxide or azide compounds should be tested with these metal-salen modified sensors.
4. The attachment of bulky tertiary butyl group into salen structure was considered to be essential for further improvement in enantioselectivity of our metal-salen coated electrodes.



ศูนย์วิทยทรัพยากร
จุฬาลงกรณ์มหาวิทยาลัย