



CHAPTER IV

CONCLUSION

The ligands **15** - **18** consisting of benzothiazolylacetamidoalkoxy groups appended on the narrow rim of calix[4]arene were synthesized in four steps: (i) substitution of calix[4]arene phenolic hydrogen with alkyl nitrile, (ii) reduction of nitrile to amino group, (iii) conversion of amino group to cyanoacetamido group and (iv) condensation of cyano group with 2-aminothiophenol to give benzothiazolyl group. The studies of the four ligands showed that all ligands interacted with Cu^{2+} , Hg^{2+} and Ni^{2+} in 10% (v/v) acetonitrile in methanol with stability constant (1:1 complex) of 3.78-4.08 for Cu^{2+} , 2.25-2.79 for Ni^{2+} , 3.31-3.99 for Hg^{2+} . The interaction of other cations such as Cd^{2+} , Pb^{2+} , Ca^{2+} , Mg^{2+} , Na^+ , K^+ were not evident from the change in UV-spectra of the ligand. A preliminary test of the Cu^{2+} -ISE membrane using the synthesized ligands as ionophores with the composition of 1.0:65.6:33.0:0.40 (weight percent of ligand : *o*-NPOE : PVC : KTCIPB) showed that the ISEs response were 21.3-26.8 mV decade⁻¹. The most serious interference of divalent metal ions as measured from the potentiometric selectivity coefficient (FIM) was Pb^{2+} ($\log K_{\text{Cu}^{2+}, \text{Pb}^{2+}}^{\text{pot}} = -0.27$ to 0.28). The selectivity for Cu^{2+} over other cations decreased in the order $\text{Ca}^{2+} \sim \text{Mg}^{2+} > \text{Cd}^{2+} \sim \text{Ni}^{2+} > \text{K}^+ > \text{Na}^+$.

Suggestion for future works:

An attempt to synthesize benzothiazolylthioacetamido calix[4]arene by refluxing the ligands **15-18** with Lawesson's reagent in toluene yielded many decomposition products. It may worth investigating because the replacement of S into carbonyl O may increase the selectivity of the ligands toward Group I and II metal ion.

The simple and efficient methods for investigations of the relationships of stability constants on polarity of the solvent should be established. This will be a useful tool for prediction of the selectivity of the ISE-membrane.