CHAPTER IV

CONCLUSION

The chromic transitions of poly (10, 12 pentacosadiynoic acid) sol were studied by electronic absorption spectroscopy. The thermochromic transition started with gradual shift of the absorption λ_{max} corresponding to the change of blue vesicles into the thermally unstable and reversible purple form. This gradual shift is presumably attributed to the conformational alteration of the methylene chains. Excess heating resulted in the transition of the vesicles into the stable and irreversible red form suggesting the hydrogen bond breaking at the carboxylic head group. On the other hand, the solvatochromic and alkalinochromic transitions begin with the interface interaction leading directly to the hydrogen bond disruption and the red vesicles. The techniques and interpretation presented here should be general for other types of chromism of various forms of polydiacetylene assemblies.

Immobilization of poly(PCDA) vesicle via layer-by-layer deposition was an effective method for prepared vesicles into thin films with preserved colorimetric sensing properties. The color intensity of the films can be controlled through the number of vesicle layers deposited by this technique. With chitosan, polyelectrolyte multilayer films containing polydiacetylene vesicles were successfully prepared. The films were demonstrated to be very stable upon storage and very convenience to be used as naked eye detecting devices.

A selective Pb^{2+} detecting system was developed from a sol of TEGPCDA and PCDA mixed lipid assembly. The incorporation of TEGPCDA into PCDA assembly can at 30% mole enhance the sensitivity of the lipid which can detect Pb^{2+} down to 50 μM of Pb^{2+} simply by observing the color change from blue to pink.

Thermochromic screen ink of PCDA, MPCDA, APCDA and EBPCDA was successfully prepared using commercial screen ink resin. The screen ink was screened through a patterned stencil to prepare thermochromic labels with desired images and thermochromic properties. The irreversible thermochromic labels may be used for indicating the inappropriate temperature history during storage or transport while the reversible ones may be used for indicating the present temperature of the products.

Suggestion for future works

The suggested for future work should be focused on

1) Development of chemical or biological sensor from PEM film
2) Study of the nanostructure assembly of TEGPCDA/PCDA vesicle
3) Study of thermochromic transition mechanism of TEGPCDA/PCDA
4) Preparation of metal ion sensor by incorporate novel receptor molecule into TEGPCDA/PCDA vesicle