



## CHAPTER IV

### CONCLUSION AND SUGGESTION

#### 4.1 Conclusion

The thermochromic films with tunable color transition temperature (CTT) were successfully prepared from methacrylic-acrylate latexes and poly(10,12-pentacosadiynoic acid) vesicles. The thermochromic films changed their color from blue to red at various temperatures depending on the conditions used in the preparation. The parameters affecting the CTT and film properties include the methacrylic/acrylate monomer ratio, addition of cross linking monomer, addition of ammonia, emulsifier content, and addition of texanol (a coalescing agent). The CTT of the thermochromic films is associated with the  $T_g$  of the latexes. The addition of crosslinking monomers enhanced film forming ability without lowering the glass transition temperature ( $T_g$ ). The addition of texanol at 0-25% (w/w) gave the widest tunable CTT range, 0-75 °C. The addition of ammonia can also be used to improve the film forming properties when the high  $T_g$  and CTT values are desired. The mechanisms proposed for the color transition of the films included thermally induced mechanochromism and solvatochromism. The strategy found in this research work can be conveniently apply for design and preparation of films used as indicative label for temperature sensitive products such as foods and medicines

#### 4.2 Suggestion for future work

The real applications from the results of this research work in the field of indicative label on frozen food packaging should be sought afterward. The important properties of the label are the storage stability and adhesive ability. Therefore, the future work may be searching for the method of thermochromic films preparation as sticker with used the copolymer of vinyl acetate monomer and acrylic monomers because vinyl acetate monomers are more flexible than methacrylic.