CHAPTER IV
CONCLUSION

4.1 Conclusion

In conclusion, five new PDA containing boronic acid with either amide or ester tethers were prepared successfully. The PDA having amide group such as 10,12-*p*NB-PDA (**1a**), 10,12-*m*NB-PDA (**2a**) 6,8-*m*NB-PDA (**3a**) and showed thermochromically reversibility and partial thermochromically reversibility respectively upon cooling-heating process. These PDA was also stable upon the exposure to vapor of VOC, acid-base and surfactants. The color of these PDA remains blue or pale purple. On the other hand, chromic properties of PDA having the ester group such as 10,12-*p*EB-PDA (**4e**) and 10,12-*m*EB-PDA (**5e**) were irreversible during the same heating and cooling cycle. Also solvatochromism, alkalinochromism and affinochromism of these PDA with ester boronic acid group were observed in various degrees showing stronger trend when compared with the amide boronic acid PDA derivatives. The results suggested that the amide linkage in PDA can maintain the conjugated network causing the more stable PDA system while the PDA with ester group provided weaker H-bond interaction among head group leading to the sensitive PDA. The outcome of this study reveals the basic design of PDA sensor. The first PDA series having amide boronic acid (**1a-3a**) are an idea temperature sensing element due to their specific response to only temperature while the second PDA series (**4e**,**5e**) having ester boronic acid could be further develop into chemo sensor.

4.2 Suggestion for future works

Base on the result, the development of sugar sensor based on PDA is unsuccessful and remain challenged. What we have learn from our result is amide and aromatic groups on PDA side chain response for the strong head group interaction and prohibit the distortion of PDA conjugate backbone. This behavior then caused the color unchanged even though boronic acid-sugar interaction might occurred. To reduce such strong head group interaction, the aromatic group must be removed from the PDA system. In the future therefore, we plan to synthesis the diacetylene monomer in the hope that alkyl tethered would not interfere the boronic acid interaction and facilitate the colorimetric change.

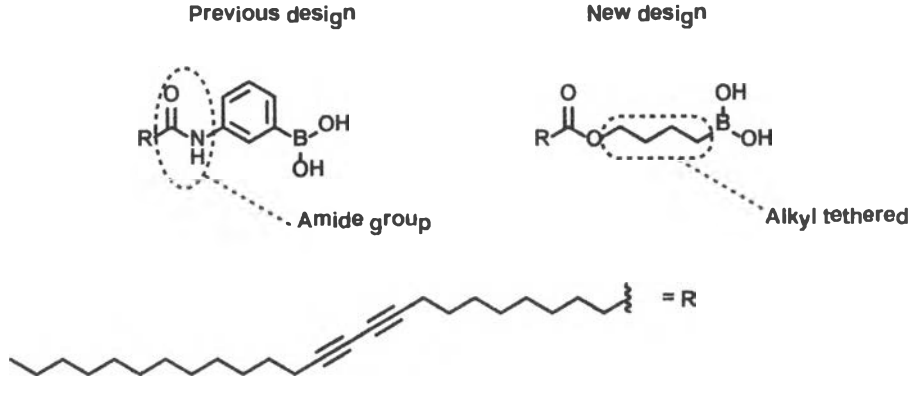

Figure 4.1 Structure of new design diacetylene monomer containing alkyl boronic acid.