CHAPTER IV
CONCLUSION

4.1 Conclusion

In conclusion, We have successfully synthesized and developed a series of 1,4-dihydropyridine (DHP) based on the cyclotrimerization of β-amino acrylate by treatment of $TiCl_4$ as Lewis acid at room temperature. The DHP was liked with various sizes of azacrown ether as receptor unit. These DHP derivatives were proven to be a selective fluorescence chemosensor soluble in aqueous media thanks to their water solubility and good fluorogenic responses. According to the results of photophysical property investigation in milliQ water, these Et-DHP-AC(1-3) exhibited the absorption maximum of 367, 369, and 362 nm, respectively and the similar emission peak at 439 nm with the florescent quantum efficiencies (Φ_f) of 0.41, 0.45, and 0.46, respectively. Et-DHP-AC(3) displayed a specific fluorescence quenching with gold ion (Au^{3+}). The decreasing of fluorescence signal was proportional to Au^{3+} concentration providing the lowest detectable concentration (LDC) of 50 μM. The fluorescence quenching was conceivably caused by the oxidation of DHP into pyridinium ring specifically induced by Au^{3+} resulting in its extraordinary selectivity over other metal ions. As the results of photophysical property investigation in acetonitrile and milliQ water (v/v = 70:30) Et-DHP-AC(3) exhibited the absorption maximum 368 nm with molar absorption coefficient as 5,800 $M^{-1}cm^{-1}$. Also this compound revealed the emission peak at around 439 nm with florescent quantum efficiencies (Φ_f) of 0.17. Moreover, they were also applied to use for fluorescence enhancing in mixture solvent between acetonitrile and milliQ water. When Et-DHP-AC(1-3) were tuned as fluorescence enhancing sensors in THF or acetonitrile and milliQ water. As a result, Et-DHP-AC(2) was found to demonstrate the best selectivity enhancement with chromium(III) that formed complexation with the ratio of Et-DHP-AC(2):Cr^{3+} equal to 3:1 in THF/milliQ water (v/v=1:1) with LDC of 50 μM causing the fluorescence enhancement because of molecular rigidification which directly prevents nonradiactive decay.

4.2 Suggestion for future work

The Et-DHP-AC(3) should become powerful sensor to detect gold(III) ion in aqueous media with real sample such as living cells, food, and drinking water. In addition, The selectivity and specificity study of Et-DHP-AC(1-3)·M^{+} complex eg. Ba^{2+}, Sr^{2+}, and K^{+} was focused, in order to prove the possibility heteroallosteric system towards other molecules.