

## CHAPTER V

### CONCLUSIONS AND FUTURE PERSPECTIVE

#### 5.1 Conclusions

In this work, GSH and Cys modified onto AgNPLs surface was successfully developed for selective determination of Ni(II). In the modification step, GSH and Cys can self-assemble on AgNPLs surface via the -SH group, resulting in a pink-colored solution of GSH-Cys-AgNPLs. After the addition of Ni(II), the aggregation between GSH-Cys-AgNPLs and Ni(II) was occurred, and the color changed from pink to purple immediately. The optimization parameters including modifier ratio, pH, and incubation time were examined. The optimal conditions comprising of GSH and Cys at a concentration ratio of 1:5, phosphate buffer pH 8.0, and 6 min of incubation time were used. The calibration curve between the absorbance at 618 nm and Ni(II) concentrations generated linear range between 10 to 150 ppb with a high correlation coefficient of 0.9971. The detection limit and quantification limit (LOD and LOQ) were found to be 7.02 ppb (S/N=3) and 23.01 ppb (S/N=10), respectively. Additionally, this method was applied for the quantification of Ni(II) in a gold-plating solution from the Gem and Jewelry Institute of Thailand (Public Organization). A good agreement between the conventional inductively coupled plasma optical emission spectrometry and GSH-Cys-AgNPLs colorimetric sensor for the determination of Ni(II) was achieved (98.85% and 96.18%, respectively). Therefore, this proposed method provides an alternative, attractive, feasible and reliable sensing toward Ni(II) determination. Moreover, our sensor might have a potential to measure Ni(II) in various kinds of real samples as well.

## 5.2 Future perspective

In the future, this GSH-Cys-AgNPLs sensor has the potential to be applied on inexpensive and portable microfluidic devices (e.g. paper-based device and polymer-based microchip) for the determination of Ni(II) in environmental sample. Moreover, the selectivity of colorimetric AgNPLs sensor can be tuned by altering type and concentration of modifier, tending to discover an innovative colorimetric sensor which can be applied for the determination of other metals.

