CHAPTER 4

CONCLUSION

The DC conductivity detector was successfully fabricated and applied for chemical analysis. Although, it can be used only in efficient movement of solution to handle with gas bubble and cannot represent the true conductance precisely, DC conductivity detector shows good analytical performance to use in flow injection analysis as an alternative conductivity detector with a simple pulseless circuitry fabrication, extremely low cost and compact conductivity detector. The detector was used to couple with the gas diffusion flow injection analysis system for dissolved inorganic carbon (DIC) determination in some natural waters. The proposed method provided a good analytical performance with the working range of calibration graph of 1.0-10 mmol L^{-1} HCO_3^-, relative standard deviation (%RSD) of <3%, sample throughput of 15 injections h^{-1} and the limit of detection of 70 µmol L^{-1} HCO_3^- (3SD of blank). The optimized system was used for DIC determination in the hot spring water samples which showed accurate result in recovery of 93-103%. This detector with GD-FI system would be developed for the portable measuring system and applied to determine the other gas convertible species such as NH_4^+/NH_3.

The LED-photodiode based fluorescence detector was successfully fabricated and applied to use with the single line FI system for ammonium determination. The fluorescence method is based on the chemical reaction of ammonium and ortho-phthalaldehyde (OPA) in a basic solution. The solution contains sodium sulfite as the reducing agent to produce the fluorescence product which is detected by the proposed fluorescence detector. This analytical experiment provided the good performance with working range of calibration graph of 0.5-10 µmol L^{-1} NH_4^+, the sample throughput of 15 injections h^{-1} and the limit of detection (LOD) of 0.5 µmol L^{-1} NH_4^+. The proposed device was applied for ammonia gas determination in air samples. The analytical performance

of this proposed fluorescence detector would be applied for NH_3 determination in breath in the future.