CHAPTER 4

Conclusion

The novel ASV method with Bi-SPCE as a working electrode has been successfully developed and applied in the simultaneous determination of trace cadmium and lead in water before and after treatment with chelating ion exchange column and in glazed ceramic ware samples. The experimental conditions for ASV determination of the metals have been studied and the optimum conditions are summarized in Table 3.1. The use of Bi-SPCE is more environmental friendly than the mercury electrode.

The developed method can be used for determining low concentration of cadmium, lead, and zinc in natural water samples. Furthermore, the treatment of metal contaminated water by employing ion exchange resin column was investigated. In water treatment samples after passing through the Chelex 100 resin to remove heavy metal ions from wastewater samples, it was found that the concentration of cadmium and lead in treated water samples are lower than the permissible values of the industrial effluent standard, and can discharge this water into the natural water. Chelex 100 resin provide efficient removal of heavy metal ions.

In ceramic samples, the metals were extracted from the glazed ceramic surface by soaking the ceramic sample with 4% (v/v) acetic acid solution for 24 h, under room temperature and in dark place. It was found that the concentration of cadmium and lead released from the glazed surface of ceramic ware samples are lower than the permissible values of the Thai industrial standard. The home-made Bi-SPCE provides advantages such as resulting in well-defined stripping response, good repeatability, and low-cost (the cost is less than 1 Bath for each working electrode). Therefore, the developed electrode can be used as an alternative electrode to mercury electrode for determination of the cadmium and lead ions at trace concentration level. For further work, the proposed method will be applied with a home-made voltammetric instrument to detect

of trace heavy metals, which can reduce instrument cost and is able to employ in ceramic's small and medium enterprises (SME). The Bi-SPCE is a greener electrode and can be mass produced with low cost.