Thesis Title	Development of Flow Injection Analysis for Trace Cadmium and Cobalt Determination
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Abstract

Flow injection analysis(FIA) systems were constructed from available materials for cadmium and cobalt determinations.Two different spectrophotometric procedures were modified for FIA to improve the efficiencies of the methods.Cadmium was determined by FIA-colorimetry based on the reaction between cadmium(II) and rhodamine B, yielding an intense violet-colored complex with a maximum absorption at 605 nm.The method involved injection of a 100 μl volume of standard and/or sample solution into a carrier stream containing 4.00 $\times 10^{-5}$ M rhodamine B, 1.10 $\times 10^{-4}$ M polyvinyl alcohol and 0.17 M potassium iodide.The optimum conditions for determining small amounts of cadmium(II) were determined.Linear calibration curve over the concentration range 0.60 - 1.60 ppm and 1.60 - 2.00 ppm were obtained. The technique was found to be accurate, reproducible and sensitive.The relative standard deviation for replicate injections was found to be 0.84 % for 1.00 ppm of cadmium(II) standard solution. A detection limit of 0.50 ppm and a percentage recovery of the added cadmium(II) of 101.63 were obtained.The method was applied to the determination of cadmium(II) in slag and soil samples obtained from the Department of Mineral Resources

; the amounts of which were found to be in the range 1.04-7.30 ppm. A FIA-spectrophotometric procedure for cobalt(II) determination was also developed. It was based on the reaction between cobalt(II) and Nitroso-R Salt as a carrier stream. The red-coloured product was measured at the maximum absorption of 510 nm after the injection of 200 μl of cobalt(II) into a carrier stream containing 5.00 $\times 10^{-3}$ M Nitroso-R salt/acetate buffer.The optimum conditions for this method were determined and linear calibration curves over the concentration ranges 0.20 -1.40 and 1.40 - 3.00 ppm of cobalt(II) were established. This method was also found to be accurate, reproducible and sensitive. A relative standard deviation for replicate injections was found to be 0.70 % for 1.00 ppm of cobalt(II) standard solution.A detection limit of 0.01 ppm and a percentage recovery of the added cobalt(II) of 99.18 were obtained. The method was applied to the determination of cobalt(II) in rock samples from Amphur Mae Prig in Lampang Province; the amounts of which were found to be in the range 0.41 - 1.38 ppm . Determinations of cadmium(II) and cobalt(II) in the slag, soil and rock samples by atomic absorption spectrophotometry were also carried out for comparison. It was found that the results obtained from both methods were in good agreement.