CHAPTER V

CONCLUSION AND RECOMMENDATION

In attempt of the investigation of absorbing reagents instead of TCM solution, many absorbing reagents such as 0.1 N sodium hydroxide solution, 2% glycerol in 0.05 N sodium hydroxide solution and buffered formaldehyde solution were tried. Buffered formaldehyde solution was found to be an efficient absorbing reagent for analysis of sulfur dioxide in air.

Iodine method and alkalimetric method were applicable to high concentration of sulfur dioxide (3.0 $\mu g/cm^3$ and 75 $\mu g/cm^3$, respectively) The precision and accuracy of these methods were not good enough for determination of sulfur dioxide in low concentration. Aniline method provided better accuracy, precision and sensitivity than the others so aniline method was selected for the further study.

The best condition for analysis of SO_2 in air by aniline method was examined and it was found that the pH of the solution should be controlled at 1.7-2.2. In the present study H_3PO_4 was used for this purpose.

For analysis of SO_2 in air, substitution of a non toxic buffered formaldehyde for TCM solution was used as absorbing reagent and sulfur dioxide was analysed towards the aniline method by formation of compound which gave spectrum in ultraviolet. That spectrum of this compound and the reagents were studied. It found that no maximum absorption peaks of reagents interfered the maximum absorption peak of

this compound. The absorption peak of aniline in buffered formaldehyde would raise up the base line of the spectrum of the compound so a reagent blank had to be used for reference.

Concentration of copper (II) and lead (II) in 1.6 $\mu g/cm^3$ SO_2 that were less than 10 µg did not interfered this determination but manganese (II) in 1.6 $\mu g/cm^3$ SO_2 was significant interference when the concentration was higher than 2 µg. Effects of these heavy metals were eliminated by adding phosphoric acid. Nitrogen oxides also interfered this determination so sulfamic acid was used to eliminate this effect.

To determine the condition for best absorption of the product, pH and time varying were studied. It was found that the maximum absorption resulted at 242 nm, pH 1.7-2.2 and the measurement of the absorbance should be performed 10-20 minutes alfter the mixing of solution.

By this aniline method, concentration of sulfur dioxide found resulted in positive deviation of 5% from standard sulfur dioxide in inert air. By pararosaniline method, it provided negative devation of 3% from standard sulfur dioxide in inert air. Sulfur dioxide in ambient air could be determined from 25 $\mu g/ m^3$ by this method while pararosaniline could determine in lower concentration (5 $\mu g/ m^3$).

Pararosaniline method provides higher accuracy and sensitivity than this aniline method but cost of the method is also higher. Thus, for routine work the determination of sulfur dioxide in air in the area of rather high concentration of SO_2 (25 $\mu g/ m^3$) this aniline method should be used since its cost is cheaper and chemicals are easily found.

Owing to the lack of low concentration of standard sulfur dioxide permeation tube, the further study at very low sulfur dioxide concentration should be worthful for complete of this method. Other studies which would be suggested are as the following.

1. Heavy metals interferences in this study were eliminated by H_3PO_4, other complexing agents should be worth to try.

2. The other amines instead of aniline might give high accuracy and precision and this would be an other interesting study.