

CHAPTER 5

CONCLUSION

5.1 Ability of Factor Analysis in Quantitative Infrared Analysis of Mixed Xylene

Although there are some errors in quantitative infrared analysis of mixed xylene by factor analysis, however. However factor analysis has shown the feasibility in the measurement of *o*-, *m*-, and *p*-xylene. As demonstrated in Chapter 4 factor analysis program works well on the ternary xylene mixture, but in real mixed xylene there are some differences between the results from this technique and the conventional technique. The ability of factor analysis depends on several factors such as the number of spectra analyzed, the number of data points in each spectrum, the degree of spectral overlap between the components, and the signal to noise ratio of the spectra. The effects of these factors cause the errors in the calculation of factor analysis.

5.2 Application of Factor Analysis in Real Measurement

When factor analysis was used for the quantitative analysis of mixed xylene in a real measurement in laboratories or industries, mixed xylene does not contain only three isomers, but also toluene, ethylbenzene, and other aromatic hydrocarbons. The more components in mixed xylene affect the factor analysis calculation, therefore, the program must be studied with the real mixed xylene in process. Adequate calibration samples are required for constructing the calibration set. The calibration set should be tested until the results meet the acceptable error before using with testing samples.

5.3 Suggestion for Further Study

The limitation of factor analysis should be studied by using the real mixed xylene. The effect of other components and the variations of temperature in xylene process may cause the decrement of prediction quality of factor analysis.



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