

Analysis of Organic Mixtures from Particulate Matters by Using GCxGC/High Resolution Mass Spectrometer

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Introduction

In Korea and China, airborne particulate matter (PM_{2.5}) is very serious environment problems, having primary organic pollutants directly released from emission sources and secondary organic pollutants generated from atmosphere chemical reaction. Thus, the complex organic compounds extracted from PM_{2.5} collected during one month were analyzed to compare their identifications, relative quantities and emission sources.

Methods

Samples of PM_{2.5} were collected using a high volume air sampler. The 90 cm² filter was extracted with dichloromethane through sonication twice. The two days of extracts were combined, filtered and concentrated under N₂ gas. Comprehensive two-dimensional gas chromatography /high resolution time-of-flight mass spectrometry (LECO GC-HRT) was utilized to analyze the organic extracts.

Results and Conclusions

Approximately, 500 compounds were separated on the polar and sequential nonpolar GC columns and identified based on the mass spectral data from NIST and Wiley libraries, and exact mass accuracy (<1 ppm) of molecular ion from high resolution data, including alkanes, carboxylic acids, hopanes, PAHs, substituted aromatics and steranes, so on. A variety of PAHs were identified in Beijing samples such as 11H-benzo[b]fluorine, benzo[ghi]fluoranthene, acepyrene, pyrene and benzo[A]yrene. The identified organic compounds were different qualitatively and quantitatively between Korea and China. Thus, it is anticipated that the issues between two countries related about the emission sources will be discussed, based on these objective results obtained for PM_{2.5} collected in Korea and China