Announcements

2018
Aug. 29 – Sep. 1
(Kyoto, Japan)

2019
May 18 – 19
(Kitakyushu, Japan)
The 79th Symposium of the Japan Society for Analytical Chemistry.*

Sep. 12 – 14
(Sendai, Japan)
The 67th Annual Meeting of the Japan Society for Analytical Chemistry.*

Sep. 11 – 13
(Chiba, Japan)
The 68th Annual Meeting of the Japan Society for Analytical Chemistry.*

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We are pleased to announce that Analytical Sciences administers the abstracts of selected papers published in Bunseki Kagaku. Bunseki Kagaku is an article magazine (monthly publication in Japanese) of The Japan Society for Analytical Chemistry. Bunseki Kagaku publishes peer-reviewed original, technical and review articles, analytical data and techno reports that pertain to various aspects of analytical chemistry. The insertion of the abstracts in Analytical Sciences will help readers all over the world to be aware of recent advances in all fields of analytical chemistry.

(The editorial committee of Bunseki Kagaku)

**BUNSEKI KAGAKU**

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Special Articles: Analytical Chemistry for Atmospheric Environment

Development of a Method for Determination for Atmospheric Volatile Methylsiloxanes and Its Applications to Environmental Monitoring

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To determine atmospheric concentrations of cyclic and linear volatile methylsiloxanes (VMS), material blanks, sample storage conditions, and optimization of GC/MS conditions were examined. A simple sampling method using a solid-phase extraction (SPE) cartridge attached to a mass-flow controlled diaphragm pump was established. For GC/MS analysis, the peak shapes of VMS were improved by using a press-fit type inlet liner. This achieved high sensitivity of VMS, especially for highly volatile compounds, such as hexamethylcyclotrisiloxane (D3). To reduce instrumental and method blanks of VMS, we selected GC parts and lab materials that showed low levels of VMS in a hexane elution test. In a sample storage condition test, no significant loss of cyclic VMS was observed for up to 7-days of storage in a freezer. Using the established method, we conducted the air monitoring of VMS over one year (February 2014-February 2015) in Kazo City, Saitama Prefecture. The total of the 7VMS concentrations varied widely from 63 to 1150 ng m⁻³, with a 100% detection frequency for all VMS measured, except for octamethyltrisiloxane (D3). The mean concentrations of the two main VMS, octamethylcyclotetrasiloxane (D4) and decamethylcyclopentasiloxane (D5), were 123 ng m⁻³ and 118 ng m⁻³, respectively, which was shown to be within the range of the concentrations in urban areas from other countries. The concentrations of linear VMS were observed at two orders of magnitude lower than those of cyclic VMS. The annual profiles of VMS concentrations and D4/D5 ratios tended to shift together, suggesting that the wide variation of the VMS concentrations found in this study could be caused by daily variations of the D4 concentrations. To date, this is the first study to report on the concentration profiles of individual VMS in the atmospheric environment of Japan.

**Keywords:** methylsiloxanes; emerging pollutants; atmospheric environment; GC/MS; Saitama.
Identification of Volatile Organic Compounds from Pollens for Pollen Scattering Markers Using Thermal Desorption-GC/MS

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Pollen allergy is a serious health problem especially in Japan. Therefore, the forecasting and monitoring of pollen scattering have been important techniques for decades. Conventionally, the pollen scattering is monitored by microscopic observation or counting laser-scattering. In this work, we started on the examination of chemical compounds contained in pollens because the identification of pollen and determination of pollen concentrations can be carried out chemically by monitoring atmospheric pollen compounds. First, organic compounds thermally desorbed from pollens were identified by GC/MS for commercially obtained cedar tree pollens, such as Japanese cedar (Cryptomeria japonica C. japonica), Japanese cypress (Chamaecyparis obtusa C. obtusa), and Japanese red pine (Pinus densiflora P. densiflora), and broadleaf tree pollen namely Japanese chestnut (Castanea crenata C. crenata) sampled in a coastal mountain forest. Monoterpenes, nonanol, nonanoic acid, and unsaturated hydrocarbons were observed from all cedar tree pollens. In addition to these common compounds, 1,5-cyclooctadiene, and 4,8,11-trimethyl-7,11-dienylocdecanone (BDC) were observed only from Japanese cedar pollen. Also, alkanes from Japanese cedar, benzaldehyde and (135,184-hexadecadienyl) ketone from Japanese red pine were found as their specific compounds. Benzo alcohol, phenylethyl alcohol (PEA), and terpenes were observed as characteristic compounds of Japanese chestnut. The same compounds were observed from the corresponding cedar tree pollen sampled in a neighboring forest, and it was shown that these compounds can be candidates for pollen markers. Next, pollen suspended in the atmosphere were collected by filtering. The particles were analyzed, as they were on a filter, by thermal desorption-gas chromatography/mass spectrometry (TD-GC/MS). The concentrations of BDC and PEA were determined according to changes in the cedar and chestnut pollen scattering, respectively. It is expected that chemical observation will be available in the future for the identification and quantitative determinations of pollen scatterings by further detailed examinations and automated instrumentation.

Keywords: pollen scattering; atmospheric sampling; thermal desorption-gas chromatography/mass spectrometry; Japanese cedar; Japanese chestnut.

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Development of an Analytical Method for the Detection of NOx and Its Application to the Atmospheric Analysis at a Mountain Site

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11 Analysis of the detection of NOx have been developed by using a laser-induced fluorescence spectroscopy (LIF) technique and a chemiluminescence (CL) method. Nitrogen oxides, NO and NO2, NOx represents NOx oxidation products. The NOx concentrations are measured by LIF, which has a high sensitivity and no chemical interferences when a conventional technique for NOx is applied by such as a CL method. The NO and NO2 concentrations are measured by an improved CL method. The NOx concentrations were measured by subtracting the concentrations of NO and NO2 from NOx. The NOx concentrations in the atmosphere were measured at the top of Mt. Fuji in August, 2017. The average concentration of NOx was 0.29 ± 0.05 ppb. A back trajectory analysis suggested that the air mass from the Asian continent showed a high concentration of NOx, and the air mass from the Pacific Ocean showed a low concentration of NOx. The concentration of NOx and NO2 showed a correlation, and ozone production effectiveness (OPE) were obtained from correlation plots. The obtained OPEs at a mountain site showed that the air mass from the Asian continent was 10 and from the Pacific Ocean was 18. An analytical method of NOx in the atmosphere at a mountain site was established.

Keywords: nitrogen oxides; transboundary pollution; mountain site.

Crystal Structure of 3-Acetoxy-2-methyl-N-(4-nitrophenyl)benzamide
Sevgi KANSIZ, Şükriye ÇAKMAK, Necmi DEGE, Güngör MERAL, and Halil KÜTÜK

Synthesis, Crystal Structure, and Relativistic DV-Xα Calculation of a μ-Oxido-μ-molybdato(VI)-bridged Dinuclear Oxidomolybdenum(V) Complex with 2-(3-Aminopropyl)aminoethanethiol
Masahiro MIKURIYA, Koji KUSUNOKI, Takanori KOTERA, Daisuke YOSHIOKA, Shota TAKEMURA, and Kazuyoshi OGASAWARA