# 第 23 回 環境化学討論会

# 要旨集 CD

# 23rd Symposium on Environmental Chemistry

# Abstracts CD

開催日時：2014 年 5 月 14 日～16 日

Dates: 14th — 16th May 2014

開催場所：京都大学百周年時計台記念館・芝蘭会館

Venue: Kyoto University, Kyoto, Japan


主催　日本環境化学会

**Organised by Japan Society for Environmental Chemistry**

| May 14 (Wed.) Shiran-kaikan C (Yamauchi hall)　芝蘭会館 C 会場 | | | |
|---|---|---|---|
| **International Session 1 生体影響 農薬・炭化水素・PPCPs** | | | |
| 13:00 | 1C-01 | Quantification of Neonicotinoids in Human Urine using Liquid Chromatography/ Tandem Mass Spectrometry | ○Jemima Tiwaa Marfo 1, Yoshinori Ikenaka 1, Shouta Nakayama 1, Hazuki Mizukawa 1, Kumiko Taira 2, Kazutoshi Fujioka 3, Yoshiko Aoyama 4, Osei Akoto 5, Mayumi Ishizuka 1 (1; Hokkaido Univ., 2; Tokyo Women's Medical Univ., 3; Hawaii Institute of Molecular Education, 4; Aoyama Allergy Clinic, 5; Kwame Nkrumah Univ. of Sci. & Technol.) |
| 13:20 | 1C-02 | Methylated Polycyclic Aromatic Hydrocarbons and Their Contribution to AhR-mediated Activities in Street Dust from Vietnam and India | ○Le Huu Tuyen 1,2, Nguyen Minh Tue 1,2, Shin Takahashi 4, Go Suzuki 3, Pham Hung Viet 2, Annamalai Subramanian 5, Kesav A.Bulbule 5, Shinsuke Tanabe 1 (1; CMES, Ehime Univ., 2; CETASD, Hanoi Univ. of Sci., 3; NIES, Japan, 4; Faculty of Agricultural Faculty, Ehime University, 5; KLE's Nijalingappa College, Bangalore, India) |
| 13:40 | 1C-03 | Occurrence of Micro-pollutants in Wastewater Effluents from Biogas Digester - Health Risk Assessment | ○Le Thi Phuong Hong 1, Duong Thi Hanh 1, Chau Thi Cam Hong 2, Pham Duc Phuc 1, Nguyen Viet Hung 3, Kiwao Kadokami 2, Yoshiharu Shirane 4 (1; Hanoi School of Public Health, Vietnam, 2; University of Kitakyushu, Japan, 3; Swiss Tropical and Public Health Institute, Swizterland, 4; ShiranACE Ltd, Japan) |
| 14:00 | 1C-04 | Cancelled | |
| 14:20 | 1C-05 | Removal and Occurrence of Pharmaceuticals in Sludge and Wastewater from a Wastewater Treatment Plant in Korea | ○Il-hoe Kim 1, Sang-jung Lee 2, Norihide Nakada 2, Hiroaki Tanaka 2, Ihn-sup Han 1 (1; Univ. of Seoul, 2; RCEQM, Kyoto Univ.) |
| **International Session 2 生態系・環境レベル** | | | |
| 15:00 | 1C-06 | Residue Levels and Health Risk Assessment of Organochlorine Pesticides (OCPs) in Domesticated Animals from Egypt | ○Abdallah Fikry A. Mahmoud 1,2, Elsaid A. Eldaly 2, Alaa Eldin M.A. Morshdy 2, Yoshinori Ikenaka 1, Shouta Nakayama 1, Hazuki Mizukawa 1, Yared B. Yohannes 1, Waleed R. El-Ghareeb 2, Mohamed Tharwat El-Abbasy 2, Mayumi Ishizuka 1 (1; Hokkaido Univ., 2; Zagazig Univ.) |
| 15:20 | 1C-07 | Polybrominated Diphenyl Ethers (PBDEs): Occurrence and Debromination in Tropical Asian Countries | ○Charita S. Kwan 1, Hideshige Takada 2, Kaoruko Mizukawa 2, Mahua Saha 2, Rinawati 3, Rei Yamashita 2, Ruchaya Boonyatumanond 4, Evangeline C. Santiago 1 (1; Natural Sci. Research Institute, Univ. of the Philippines, 2; Laboratory of Organic Geochemistry, Tokyo Univ. of Agri. & Technol., 3; Faculty of Math. & Natural Sci., Univ. of Lampung, Indonesia, 4; Env. Research and Training Center, Thailand) |
| 15:40 | 1C-08 | Australasia Pellet Watch: POPs Monitoring in Australia and New Zealand Using Plastic Resin Pellets with International Pellet Watch as a Tool for Effective Risk Communication | ○Bee Geok Yeo 1, Hideshige Takada 1, Heidi Taylor 2, Maki Ito 1, Junki Hosoda 1, Wally Smith 2, Mayumi Allinson 3, Sharnie Connell 3, Laura Greaves, Mark Browne, Taj Powell, John McGrath 4 (1; Tokyo Univ. of Agri. & Technol., 2; Tangaroa Blue Foundation, 3; CAPIM, Univ. of Melbourne, 4; Surfrider Foundation Australia) |
| 16:00 | 1C-09 | The Ccapacity Building for Analysis and Reduction Measures of Persistent Organic Pollutants in Serbia | ○Takeshi Nakano 1, Vladimir Beškoski 2 (1; Osaka Univ., 2; Belgrade Univ.) |
| 16:20 | 1C-10 | Potential Environmental Application of Microbial Polysaccharides | ○Marijana Marković 1, Branka Kekez 2, Dragica Jakovljević 1, Gordana Gojgić-Cvijović 1, Dragan Manojlović 2, Vladimir Beškoski 2, Miroslav Vrvić 2 (1; Institute of Chemistry, Technol. & Metallurgy, Univ. of Belgrade, Serbia, 2; Faculty of Chemistry, Univ. of Belgrade, Serbia) |

## May 16 (Fri.) Shiran-kaikan C (Yamauchi hall)　芝蘭会館 C 会場

### International Session 3 重金属汚染・PAH・ダイオキシン・環境レベル

| | | | |
|---|---|---|---|
| 10:15 | 3C-01 | Present Status of Trace Elements Contamination in River and Marine Sediments and Fish from Jakarta Bay, Indonesia | ○Adi Slamet Riyadi 1,2, Takaaki Itai 1, Tomohiko Isobe 1, Agus Sudaryanto 2, Muhammad Ilyas 2, Iwan Eka Setiawan 2, Shinsuke Tanabe 1 (1; CMES, Ehime Univ., 2; BPPT, Indonesia) |
| 10:35 | 3C-02 | A First Order Estimate of Total Metal(loid)s in Soil of e-Waste Recycling Site in Accral, Ghana | ○Takaaki Itai 1, Asante Ansong Kwadwo 2, Akitoshi Goto 1, Samuel Obiri 2, Shin Takahashi 1,3, Shinsuke Tanabe 1 (1; CMES, Ehime Univ., 2; CSIR Water Research Institute, Ghana, 3; Dept. Agri., Ehime Univ.) |
| 10:55 | 3C-03 | Lead Pollution in the Children in Kabwe Mining Area, Republic of Zambia | ○Shouta Nakayama 1, John Yabe 2, Yoshinori Ikenaka 1, Yared Beyene Yohannes 1, Balazs Oroszlany 1, Nesta Bortey-Sam 1, Kaampwe Muzandu 2, Kennedy Choongo 2, Abel Kabalo 3, John Ntapisha 3, Aaron Mweene 2, Takashi Umemura 1, Mayumi Ishizuka 1 (1; Hokkaido Univ., 2; Univ. of Zambia, 3; Kabwe District Health Office) |
| 11:15 | 3C-04 | Leaching of Arsenic from Tailings by Microbially Produced Rhamnolipids | ○Vladimir P. Beškoski 1,2, Ivana Perić 2, Gordana Gojgić-Cvijović 2, Latinka Slavković Beškoski 3, Biljana Dojčinović 2, Miroslav M. Vrvić 1,2 (1; Faculty of Chemistry, Univ. of Belgrade, Serbia, 2; Institute of Chemistry, Technol. & Metallurgy, Univ. of Belgrade, Serbia, 3; Institute of Nuclear Sci. Vinca, Univ. of Belgrade, Serbia) |
| 11:35 | 3C-05 | Health Risk Assessment of Atmospheric Polycyclic Aromatic Hydrocarbons in Kumasi-Ghana | ○Nesta Bortey-Sam 1, Yoshinori Ikenaka 1, Shouta Nakayama 1, Osei Akoto 2, Yared Beyene Yohannes 1, Hazuki Mizukawa 1, Mayumi Ishizuka 1 (1; Hokkaido Univ., 2; Kwame Nkrumah Univ. of Sci. & Technol., Ghana) |
| 11:55 | 3C-06 | Effect of Flocculating Agent on the Formation of Polychlorinated Dibenzodioxin and Dibenzofurans in Sewage Sludge Incineration | ○Xiaoqing Lin, Xiaodong Li, Shengyong Lu, Fei Wang, Tong Chen, Jianhua Yan (Zhejiang Univ., China) |

### International Session 4 ダイオキシン・POPs・リン系塩素系難燃剤

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|---|---|---|---|
| 13:45 | 3C-07 | Dioxin in Vietnam | ○Le Thi Hai Le, Nguyen Xuan Net, Le Ke Son (Office of National Steering Commitee 33, MONRE, Vietnam) |
| 14:05 | 3C-08 | Concentrations of Phosphorous Flame Retardants (PFRs) in Atmosphere, Bulk Deposition, and Soil in Kyoto, Japan | ○Nguyen Thanh Dien 1, Yasuhiro Hirai 1, Toru Miyazaki 2, Shin-ichi Sakai 1 (1; Kyoto Univ., 2; Nippon Steel & Sumikin Technology) |
| 14:25 | 3C-09 | Evaluation of New & Legacy POPs Monitoring Techniques in Ambient Air and Results from Frequent Monitoring at Supersite, Japan | ○Takumi Takasuga 1, Takeshi Nakano 2, Yasuyuki Shibata 3 (1; Shimadzu Techno-Research Inc., 2; Osaka Univ., 3; NIES) |
| 14:45 | 3C-10 | Determination of Atmospheric Dechlorane Plus in North-East Asia and Dietary Exposure Level in Japan | ○ Kensaku Kakimoto 1,3, Kazuhiko Akutsu 1, Toshiki Tojo 2, Takanori Sakiyama 2, Yoshimasa Konishi 1, Keiji Kajimura 1, Kazuichi Hayakawa 3, Akira Toriba 3 (1; Osaka Prefectural Institute of Public Health, 2; Osaka City Institute of Public Health and Env. Sci., 3; Kanazawa Univ.) |
| 15:05 | 3C-11 | Oil Pollution Analysis Using Comprehensive GC-MS (GCxGC-MS) | ○Haruhiko Miyagawa 1, Riki Kitano 1, Katsuhiro Nakagawa 1, Megumi Hirooka 1, Shunji Hashimoto 2, Vladimir P. Beškoski 3, Narayanan Kannan 4, Takeshi Nakano 5 (1; Shimadzu corporation, 2; NIES, 3; Faculty of Chemistry, Univ. of Belgrade, 4; Univ. Putra Malaysia, 5; Osaka Univ.) |

日本環境化学会

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〒606-8501 京都府京都市左京区吉田本町
京都大学 環境科学センター 酒井研究室内
e-mail：touron23@eprc.kyoto-u.ac.jp

印刷所　中西印刷株式会社
〒602-8048
京都府京都市上京区下立売小川東入ル

# 3C-11

Oil pollution analysis using comprehensive GC-MS (GCxGC-MS)

○Haruhiko Miyagawa[1], Riki Kitano[1], Katsuhiro Nakagawa[1], Megumi Hirooka[1], Shunji Hashimoto[2], Vladimir P. Beškoski[3], Narayanan Kannan[4], Takeshi Nakano[5]
([1]Shimadzu corporation, [2]National Institute for Environmental Studies, [3]Faculty of Chemistry, University of Belgrade, [4]Universiti Putra Malaysia, [5]Osaka University)

**[Introduction]**

Crude oil and oil refinery products such as gasoline and diesel oil could lead to environmental pollution through contamination. To fingerprint the point source, a detailed study on the chemical composition of the oil is needed. For this purpose, various analytical methods using GC, NMR, FT-IR and UV have been developed. Since GC-MS is one of the effective techniques to separate components by chromatography and identify by mass spectrometry, it is widely used to determine the oil. However, a lot of components (hydrocarbons and aromatic hydrocarbons) are included in oil and their peak overlapping prevents selective detection of the respective components.

GCxGC-MS is the latest chromatographic technology to achieve ultra-high separation capability. This technology is optimal for the separation of target substances from complicated matrices that are problematic for ordinary GC-MS. We applied GCxGC-MS to the analysis of oil refinery product and the data were compared with those of GC-MS. These results suggested that this technique could be very useful in future investigation of the environmental pollution caused by the oil.

**[Experimental]**

GCxGC-MS was performed on a gas chromatograph (GC) - quadrupole mass spectrometer GCMS-QP2010 Ultra (Shimadzu, Kyoto, Japan) and GCxGC modulator (Zoex Corp.). A DB®-1 (J&W Corp., methyl polysiloxane, 30 m × 0.25 mm I.D., 0.25 μm film thickness) and a Rtx®-WAX ( Resteck Corp., 2.5 m x 0.1 mm I.D., df=0.1 μm) columns were connected through the GCxGC modulator as the first and second capillary columns, respectively. The detailed analytical conditions are shown in Table 1. Results were processed using a Zoex GC Image which is a special multipurpose GCxGC analysis software package. It is capable of directly reading in GCxGC data obtained with GCMS solution, converting it to a 2-dimensional image, and then analyzing it.

Table 1: Analysis Conditions

| [MS] | [GC×GC] |
|---|---|
| Interface temperature: 240℃ | Injection quantity: 0.5μL |
| Ion source temperature: 200℃ | Injection quantity: Split (split ratio 50) |
| Solvent elution time: 0.3 min | Vaporization chamber temperature: 275℃ |
| Data sampling time: 0.5 min to 150 min | Column oven temperature: 40 ℃-> (1.8 ℃/min) -> 240 ℃(40 min) |
| Measurement mode:Scan | Control mode : Pressure (150 kPa -> (1.4 kPa/min) -> 300 kPa (40 min)) |
| Mass range: *m/z* 35-500 | Modulation time: 5 sec |
| Scan speed: 20.000 u/sec | Hot pulse time: 0.35 sec (300 ℃) |

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Oil pollution analysis using comprehensive GC-MS (GCxGC-MS)

*Haruhiko Miyagawa*
Shimadzu Corp.

**[Results and discussion]**

Figure 1 shows total ion chromatogram of a light oil by GC-MS. A lot of peaks were detected and overlapped. Figure 2 shows a 2-dimensional representation created by GC Image from the results for the light oil analyzed using a GCxGC-MS system. By using a high-polarity column as the second column, it is possible to separate the paraffin from aromatic series, there by obtaining a blob distribution pattern reflecting the compound's structure.

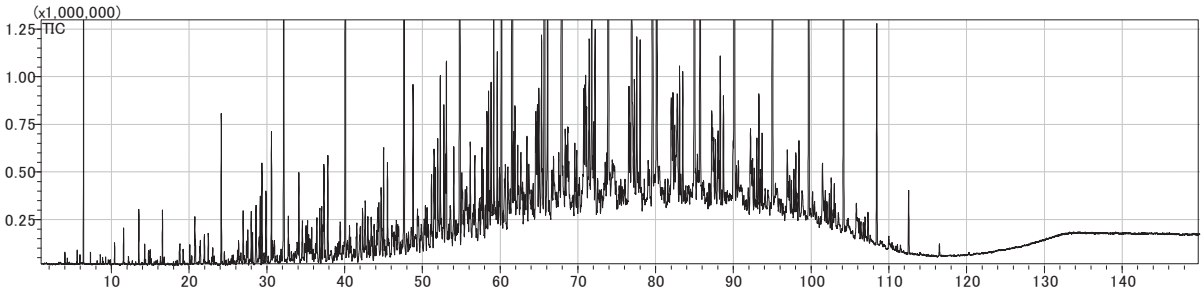


Fig. 1Total ion chromatogram of light oil using GC-MS

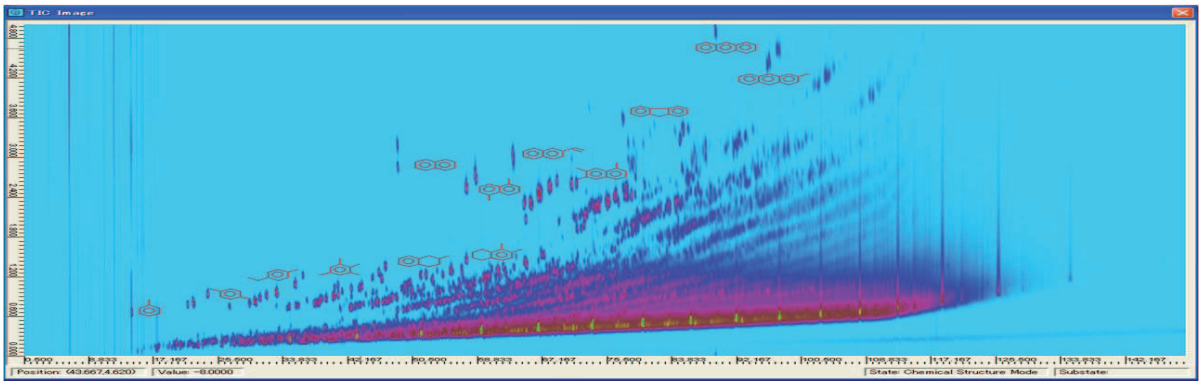

Fig. 2 2-Dimensional Image of light oil using GCxGC-MS

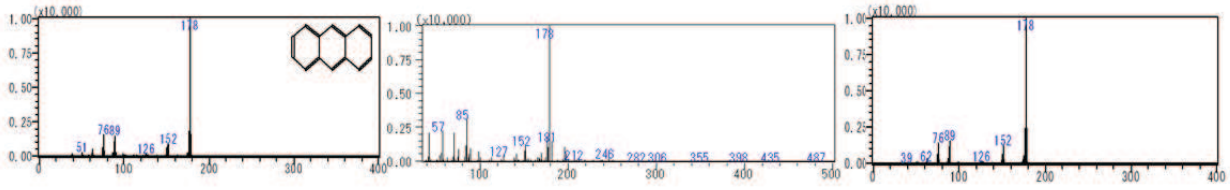


Fig. 3 Mass spectra of anthracene obtained by NIST, GC-MS, and GCxGC-MS

The mass spectra of anthracene obtained by GC-MS, and GC-MS/MS (Figure 3) were compared with that of mass spectra libraries (NIST, US National Institute of Standards and Technology). The degree of similarity is low with GC-MS (SI=69), but with GCxGC-MS (SI=95), a high degree of similarity is shown. This is because high-level separation can be achieved by modulation with 2 different types of columns, and the sharp peaks characteristic of GCxGC analysis.

**[Conclusions]**

GCxGC-MS showed a higher separation of components in light oil in comparison to GC-MS. These results suggest the applicability of this new technique in oil analysis. In this presentation, we shall demonstrate the analytical results of several oil refinery products and oil samples from polluted sites.