International Symposium on Environmental Education and Sustainability Sciences

环境教育与可持续科学国际学术论坛

School of Environmental and Civil Engineering

Jiang University, China

江南大学 环境与土木工程学院，中国

Graduate School of Life and Environmental Sciences

University of Tsukuba, Japan

筑波大学 生命环境科学研究科，日本

30th May ~ 1st June, 2016

1. ORGANIZER AND PARTICIPANTS 主办与参会

1.1 ORGANIZER 主办方

(1) School of Environmental and Civil Engineering, Jiang University, China

江南大学 环境与土木工程学院，无锡 中国

(2) Graduate School of Life and Environmental Sciences, University of Tsukuba, Japan

筑波大学 生命环境科学研究科，筑波 日本

1.2 PARTICIPANTS 参会人

No.	Name of Participants	Affiliation(s) or Universities	Title
1	He Liu	Jiangnan University, China	Professor, Dean
2	Zhenya Zhang	University of Tsukuba, Japan	Professor
3	Kenichi Matsui	University of Tsukuba, Japan	Associate professor
4	Zhongfang Lei	University of Tsukuba, Japan	Associate professor
5	Kaiqin Xu	National Institute for Environmental Studies, Japan	Professor
6	Dongye Zhao	Auburn University, USA	Professor
7	Cecep Kusmana	Bogor Agricultural University (IPB), Indonesia	Professor
8	Nahrowi	Bogor Agricultural University (IPB), Indonesia	Professor
9	Edy Hartulistiyoso	Bogor Agricultural University (IPB), Indonesia	Ph. D
10	Tsung-Yi Lin	National Taiwan Normal University	Professor
11	Shuanghong Li	International Welfare Culture Industry, Inc. (Japan)	Ph. D
12	Gang Luo	Fudan University, China	Associate professor
13	Yi Zhang	Fudan University, China	Associate professor
14	Chuanping Feng	China University of Geosciences(Beijing) , China	Professor, Assistant dean
15	Nan Chen	China University of Geosciences(Beijing) , China	Associate professor
16	Chunfeng Song	Tianjin University, China	Associate professor
17	Yingxin Zhao	Tianjin University, China	Ph. D
18	Chunguang Liu	Shangdong University, China	Associate professor
19	Shengjiong Yang	Xi'an University of Architecture and Technology, China	Ph. D

20	Dahu Ding	Nanjing Agricultural University, China	Ph. D
21	Shuo Wang	Jiangnan University, China	Associate professor
22	Bo Fu	Jiangnan University, China	Associate professor
23	Xiaoying Cheng	Jiangnan University, China	Associate professor
24	Wansheng Shi	Jiangnan University, China	Associate professor
25	Jie Li	Tongji University, China	Doctoral students
26	Muxi Luo	Tongji University, China	Doctoral students
27	Johan Syafri Mahathir Ahmad	University of Tsukuba, Japan	Doctoral students
28	Ziwen Zhao	University of Tsukuba, Japan	Doctoral students
29	D.A. Anura Kumara	University of Tsukuba, Japan	Doctoral students
30	Kakeru Ruike	University of Tsukuba, Japan	Doctoral students
31	Zhaoling Li	University of Tsukuba, Japan	Doctoral students
32	Chantsalnurmaa Shagdarsuren	University of Tsukuba, Japan	Doctoral students
33	Yucheng Zhu	University of Tsukuba, Japan	Doctoral students
34	Nguyen Hong Son	University of Tsukuba, Japan	Doctoral students
35	Daisaku Nozawa	University of Tsukuba, Japan	Doctoral students
36	Yang Yu	University of Tsukuba, Japan	Doctoral students
37	Weiwei Huang	University of Tsukuba, Japan	Doctoral students
38	Aisha Karpaeva	University of Tsukuba, Japan	Doctoral students

1.3 Contact 联系方式

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2. ACTIVITIES & ARRANGEMENT 活动安排

2.1 Venue 会议会场

No. 5 auditorium of Changguangxi Hotel, Jiangnan University 长广溪宾馆第 5 报告厅

2.2 Hotel 宾馆

Name 名称：Changguangxi Hotel (长广溪宾馆), Wuxi, China

Location 位置：

2.3 Canteens

(1) The canteen of Changguangxi hotel 长广溪宾馆餐厅

(2) Second floor of the second canteen, Jiangnan University 江南大学第二食堂二楼

Location 位置：

2.4 Activities and arrangement

30th May, 2016			
No.	**Activities**	Time 时间	Place 地点
1	Arrival 到达	10:00am - 20:00pm	Changguangxi hotel, Jiangnan University 江南大学 长广溪宾馆
2	Dinner 晚餐	According to the arrival time 根据到达时间	Changguangxi hotel, Jiangnan University 江南大学 长广溪宾馆
31st May, 2016			
3	Breakfast 早餐	7:00am - 8:00am	The canteen of Changguangxi hotel 长广溪宾馆餐厅
4	Symposium 研讨会	8:10am - 12:00am	No. 5 auditorium of Changguangxi Hotel 长广溪宾馆第 5 报告厅
5	Lunch 午餐	12:00am - 13:30pm	Second floor of the second canteen, Jiangnan University 江南大学第二食堂二楼
6	Presentation (1) 报告会(1)	13:30pm - 17:10pm	No. 5 auditorium of Changguangxi Hotel 长广溪宾馆第 5 报告厅
7	Presentation (2) 报告会(2)	13:30pm - 15:50pm	No. 3 auditorium of Changguangxi Hotel 长广溪宾馆第 3 报告厅
8	Closing remarks 总结致辞	17:10pm - 17:15pm	No. 5 auditorium of Changguangxi Hotel 长广溪宾馆第 5 报告厅
9	Dinner 晚宴	17:30pm - 20:00pm	Lihu room of the canteen in Changguangxi hotel 长广溪宾馆 蠡湖厅
1st June, 2016			
10	Breakfast 早餐	7:00am - 8:20am	The canteen of Changguangxi hotel 长广溪宾馆 餐厅
11	Gathering 集合	8:20am - 8:30am	The lobby of Changguangxi hotel 长广溪宾馆 大厅
12	Fieldwork 参观	8:30am -11:30am	(1) Algae-water separation station for Taihu water purification in Wuxi city 无锡太湖蓝藻打捞中心 (2) Wetland project for ecosystem restoration in Gonghu Bay Area, Wuxi city 无锡贡湖湾人工湿地生态修复工程
13	Lunch 午餐	12:00am - 13:00pm	Second floor of the second canteen, Jiangnan University 江南大学第二食堂二楼
14	Say Goodbye 再会	14:00pm -	The lobby of Changguangxi hotel 长广溪宾馆 大厅

3. SCHEDULE 会议议程

3.1. Day 1 (31st May, 2016)

Activity 活动：Symposium 学术研讨

Place 地点：No. 5 auditorium of Changguangxi Hotel 长广溪宾馆第 5 报告厅

Session 1-Greetings and introductions			**Chair: Prof. Jiangnan Univ.**	
No.	Time Slot	Activity or Title	Affiliation(s) or Universities	**Speaker (s)**
1	8:10-8:15	Welcoming speech	International office of Jiangnan University, China	Director of the international office of Jiangnan Univ.
2	8:15-8:30	Introduction: Jiangnan University and the School of Environment and Civil Engineering	Jiangnan University, China	**Prof. He Liu**
3	8:30-8:45	Introduction: University of Tsukuba, The Graduate School of Life and Environmental Sciences	University of Tsukuba, Japan	**Prof. Matsui Kenichi**
8:45-9:00		**TEA BREAK & PHOTO TAKING**		
4	9:00-9:25	Anaerobic Fermentation Systems: Advantages and International Strategies	University of Tsukuba, Japan	**Prof. Zhenya Zhang**
5	9:25-9:50	Sustainable Watershed Management and Water Environmental Restoration by Bio-eco Engineering	National Institute for Environmental Studies, Japan	**Prof. Kaiqin Xu**
6	9:50-10:15	Functional Granular Sludge: Achievements and Perspectives	University of Tsukuba, Japan	**Prof. Zhongfang Lei**
7	10:15-10:40	Development and Applications of Nanomaterials for in situ Immobilization of Heave Metals and Degradation of Oil Hydrocarbons	Auburn University, USA	**Prof. Dongye Zhao**
Session 2-General topic: Environmental Education and Sustainability			**Chair: Prof Kenichi Matsui**	
No.	Time Slot	Activity or Title	Affiliation(s) or Universities	**Speaker (s)**
8	10:40-11:00	Current Joint and Double Degree Programs in Bogor Agricultural University and Its Chance for SUSTEP Education Program	Bogor Agricultural University (IPB), Indonesia	**Nahrowi**, Fatmasari Siregar, Eka Intan Kumala Putri, Marimin, and Dahrulsyah
9	11:00-11:20	Sustainable Mangrove Uses by Local Community in Indonesia	Bogor Agricultural University (IPB), Indonesia	**Cecep Kusmana**
10	11:20-11:40	Is Man-made Structure Sound for Coastal Erosion Control?	National Taiwan Normal University	**Tsung-Yi Lin**
11	11:40-12:00	Sustainable Development of Social Welfare Environment: To Explore and Practice the Mode of International Welfare Personnel Education and Training	International Welfare Culture Industry, Inc.	**Shuanghong Li**
12:00-13:30		**LUNCH BREAK**		

No. 5 auditorium 第5报告厅

Session 3-Specific Topic on Water/Wastewater Treatment and Safety				**3.1 Chair: Prof. Kaiqin Xu**
No.	Time Slot	Activity or Title	Affiliation(s) or Universities	**Speaker (s)**
12	13:30-13:50	Application of Dielectric Barrier Discharge Process in Microorganism Removal from Water	Fudan University, China	**Yi Zhang**, Tuti Mariana Lim, Qiong Tang, Wenju Jiang
13	13:50-14:10	Heteroaggregation of CeO_2 and TiO_2 Nanoparticles in Aqueous Phase: Application of Turbiscan Stability Index and Fluorescence Excitation-Emission Matrix (EEM) Spectroscopy	Tongji University, China	Hongtao Wang, **Muxi Luo**, Tongxuan Ren, Huapeng Jin, Fengting Li
14	14:10-14:30	Lake Eutrophication and Control Technology	Jiangnan University, China	**Xiaoying Cheng**
15	14:30-14:50	Removal of fluoride from aqueous solution by polypyrrole-grafted biological carbon composite	China University of Geosciences(Beijing) , China	**Nan Chen**, Chuanping Feng
16	14:50-15:10	Zeolitic Imidazolate Framework-8 with High Efficiency in Trace Arsenate Adsorption and Removal from Water	Tongji University, China	**Jie Li**, Yi-nan Wu, Zehua Li, and Fengting Li
15:10-15:30		**TEA BREAK**		
				3.2 Chair: Prof. Zhongfang Lei
17	15:30-15:50	Recovery of Nitrification in Cadmium-Inhibited Activated Sludge System by Bio-accelerators	Tianjin University, China	**Yingxin Zhao**, Yue Wang, Min Ji
18	15:50-16:10	Phosphate Recovery through Adsorption Assisted Precipitation using Novel Precipitation Material Developed from Building Waste: Behavior and Mechanism	Xi'an University of Architecture and Technology, China	**Shengjiong Yang**
19	16:10-16:30	Toxic Effect and Interaction Mechanisms of Bisphenol A on Enzyme, Hepatocyte of Rat and Microorganisms in Sludge	Shangdong University, China	Rui Zhang，Guangying Hou, Rutao Liu, **Chunguang Liu**
20	16:30-16:50	Degradation of Antibiotics by Persulfate Activated by Magnetite Nanoparticles	Nanjing Agricultural University, China	**Dahu Ding**, Yuefei Ji, Tianming Cai
21	16:50-17:10	Health Risk Assessment for Edible Crops Exposed to Hepatotoxin Microcystins	University of Tsukuba, Japan	**Kakeru Ruike**, Ryuhei Inamori, Yuhei Inamori, Zhongfang Lei, Zhenya Zhang

No. 3 auditorium第3报告厅

Session 4- Specific Topic on Biomass and Resources Recovery			**Chair: Prof. Zhenya Zhang**	
No.	Time Slot	Activity or Title	Affiliation(s) or Universities	**Speaker (s)**
22	13:30-13:50	Developing Multiple Stakeholder	University of	**Nguyen Hong Son**,

		Engagement for the Cleaner Production Process in Vietnam: A Case on the Thai Nguyen Paper Joint Stock Company	Tsukuba, Japan	Kenichi Matsui
23	13:50-14:10	Study of Anaerobic Biodegradability of Rice Straw Hydrothermal Liquefaction (HTL) Products: Aqueous Products after Extraction with Four Different Organic Solvents	Fudan University, China	Huihui Chen, **Gang Luo**, Shicheng Zhang
24	14:10-14:30	Carbon isotope fractionation of acetate by acetogenesis in Philippine rice field soil	Jiangnan University, China	**Bo Fu**, Martin Blaser, Ralf Conrad
25	14:30-14:50	Innovation of Microalgal Biofuel Production Route by Efficient Waste Heat Recovery	Tianjin University, China; University of Tsukuba, Japan	**Chunfeng Song**, Yutaka Kitamura, Zhongfang Lei, Zhenya Zhang
26	14:50-15:10	Short-term Dry Anaerobic Digestion for Ammonia and Volatile Fatty Acids Accumulation in Swine Manure and Their Subsequent Separation from Phosphorus resource	University of Tsukuba	**Weiwei Huang**, Zhongfang Lei, Zhenya Zhang
27	15:10-15:30	Comprehensive Roof Garden As An Approach for Integrated Urban Activities-rural Atmosphere and Sustainable On-site Sanitation System: Pilot Project in Yogyakarta, Indonesia	University of Tsukuba	**Johan Syafri Mahathir Ahmad**
15:30-15:50		**TEA BREAK**		
No. 5 auditorium第5报告厅				
28	17:10-17:15	Closing remarks	Jiangnan University, China	**Prof. He Liu**

3.2. Day 2 (1st June, 2016)

Activity 活动：Fieldwork 实地参观

No.	Time Slot	Activity or Title	Attendees
1	8:30-12:00	Fieldwork: (1) Algae-water separation station for Taihu water purification in Wuxi city (2) Wetland project for ecosystem restoration in Gonghu Bay Area, Wuxi city	The professors and students from Jiangnan University and the University of Tsukuba; The professors from other Universities
12:00-14:00		**LUNCH BREAK**	
2	14:00-	Campus visit and Say Goodbye	

ABSTRACTS

(No. 1.~ No.3 Welcome speech and introductions)

#No. 4

Anaerobic Fermentation Systems: Advantages and International Strategies

Zhenya Zhang, Zhongfang Lei

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The disposal of organic wastes will impose severe burden on the environment if not properly dealt with. However, organic wastes can also become resources if being recycled. Anaerobic digestion is an important and indispensable technology regarding purification effectiveness and energy recovery from high-strength wastewaters or solid wastes. In this talk, five anaerobic system techniques will be introduced: (1) Enhanced methane production reactor with effective mitigation of ammonia inhibition; (2) High efficiency ammonia fermentation and nitrogen recovery from livestock waste; (3) Realization of volatile organic fatty acids (VFAs) and ammonia fermentation through dry anaerobic digestion; (4) Pretreatment of lignocellulosic waste using subcritical water technology to achieve effective methane production; (5) Bio-ethanol production from lignocellulosic waste pretreated with anaerobic fermentation liquor. Finally, a case study will be followed to show the benefits and effectiveness of separate manure and urine treatment and biogasification in a dairy farm in Shanghai suburb.

Keywords: Organic wastes; Anaerobic digestion; Ammonia; Volatile fatty acids (VFAs); Methane

#No. 5.

Sustainable Watershed Management and Water Environmental Restoration by Bio-eco Engineering

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In this lecture, Japan's water environment management policies and experience, lake eutrophication and watershed environmental management strategies will be introduced. At the same time, rural decentralized wastewater treatment systems - Johkasou systems and its applications, as well as biological and ecological engineering technologies for water environmental restoration will be further discussed. In addition, environmental education, public participation, and environmental enlightenment are also important for the conservation of watershed management.

Keywords: Watershed management; Environmental restoration; Bio-engineering; Eco-engineering; Johkasou system

#No. 6

Functional Granular Sludge: Achievements and Perspectives

Zhongfang Lei [a], Wenli huang [b], Zhenya Zhang [a]

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Conventional suspended floc sludge process has been efficiently applied in wastewater treatment plants worldwide, and its main treatment units like biological reactors and sedimentation tanks occupy large land areas. Compared to suspended floc sludge systems, granular sludge systems have been proven to be more advantageous for biological treatment of domestic and industrial wastewaters when taking cost-effectiveness and energy and resources recovery into consideration. This talk will focus on granulation process, characteristic differences between suspended floc sludge and granular sludge (especially anaerobic and aerobic granular sludges), and their applications in practice. Specific attention is given to some functional granular sludges which have been or are potentially used for methane and hydrogen production, nitrifying, phosphorus accumulation, etc. Future researches are also prospected for these functional granular sludges and their potential combination to realize sustainable management of wastewater treatment plants.

Keywords: Suspended floc sludge; Granular sludge; Functional granules; Sustainability; Wastewater treatment

#No.8

Current Joint and Double Degree Programs in Bogor Agricultural University and Its Chance for SUSTEP Education Program

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Joint and double degree program are an academic collaboration between two or more different universities that are getting popular recently. The student is expected to complete the programs in a regular master's or doctoral time period and achieve degree from both of the universities at the end of double degrees, and additional certificate for joint degree program. The programs have been implemented in Bogor Agricultural University (IPB) since 2012, and we have collaborations with many partner universities such as Ibaraki University, Chiba University, Ryukyu University, Adelaide University, and several universities in France for double degree program, and Gottingen University, Adelaide University, Ehime University, Kochi University, and Kagawa University for joint degree program. Still, we are looking forward to establishing this kind of co-operation with new university partners. By joining the programs, the students will get many advantages, such as they will graduate with a competitive advantage, gain broader range of skills and knowledge, build wider networks, and the most important is they can save time and money. Nevertheless due to the uniqueness of each university, IPB is still facing many challenges and obstacles when implementing this kind of programs, such as adjusting the curriculum with the partner universities, academic schedule, and limited scholarship. Therefore, many efforts on improving the program are still necessary for its further development.

Keywords: Joint degree; Double degree; Advantages; Constrains; IPB

#**No.9**

Sustainable Mangrove Uses by Local Community in Indonesia

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Indonesia is an archipelagic country of more than 17,504 islands (28 big and 17,475 small islands) with a coastline length estimated to be 95,181 km, which bears mangroves from several meters to several kilometers. They are estimated at 3.2 million hectares growing extensively in the five big islands (Java, Sumatra, Kalimantan, Sulawesi, Papua) with various community types comprising of about 157 species (52 species of trees, 21 species of shrubs, 13 species of lyana, seven species of palms, 14 species of grasses, 8 species of herbs, 3 species of parasites, 36 species of epiphytes, 3 species of ferns). The mangroves resources in Indonesia involve the flora, fauna, and land resources which are needed for supporting many kinds of human needs, especially for local community living in surrounding mangroves. For centuries, the Indonesian people have traditionally utilized mangroves. The most significant value of mangrove utilization is the gathering of forest products classified into timber and non-timber products. The timber refers to poles and firewood, charcoal, and construction materials (e.g. housing material and fishing gears); the latter include tannin, medicines, dye, nypa thatch and shingles, nypa sap for vinegar and wine-making, and food drinks. Traditional uses of mangrove forest products are mainly the direct utilization of the products, usually in small scale. Besides these, local people are used to utilizing associated mangrove aquatic fauna for supporting their daily life as well as utilizing mangrove habitat for multipurpose uses through agroforestry techniques (silvofishery, agrosilvofishery, agrosilvopastoralfishery systems).

Keywords: Agroforestry techniques; Fauna; Flora; Land resources; Local community; Mangrove

#**No.10**

Is Man-made Structure Sound for Coastal Erosion Control?

Tsung-Yi Lin
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In response to coastal erosion, man-made structures, such as dikes, groins, and detached breakwaters are usually used in Taiwan to protect the shoreline in hazardous typhoon events. In this study, we investigated the morphologic changes after the installation of a group of eleven detached breakwaters at the Cigu coast of Tainan, Taiwan. The results show that since the installation, the nearby shores, especially the down-drift side of the coast, had experienced rapid erosion either during or after the construction. Only the four detached breakwaters at the most northern end had salients that formed on their back sides. The others yielded no sand accumulation at all. The bare sand surface of these salient then became the sources of wind-blown sand that moved over the dike during the winter season. These wind-blown sand first buried the road and large numbers of spared tetrapods, and then encroached the nearby aqua-cultural ponds.

Keywords: Groin; Detached breakwater; Jetty; Coastal erosion

#**No.11**

The Sustainable Development of Social Welfare Environment: To Explore and Practice the Mode of International Welfare Persons' Education and Training

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The development of medical level and improvement of living standards contribute a lot to the aging of society. Now, the total population of over 60 years old people is 600 million in the world. In 2014, elderly population over the age of 60 years old was reported to be 200 million in China, the largest elderly population country in the world. In 2015, some data show that Chinese aging population has reached a serious level. Because of the rapid development of aging population, education system of welfare is lagging behind the other occupations. Therefore, this situation can not meet the objective needs of the welfare facilities. In this context international professional education and exchanges or cooperation is very important. Also, to explore and practice some models may promote the formation of international welfare social environment. In the future those models may bring about the world more well-being and sustainable development.

Keywords: Aging; Population; Model; Sustainability

#**No.12**

Application of Dielectric Barrier Discharge Process in Microorganism Removal from Water

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Dielectric barrier discharge (DBD) is a low-pressure gas discharge process, in which a gas stream passes between two electrodes separated by a solid dielectric material. By applying high voltage and changing gas compositions, various reactive species can be produced therein. In this study, optimum conditions were explored for •OH production, and applied to remove microorganisms from real and simulated waters. Humid air was identified as the best gas source, and H_2O_2 and ozone were also generated. A sea water dinoflagellate species, seven fresh water cyanobacteria strains, two common bacteria strains were tested by using a real algae-ladden fresh water and several samples from a drinking water treatment plant. DBD efficiently removed all these microorganisms, as indicated by the decrease of microbial counts or *chlorophyll a* contents. In some cases extracellular polymers were also quantified, and microbial morphologies were observed. The latter showed clear disruption of cellular structures.

Keywords: Dielectric barrier discharge (DBD); Water purification; Reactive species; Microorganism

#**No. 13**

Heteroaggregation of CeO_2 and TiO_2 Nanoparticles in Aqueous Phase: Application of Turbiscan Stability Index and Fluorescence Excitation-Emission Matrix (EEM) Spectroscopy

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In recent years, CeO_2 and TiO_2 engineered nanoparticles (ENPs) have been widely used in various fields. The heteroaggreagtion behavior of these two ENPs can influence their fate and transport in the aqueous phase. In this study, we employed the Turbiscan Stability Index (TSI) to investigate the stability and the heteroaggregation of CeO_2 and TiO_2 ENPs at different CeO_2/TiO_2 ratio. In addition, we used fluorescence excitation-emission matrix (EEM) spectra to study the competitive adsorption of humic acid (HA) onto the surface of CeO_2 and TiO_2 ENPs. It was found that different CeO_2/TiO_2 ratio caused various aggregation behaviour and stability in aqueous phase. The increase of CeO_2/TiO_2 ratio could reduce TSI, indicating higher stability. TSI and Fluorescence EEM spectra were found to be useful for the characterisation of heteroaggregation of CeO_2 and TiO_2 ENPs in the presence of HA.

Keywords: Nanoparticle; Heteroaggregation; Turbiscan Stability Index; Fluorescence excitation-emission matrix (EEM) spectroscopy

#**No. 14**

Lake Eutrophication and Control Technology

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Taihu Lake is the third largest freshwater lake in China. After the 1970s, the nutrition status began to increase. After the mid-1980s, the nutritional degree was more and more serious. Between the early 1990s and the 2006, the eutrophic degree fluctuated in high level and rose constantly. Since the latter half of 2007, the eutrophic level began to decrease because the government took some measures to control the eutrophication. These measures included the external pollutants reducing, blue-green algae salvaging, ecological dredging, water transffering to Taihu Lake, and the ecological restoration using.

Keywords: Taihu Lake; eutrophication; control measures

#**No.15**

Removal of Fluoride from Aqueous Solution by Polypyrrole-grafted Biological Carbon Composite

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An effective defluoridation adsorbent was developed by depositing polypyrrole (PPy) into granular peanut shell biological carbon (BC). In batch tests, the PPy/BC composite performed commendably in a wide pH ranging from 2.0 to 10.0, and achieved a fluoride adsorption capacity of 17.15 mg g^{-1}. Kinetic studies illustrated that adsorption process was accomplished via surface adsorption as well as intraparticle diffusion. Thereinto, macropore diffusion, which was the first phase of intraparticle diffusion process, was the rate controlling step. Through further computations of XPS data, polypyrrole could be characterized as two-layers deep. Meanwhile, co-ions experiment, XPS and FT-IR confirmed that the mechanism was a specific chemisorption process via the replacement of doped ionizable chloride ions.

Keywords: Biological carbon (BC); Polypyrrole grafted; Fluoride adsorption; Kinetics; X-ray photoelectron spectroscopy (XPS)

#**No. 16**

Zeolitic Imidazolate Framework-8 with High Efficiency in Trace Arsenate Adsorption and Removal from Water

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The development of highly efficient adsorbents is one of the principal challenges in water treatment field. In this study, zeolitic imidazolate framework-8 (ZIF-8) was developed for the removal of trace arsenate from water. Results showed that ZIF-8 outperformed some other adsorbents and possessed the firstly highest reported adsorption capacity (76.5 mg g^{-1}) at a low equilibrium concentration (9.8 μg L^{-1}). Satisfactory adsorption properties (adsorption capacity, adsorption rate, adaptability to water environment, regeneration capacity) demonstrated the feasibility of using ZIF-8 as an efficient adsorbent for the removal of aquatic trace arsenate. In addition, fourier transform infrared (FTIR) and X-ray photoelectron spectroscopy (XPS) spectra revealed the proposed mechanism of As(V) adsorption onto ZIF-8: producing large amounts of external active sites (Zn–OH) through the dissociative adsorption of water and subsequently forming an inner-sphere complex with arsenate ion. Insights into the adsorption process disclosed several key factors to this high removal efficiency.

Keywords: Arsenate; Adsorption properties; Mechanisms; Low equilibrium concentration

#**No. 17**

Recovery of Nitrification in Cadmium-inhibited Activated Sludge System by Bio-accelerators

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Cadmium (Cd) is toxic to nitrifying bacteria, but current studies on recovery process in Cd-inhibited activated sludge system are limited, especially on intensify-recovery processes with developing nontoxic bio-accelerators. In this study, bioactivity recovery effects were demonstrated with respect to effluent NH_4^+-N, NO_2^--N, NO_3^--N concentrations, specific oxygen uptake rates and cadmium distribution in five parallel SBRs. Results indicated that bioactivity of nitrifying bacteria was mainly inhibited by surface-bound Cd. Dosing biotin, L-aspartic acid and cytokinin simultaneously was the most effective. Linear chain together with amide (NH) and carboxyl (COOH) groups may be important factors in fast nitrification recovery process. In terms of dosage and dosing mode, six-multiple dosage of optimal mixture with dosing at each cycle evenly was the most effective and bioactivities of nitrifying bacteria could 100% recovered within 7 days. The bio-accelerators and optimum usage can be potentially applied to cope with heavy metal shock-loading emergency situations.

Keywords: Activated sludge; Bio-accelerator; Cadmium inhibition; Nitrification; Recovery

#**No. 18**

Phosphate Recovery through Adsorption Assisted Precipitation using Novel Precipitation Material Developed from Building Waste: Behavior and Mechanism

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Phosphate is a very important basic material in agricultural and industrial applications. In present study, phosphate was precipitated and recovered through a tablet precipitation material (TPM) which was developed from solid building waste. The development of TPM provided an alternative for the management of building waste. The results showed that TPM could effectively recover phosphate from aqueous solution; the final precipitates consisted of hydroxyapatite and brushite. The precipitation recovery process was assisted and droven by adsorption mechanism. The adsorption process concentrated and attracted phosphate that supplied partial phosphate supersaturation surrounding the surface of TPM and assisted the precipitation process. The equilibrium of removal and recovery process could be attained in 60 minutes. The maximum recovery capacity achieved 3.81 ± 0.24 mg g^{-1}. In addition, the release of Ca^{2+} from TPM fitted a pseudo-2nd order model, and the release process was divided into two stages according to the Fick's law. As a result, TPM developed from building waste exhibited sufficient potential for phosphate recovery.

Keywords: Adsorption assisted precipitation; hydroxyapatite phosphate (HAP); Dicyclopentadiene (DCPD); Building waste

#**No. 19**

Toxic Effect and Interaction Mechanisms of Bisphenol A on Enzyme, Rat Hepatocytes and Microorganisms in Sludge

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The environmental endocrine disrupter bisphenol A (BPA) is ubiquitous in living environment and natural environment. The fate of BPA is complicated due to the interactions with various constituents in water or sludge. Previous studies have reported the toxic effect of BPA on microorganisms and animals, but the underlying mechanism remains unknown. To determine how BPA influences enzyme (α-amylase and catalase as models), multi-spectral technology and molecular docking technique were employed to clarify the molecular mechanisms involved in the interactions between BPA and α-amylase/catalase. The enzyme activity assay on purified α-amylase/catalase was performed to evaluate the direct impact of BPA to α-amylase/catalase. To decorticate the BPA-derived detrimental effects on hepatocytes, we also investigated the oxidative stress, cell viability and catalase response of primary hepatocyte after being exposed to BPA. To identify the effect of BPA on microorganisms in sludge, microbial activity, content of dissolved organic matter in sludge and hydrogen yield from the sludge by fermentation were tested with/without BPA exposure to various concentrations.

Keywords: Multi-spectral technology; Molecular docking technique; Cytotoxicity; Micro-organisms toxicity; BPA exposure

#**No. 20**

Degradation of Antibiotics by Persulfate Activated by Magnetite Nanoparticles

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The great potential of sulfate radical in degrading organic pollutants has been well described previously. In this study, magnetite nanoparticles (MNP) were prepared through a simple one-pot synthesis process. Results show that the persulfate (PS) could be effectively activated by the MNP to produce sulfate radicals. Furthermore, a typical antibiotic, norfloxacin can be degraded by using the MNP/PS system. Almost 90% degradation of 5 mg L^{-1} norfloxacin was achieved in 60 min by using 0.3 g L^{-1} Fe_3O_4 NPs and 5.0 mM PS at inherent pH. Comparing with thermal activation (30~70 ℃), the MNP possesses well performance and low energy input. XPS results indicate that no obvious change of Fe(II)/Fe(III) on the surface of MNP occurs. Over 10 products are identified through HPLC-MS analysis, indicating the degradation process is initiated by piperazine ring transformation, defluorination, and hydrolysis.

Keywords: Sulfate radical; Magnetite nanoparticle; Norfloxacin; Degradation

#**No. 21**

Health Risk Assessment for Edible Crops Exposed to Hepatotoxin Microcystins

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Recently, contamination of hepatotoxin Microcysitns, which is produced by harmful blue green algae "*Microcystis* spp.", has become a worldwide problem in lakes and ponds. In addition, Microcystins are observed in the agricultural irrigation water sources, too. Therefore, Micrcystins might pollute edible crops in cultivation field via irrigation water. This study focused on the health risk assessment of Microcystins treated edible crops. As a result, some crops such as rice, water morning glory, etc. can absorb and accumulate Microcystins into edible part via root. However in the soil cultivation, excluding water morning glory, little Microcystins was detected in the edible part of some species treated with 1,000 μg・l^{-1} of Microcystins solution, thus no risk was observed. Water morning glory exhibited health risk under the tested conditions. Hence, health risk should be paid more attention when hypereutrophic water is used for irrigation, especially with high concentration of Microcystins conditions.

Keywords: *Microcystis* spp.; Microcystin; Irrigation water; Risk assessment

#**No. 22**

Developing Multiple Stakeholders Engagement for the Cleaner Production Process in Vietnam: A Case on the Thai Nguyen Export Paper Joint Stock Company

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In the last several decades, the industrial manufacturing process has always been regarded as one of the main causes of environmental problems at both national and global scales. In order to mitigate or minimize industrial pollutions, the United Nations Environment Programme (UNEP) has promoted "Cleaner Production" (hereunder CP) since 1989 (UNEP, 1989). Today, many developing countries recognize it as an efficient method for improving industries' environmental performance. As the CP process also covers management aspects, there are still much to be discussed about CP such as CP's management process, organizational capacity, and stakeholders' collaboration. Therefore, this talk attempts to fill these gaps by examining the questions regarding how multiple stakeholders, especially the mass media should cooperate effectively towards cleaner production in developing countries. It aims to shed light on stakeholders' collaboration concerning CP implementation in developing countries, especially Vietnam by examining one case study in Vietnam.

Keywords: Cleaner Production; Stakeholder Involvement; Industrial pollution

#**No. 23**

Study of Anaerobic Biodegradability of Rice Straw Hydrothermal Liquefaction Products: Aqueous Products after Extraction with Four Different Organic Solvents

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This study examined the chemical compositions and the anaerobic degradability of the aqueous products from hydrothermal liquefaction (HTL-ap) of rice straw. The aqueous products were obtained by a pilot plant after hydrothermal reaction at 280℃ for 30 min. The COD values of HTL-ap changed from 20.74g/L into 15.99g/L, 17.63g/L, 13.28 g/L, 148.90 g/L after extraction with four organic agents petroleum ether(PE), cyclohexane(CH), dichloromethane(DM) and ethyl acetate(EA), respectively. The effects of the four different organic extraction agents on methane production showed significant differences. The anaerobic biodegradation was terminated artificially after 21days and almost 67.4% COD of the organic compounds in the aqueous phase after extraction with PE changed into CH_4 and the CH and EA aqueous phases were 54.8% and 93.84% while the HTL-ap without any extraction was 51.4%. At the same time, the DM phase was completely inhibited by the dichloromethane dissolved during the extraction process. To explain the differences, the organic and water phases with or without extraction before and after anaerobic digestion were analyzed by GC-MS, HPLC, LC-MS and FTIR technologies. To verify the stability of digestion and to analyze changes in microbial community structure, two semi-continuous reactions were also conducted with PE aqueous and raw aqueous products.

Keywords: Rice straw; Hydrothermal liquefaction; Organic solvent extraction; Anaerobic biodegradability

#**No. 24**

Carbon isotope fractionation of acetate by acetogenesis in Philippine rice field soil

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Acetate is an important intermediate in the anaerobic degradation of organic matter. It is not only produced from fermentation but also from the reduction of CO_2 via the acetyl-CoA pathway (acetogenesis). Temperature is a major driving force in many environmental systems. To investigate the effect of temperature on acetate production in rice field soil, we incubated Philippine rice field soil at 15, 30 and 50 ℃ under H_2/CO_2 or under N_2 with bromoethanesulfonate (BES) as inhibiter of methanogenesis and KCN as inhibitor of acetogenesis, and followed the carbon isotope signatures of CH_4, CO_2 and acetate by mass spectrometry. Compared with -15.9‰～-25.4‰ under N_2, incubations under elevated H_2/CO_2 yielded ^{13}C-depleted acetate of -68.0‰ ～-24.0‰, indicating that H_2-dependent acetogenesis dominated acetate production. Under N_2, however, carbon isotopic fractionation of acetate could only be observed at 15 ℃ in incubations with KCN but not at the other temperatures (30 and 50 ℃). The $\delta^{13}C$ values of acetate under these conditions were similar to those of soil organic matter (-23.5‰) indicating that acetate was mainly produced from fermentation.

Keywords: Acetate; Acetogenesis; Carbon isotope; Temperature; Rice soil

#**No. 25**

Innovation of Microalgal Biofuel Production Route by Efficient Waste Heat Recovery

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Biofuel is a promising alternative of fossil fuels due to its sustainability, environmental friendliness and good adaptability. In particular, microalgal biofuel has several significant advantages, such as higher photosynthetic efficiency, higher lipid production, no competition for land with crops, fast-growing and fixation of waste CO_2, etc. However, high production cost of biofuel is still a critical challenge which needs to be overcome. In this work, the energy saving potential by waste heat recovery in the existing biofuel production routes is evaluated and summarized. The waste heat grade of cultivation, harvesting, drying, extraction, transesterification and purification is analyzed in detail. Meanwhile, the optimized heat integration arrangement is put forward to avoid additional heat or cold utility. The investigation results indicated that the total energy consumption of biofuel production could be saved by maximum 40% when using waste heat recovery and heat integration technology.

Keywords: Microalgae; Biodiesel; Waste heat recovery; Energy

#**No. 26**

Short-term dry anaerobic digestion for ammonia and volatile fatty acids accumulation in swine manure and their subsequent separation from phosphorus resource

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The study sought to maximize the recycling of C, N and P resources in swine manure (SM) through short-term dry anaerobic digestion (AD) and ammonia stripping technology, with specific goals of: (1) effective ammonia production and recovery; (2) separation of total volatile fatty acids (TVFAs); and (3) preservation of high P bioavailability in the solid residue for further applications. Results showed that high concentrations of TVFAs (94.4 mg-COD/g-VS) and ammonia-N (20.0 mg/g-VS) as well as high potentially bioavailable P (10.6 mg/g-TS) in the digestate were achieved after 8 days' dry AD under the optimal conditions (55 ℃, 20% TS and unadjusted initial pH 8.6) determined in this study. In addition, greater than 90% of the ammonia in SM was efficiently recovered by air stripping at TS about 20% without unfavorable decrease of TVFAs. Finally, the TVFAs retained in solid SM could be separated by water addition and centrifugation.

Keywords: Volatile fatty acids; Ammonia; Phosphorus fractionation; Dry anaerobic digestion; Dry ammonia stripping

#**No. 27**

Comprehensive Roof Garden as An Approach for Integrated Urban Activities, Rural Atmosphere and Sustainable On-site Sanitation System: Pilot Project in Yogyakarta, Indonesia

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Yogyakarta city is the capital of Special District of Yogyakarta with 12.5 square miles area and population of 636,660 inhabitants (2012). As a growing city, Yogyakarta is experiencing various changes in land use and layout. An increasing number of development and construction consequences bring about the decrease in available green open spaces. This may lead to some environmental problems such as air pollution, increase in ambient temperature and reduction of rainwater infiltration area. A roof garden will be introduced, which has the ability to create rural atmosphere in an urban area. This project tries to establish a comprehensive building system which can utilize renewable energy, harvest rainwater, and biologically purify wastewater, realizing closed-cycle on-site sanitation and creating more local green open space. This concept is proposed not only to solve environmental problem caused by limited land area for green open spaces, but also to realize Yogyakarta city's future vision as a resilient city.

Keywords: Green open space; Roof garden; On-site sanitation