2018 6th International Conference on Environment Pollution and Prevention (ICEPP 2018)

December 6-8, 2018.

Brisbane, Australia

Supported by

Published and Indexed by

Conference Venue

The University of Queensland

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The University's global research positioning was highlighted by the election of five UQ scientists to the Australian Academy of Science (AAS) in 2015 – almost one quarter of the 21 new Fellows and the most from any institution in the country.

The five new Fellows joined an existing group of 29 UQ scientists admitted to the AAS as Fellows since 1988, bringing the total number of UQ academics who are members of one of Australia's six prestigious learned academies to 166.

UQ is one of only three Australian members of the global Universitas 21, a founding member of the Group of Eight (Go8) universities, and a member of Universities Australia
Bukit Bintang is a great choice for travelers interested in entertainment, family-friendly trips and markets.

Recommended Hotel:
Mercure Hotel Brisbane
Address: 85-87 North Quay, Brisbane, CBD,Brisbane,Queensland,4000,Australia

Also, the participants can choose the preferable hotel nearby.

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Brisbane Conference Introductions

Welcome to 2018 HKCBEES Brisbane conference. This conference is organized by HKCBEES. The objective of the Brisbane conference is to bring together leading scientists, researchers around the world to discuss the priority topics for Environment Pollution and Prevention in recent years

2018 6th International Conference on Environment Pollution and Prevention (ICEPP 2018)

Papers will be published in the following conference proceeding or journal:

E3S Web of Conferences (Open Access proceedings in Environment, Energy and Earth Sciences), which is indexed by Google Scholar, CAS, DOAJ, CPCI (Web of Science), EBSCO, ProQuest, Ei Compendex, Scopus.

International Journal of Environmental Science and Development (IJESD, ISSN: 2010-0264), and be included in the Engineering & Technology Digital Library, and indexed by Chemical Abstracts Services (CAS), CABI, Ulrich Periodicals Directory, Electronic Journals Library, Crossref, ProQuest.

Conference website and email: http://www.icepp.org/; icepp@cbees.net

Presentation Instructions

Instructions for Oral Presentations

Devices Provided by the Conference Organizer:

Laptop Computer (MS Windows Operating System with MS PowerPoint and Adobe Acrobat Reader)
Digital Projectors and Screen
Laser Sticks

Materials Provided by the Presenters:

PowerPoint or PDF Files (Files should be copied to the Conference laptop at the beginning of each Session.)

Duration of each Presentation (Tentatively):

Regular Oral Presentation: about **10** Minutes of Presentation and **5** Minutes of Question and Answer
Keynote Speech: about **40** Minutes of Presentation and **5** Minutes of Question and Answer

Instructions for Poster Presentation

Materials Provided by the Conference Organizer:

The place to put poster

Materials Provided by the Presenters:

Home-made Posters
Maximum poster size is A1
Load Capacity: Holds up to 0.5 kg

Best Presentation Award

One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on December 7, 2018.

Dress code

Please wear formal clothes or national representative of clothing.

Keynote Speaker Introductions

Keynote Speaker I

Prof. Rodney Stewart
Griffith University, Queensland, Australia

Rodney Stewart is a Professor in the School of Engineering based at Griffith University, Gold Coast City, Queensland Australia. He is a specialist in engineering and environmental management research, particularly related to intelligent water and energy networks and digital utility sector transformation. He is currently leading or completed water end use studies covering potable-only water supply schemes, dual supply schemes and internally plumbed rain tank schemes. He was appointed as a National Water Commission Fellow in 2011 to verify the end use potable water savings achievable from a range of contemporary water supply schemes. More recently, his work is exploring the residential end use water-energy nexus as well as the development of intelligent algorithms for managing distributed battery storages in smart electricity grid networks. Professor Stewart has published over 200 research articles and received over AUD$5 million in competitive research funding as first chief investigator.

Topic: ‘Role of Intelligent Sensor Networks and Big Data Informatics for Managing Urban Water and Energy Resources’

Abstract—Intelligent water monitoring sensors coupled with advancements in big data analytics provides an opportunity to better manage urban water and energy resources. However, the uptake of these technologies has been slow due to a number of impediments; many of which can be overcome with evidence-based research, pilot trials, and effective knowledge transfer. Professor Stewart will discuss research and pilot trials undertaken in the Australian context that demonstrate the role of intelligent sensor networks and big data informatics for better managing and conserving urban water and energy resources. Some specific demonstration projects presented include using such technology for better network management, deploying customer resource usage interfaces, infrastructure asset life cycle management, optimised water and power quality management, and enhanced water reservoir treatment management. Professor Stewart will focus on the environmental benefits of implementing intelligent sensor networks and big data analytics for best managing urban water and energy resources.

Keynote Speaker II

Prof. James T. Anderson
West Virginia University, USA

Dr. Jim Anderson is a professor of wildlife ecology and management and the Davis-Michael Professor of Forestry and Natural Resources at West Virginia University. He earned a B.S. in wildlife from the University of Wisconsin-Stevens Point, an M.S. in range and wildlife management through the Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville, and a Ph.D. in wildlife science from Texas Tech University. Jim has published over 160 scientific research articles on wetland ecology and management, wildlife-habitat relationships, and restoration ecology. He has mentored more than 50 graduate students and has garnered more than $20 million in competitive external funding to support his research. He has been an invited keynote speaker at 15 international conferences, serves on numerous committees, and has served on the editorial board of 6 international journals. He teaches over 1,000 students annually in a number of courses including Restoration Ecology, Applied Wetlands Ecology and Management, Introduction to Wildlife and Fisheries Resources, Big Game Ecology and Management, and Waterfowl Ecology.

Topic: ‘Can we Build Functional Wetlands?’

Abstract—Compensatory mitigation is the primary tool used to reduce wetland loss in the United States. Compensatory mitigation programs are designed to replace lost area and function when permitted damage to natural wetlands is unavoidable. Function and species composition of mitigated and natural wetlands of West Virginia, USA have been studied since 2001. Early studies evaluated simple metrics, such as call indices of amphibians, but later more complex analyses and functional assessments were incorporated. Avian species richness, diversity, and abundance were similar between mitigated and reference wetlands. Waterbird and waterfowl abundance were higher in mitigated than reference wetlands. Frog and toad species richness, Wisconsin index calling values, and abundance were higher in mitigated than reference wetlands. Mean total percent cover of plant species was similar between mitigated and reference wetlands. Plant species richness, evenness, and diversity were greater in mitigated than reference wetlands. Mean weighted averages of plant communities using cover values and wetland indicator status were similar between wetland types. Mitigated sites had more pioneer plant species, non-native dominants, and species with relatively lower conservation quality. Plant compositional differences become smaller as mitigated sites age. Mitigated and reference wetlands supported similar invertebrate assemblages, especially among benthic populations. Abundance of metamorphs, survival, and growth of larval green frogs (Lithobates clamitans) and spring peepers (Pseudacris crucifer) were similar between wetland types. Decomposition rates of broadleaf cattail (Typha latifolia), common rush (Juncus effuses), brookside alder (Alnus serrulata), and reed canary grass (Phalaris arundinacea) were similar between mitigated and reference wetlands. Diet composition and selection of invertebrate food items by adult red-spotted newts (Notophthalmus viridescens) was nonrandom, but was only minimally affected by wetland type. Water quality varies among wetlands, but is similar between mitigated and natural wetlands. Results suggest that wildlife communities may respond more favorably than plant communities, but in most cases mitigated wetlands and natural wetlands are functionally and compositionally similar.

Keynote Speaker III

Prof. R. J. (Dick) Haynes
The University of Queensland, St Lucia, Queensland, Australia

Professor Haynes works in the areas of soil and environmental science. His present research interests are in the use and recycling of industrial, agricultural and municipal wastes and minimising their effects on the environment. He has extensive experience having worked as both an applied research scientist and as a university professor and has worked in New Zealand, South Africa and Australia. He has published over 170 original research papers in international journals, over 20 review papers in international volumes as well as many conference and extension papers and contract reports. He has been an invited keynote speaker at 7 international conferences and has served on the editorial board of 4 international research journals. He has acted as principal supervisor and co-supervisor of PhD, MSc and honours students in both South Africa and Australia. Professor Haynes has carried out research in commercial horticultural, pastoral, arable and forestry production as well as in small-holder semi subsistence agriculture. He has also worked on bioremediation of soils contaminated with organic pollutants, rehabilitation of mined sites, application of organic and inorganic wastes to soils and the effects of heavy metal contaminants on soil processes. His research has been mainly in the areas of applied soil chemistry and soil microbiology/biology with links to soil physical properties and to pollution of air and water. He has specialised in working on applied problems and maintains strong links with industry. Major areas of research have included the role of grazing animals in the fertility of pastoral soils, N cycling and gaseous and leaching losses from arable and pastoral systems, soil quality and soil degradation under agricultural land use, effects of soil contaminants on soil processes, rehabilitation and remediation of contaminated, degraded and mined sites and use of wastes as soil amendments.

Topic: ‘Sustainable revegetation of metal processing tailings - bauxite residue as an example’

Abstract—Bauxite is mined by open cut techniques and processed in alumina refineries by the Bayer process in which Al-containing minerals are dissolved in hot NaOH. The alumina produced is then transported to an aluminium smelter where aluminium metal is produced. The insoluble solids (bauxite processing residues) produced during the refining of alumina are deposited in impoundments surrounding the alumina refinery using either wet (15-30% solids) or dry (50-60% solids) disposal techniques. Dry disposal is now the dominant method used since it requires less space, the residue consolidates more rapidly, there are much less problems with treating drainage and it simplifies reclamation processes. For every tonne of alumina produced, 1-2 tonnes of residues are produced and, on a global basis, annual production of residue is about 120 million tonnes while the legacy over the last 120 years is about 2.7 billion tonnes. The material is red in colour due to its high content of iron oxides and is composed of mainly fine, silt-sized particles (0.002-0.02 mm dia.). As a result it is often referred to as red mud. Establishment of a vegetation cover on the residue waste areas is normally an essential closure strategy for the refinery. Major limitations to plant growth in residues include salinity, sodicity, alkalinity, Al toxicity and deficiencies of macro- and microelements. Physical properties are also problematic since residue mud consolidates to form a solid mass that waterlogs easily and can also dry to form a massive structure. Before establishment of vegetation it is desirable to leave the area for several years to allow excess salts (especially Na) and alkalinity (as bicarbonate) to leach down the profile. Gypsum (calcium sulphate) can then be cultivated into the surface horizon. This reduces pH by inducing precipitation of alkalinity as CaCO3. It also displaces Na with Ca and promotes further leaching of Na. Organic amendments (e.g. composts, animal manures) can then be applied to supply nutrients, increase CEC and improve physical conditions. Addition of inorganic fertilizers to supply nutrients is also essential. The type of vegetation established is often dependant on the nature of the surrounding vegetation (pasture or native vegetation). In either case, plants introduced need to be adapted to climatic conditions in the locality as well as being tolerant to saline, sodic conditions. With careful management a vegetation cover can be established. There is a need for long-term revegetation trials on bauxite residues since most revegetated sites are less than 10 years old.


Lunch	**12:00~13:30**

Brief Schedule for Conference

<table>
<tr><td>Day 1</td><td colspan="2">December 6, 2018 (Thursday) 10:00~17:00
Venue: Level 2 courtyard
The 2nd Floor, Building 78, Brisbane St Lucia, QLD 4072, The University of Queensland, Queensland, Australia
Participants Onsite Registration & Conference Materials Collection</td></tr>
<tr><td rowspan="8">Day 2</td><td colspan="2">December 7, 2018 (Friday) 9:05~17:45
Arrival Registration, Keynote Speech, Conference Presentation</td></tr>
<tr><td colspan="2">Morning Conference
Venue: Conference room 343
The 3rd Floor, Building 78, Brisbane St Lucia, QLD 4072, The University of Queensland, Queensland, Australia</td></tr>
<tr><td colspan="2">Opening Remarks 9:05~9:15
Prof. R. J. (Dick) Haynes
The University of Queensland, St Lucia, Queensland
Keynote Speech I 9:15~10:00
Topic: ‘Role of Intelligent Sensor Networks and Big Data Informatics for Managing Urban Water and Energy Resources’
(Prof. Rodney Stewart, Griffith University, Queensland, Australia)</td></tr>
<tr><td colspan="2">Coffee Break & Group Photo Taking 10:00~10:30</td></tr>
<tr><td colspan="2">Keynote Speech II 10:30~11:15
Topic: ‘Can we Build Functional Wetlands?’
(Prof. James T. Anderson, West Virginia University, USA)

Keynote Speech III 11:15~12:00
Topic: ‘Sustainable revegetation of metal processing tailings - bauxite residue as an example’
(Prof. R. J. (Dick) Haynes, The University of Queensland, St Lucia, Queensland)</td></tr>
<tr><td colspan="2">Lunch 12:00~13:30
Venue: Outside of the conference room</td></tr>
<tr><td colspan="2">Afternoon Conference
Venue: outside of conference room</td></tr>
<tr><td>Session 1
13:30~15:15
Venue: 343</td><td>7 presentations-Topic: “Air Pollution Monitoring and Climatology”
Session Chair: Prof. R. J. (Dick) Haynes</td></tr>
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	Session 2 **13:30~15:15** **Venue: 344**	**7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"** **Session Chair: Prof. Rodney Stewart**
	Session 3 **13:30~15:30** **Venue: 346**	**8 presentations-Topic: "Ecological Environment and Sustainable Development"** **Session Chair: Prof. James T. Anderson**
	Coffee Break 15:15~15:45	
	Session 4 **15:30~17:45** **Venue: 343**	**9 presentations-Topic: "Waste Management and Chemical Engineering"** **Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali**
	Poster Session: 15:15-17:45 **Venue: 344/346 conference room**	
	Dinner 18:00 **Venue: outside of conference room**	
Day 3	**December 8, 2018 (Saturday) 9:00~17:00** **One Day Tour**	

Tips: Please arrive at the conference to upload or copy PPT into the laptop room 10 minutes before the session begins.

Note: (1) The registration can also be done at any time during the conference.

(2) The organizer doesn't provide accommodation, and we suggest you make an early reservation.

(3) One Best Presentation will be selected from each presentation session, and the Certificate for Best Presentation will be awarded at the end of each session on December 7, 2018.

Session 1

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D1004-A Presentation 1 (13:30~13:45)
The influence of shipping to the air quality in the North-West Black Sea
Vasile Rață
"Dunărea de Jos" University of Galati, Romania

Abstract—Based on the problem of pollution and climate changes, being motivated by the desire to keep the Earth planet a propitious environment for future generations, this paper addresses the problem of air pollution in urban areas, in the proximity of shipping routes and ports of the Northwest Black Sea. These areas are considered to be critical spots because of the considerable amounts of pollutant emissions that are produced and diffused into the atmosphere through the burning process of maritime fuel in large-scale naval engines. It analyzes the influence of pollutants such as sulfur oxides (SOx), nitrogen oxides (NOx), particulate matter (PM10, PM2.5), in the aspects of wind and precipitation, in the studied areas, wishing to highlight the existence or context in which shipping activities affect air quality parameters. The final goal of the paper is the knowledge and dissemination of the problems faced by this region in order to implement on a long-term basis the solutions adopted at the World level, approaching the applicable principles in the Emission Control Areas (ECA).

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D1006 Presentation 2 (13:45~14:00)
A comparison of control methods of air pollution in London and Beijing
Daohan Tang
Flinders University, Australia

Abstract—In 1952, London was enveloped by poisonous smog and caused 12,000 deaths, which triggered the British government established comprehensive air pollution governance. In Beijing, people have experienced unhealthy levels of air pollution for over 20 years. To improve Beijing air pollution governance, the study examines the air pollution characteristics of Beijing and utilises a benchmarking approach to identify where improvements are warranted. London is selected as a benchmarking partner to examine how it achieved its outstanding performance on air pollution mitigation. The benchmark criteria across pollution characteristics and levels, regulations, public participation, promotion of alternative energy are applied in comparing the performance of air pollution mitigation in both London and Beijing. By working out the gaps between London and Beijing, the weaknesses and recommendations in air pollution governance in Beijing can be identified, including upgrading air quality monitoring network, improving air pollution legislative framework, establishing new administrative departments for efficient law enforcement and distinct liability, raising the standards for vehicles and fuels, promoting public participation and low-carbon life.

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: “Air Pollution Monitoring and Climatology”

Session Chair: Prof. R. J. (Dick) Haynes

D2019 Presentation 3 (14:00~14:15)
Radon in dwellings of Papua New Guinea: Observations of a preliminary study
P J Jojo, Philip Epemu Victor, F B Pereira and Gabriel Anduwan
PNG University of Technology (UNITECH), Lae, Morobe, Papua New Guinea

Abstract—Restricting exposure to hazardous materials and epidemics is a primary step in reducing health concerns of the public. Radon and its progeny are known potential indoor air pollutants causing higher risk of lung cancer through chronic exposure. There is no known threshold concentration below which radon exposure presents no risk. Even at low concentrations, radon can result in an increase in the risk of lung cancer. We have made a preliminary study on the levels of indoor radon and thoron concentrations in selected populated locations in the city of Lae in Papua New Guinea using both active and passive methods of measurement. The basic source term of indoor radon, the flux from the soil air has also been determined. The overall average indoor activity of radon gas was 13.4 3 Bq m-3, that for thoron was 2.5 1.1 Bq m-3 and the annual average inhalation dose was 0.25 0.12 mSv. The radon flux from soil air was found to be 12.7 Bq m-2 h-1. The concentrations of radon and thoron progeny and their equilibrium factor were also determined. It is found that the dwellings have lower levels of radon as compared with the dwellings in many other regions of the world.

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D0019-A:Presentation 4 (14:15~14:30)
Study of Isoprene Emissions in Biogenic & Anthropogenic Environment in Urban Atmosphere of Delhi - The capital city of India
Prabhat Kashyap, Krishan Kumar
Jawaharlal Nehru University, India

Abstract—Biogenic volatile organic compounds (BVOCs) not only govern the rural atmosphere but also significantly regulate the atmospheric chemistry of urban area. Particularly, Isoprene is the single largest emitted compound among other BVOCs globally, that influence the tropospheric ozone chemistry in urban environment as its high ozone forming potential. It is mainly emitted by vegetation & a significant portion is also released by vehicular exhaust. This study investigates the spatial and temporal variations of isoprene emissions in 2 different seasons (post-monsoon & winter) at four different locations of Delhi. For the quantification of anthropogenic and biogenic isoprene, two sites from traffic intersections (Punjabi Bagh & CRRI) and two sites from vegetative locations (JNU & Yamuna Biodiversity Park) were selected in the vicinity of isoprene emitting tree species. The concentrations of traffic tracers (benzene, toluene) were also determined & their robust ratios with isoprene were used to differentiate anthropogenic isoprene with biogenic portion at each site. For collection of intra-day samples (3 times a day) in each season, FLM Carbopack X thermal desorption tubes were used and further analysis was done with Gas chromatography-mass spectrometry (GC-MS). The results of the study proposed that the ambient air isoprene is always higher in post-monsoon season as compared to winter season at all the sites. The maximum isoprene emission flux was always observed during afternoon hours in both seasons at all sites. The maximum isoprene concentration was found to be 13.95 ppbv at Biodiversity Park during afternoon time in post monsoon season while the lower concentration was observed as low as 0.07 ppbv at the same location during morning hours in winter season. Furthermore, high correlation between isoprene emissions with traffic volume at traffic sites revealed that a noteworthy share of its emission also originates from road traffic.

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D3001-A Presentation 5 (14:30~14:45)
Carbon sequestration in bamboo ecosystem: A prototype for climate change mitigation
David C. Vanlalfakawma and S.K. Sen
Department of Botany, Visva Bharati University, Santiniketan,West Bengal, India

Abstract—A large amount of scientific documents is available on the pivotal role of the forests, especially tropical forests to sequester considerable amount of atmospheric CO2 and to mitigate the climate change effects. Recent researches revealed that bamboo, a gigantic grass of the poaceae family may be the prototype for Clean Development Mechanism (CDM) and REDD+ due to its high carbon storage and sequestration rates. The mean carbon storage and sequestration rate in bamboos ranges from 30 – 121 Mg ha-1 and 6 –13 Mg ha-1 yr-1, respectively. The rapid accumulation of biomass and effective fixation of CO2 are attributed to its high carbon sequestration potential. Bamboo, aptly called as "poor man's timber" is an important agroforestry and forest plant in several countries of the Asia-Pacific region for generating varied socio-economic requirements. This paper discussed the potential of bamboo ecosystems in storing and sequestering carbon and its capacity as a prototype for climate change mitigation.
Mg = Mega gram; ha = hectare (10,000 sq. metre); yr-1 = per year

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D2014 Presentation 6 (14:45~15:00)
Subsistence and small-holder farmer's understanding and experiences of and response to climate change impacts in three agroecological zones of Nepal
Sikha Karki, Paul Burton, Brendan Mackey
Cities Research Institute, Griffith University, Gold coast, Queensland, Australia.

Abstract—Climate all over the globe is changing, and this change is accelerating. Climate change has impacted all countries, regardless of size or development and Nepal is no exception. Although this pressing issue has been influencing almost all sectors of the economy, the agriculture sector is one whose performance is especially determined by an increasingly variable climate. In this study, we assessed the farmer's experiences and understanding of climate change, its impacts on agriculture, particularly, cereal crop yield and food security interviewing 384 farm households, 128 households each from three agro-ecological regions of Nepal. This was further supplemented by the focus group discussions with a group of local women from each region and key informant interviews and cross-validation with climate and yield data. The farm households were found to be experiencing climate change mainly increased temperature, reduced and unpredictable rainfall. However, they had not heard about climate change, and the cause of climate change was not properly known to all. Climate change was reported to have impacted crop production as well as threatened their food security. Climate change has been experienced irrespective of geographical region, age group, education or socio-economic background and different measures were followed by the farmers in response to the challenges in the agriculture. Different factors were reported to have influenced agriculture, agricultural productivity and consequently food security. However, the impact of human-induced climate change is a unique challenge faced by this generation of farmers.

Session 1

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-343

7 presentations-Topic: "Air Pollution Monitoring and Climatology"

Session Chair: Prof. R. J. (Dick) Haynes

D0054 Presentation 7 (15:00~15:15)
Isolation and identification of chromium-tolerant bacterial strains and their potential to promote plant growth
Muhammad Arshad, Anza Javaid, Maria Manzoor, Kiran Hina, Muhammad Arif Ali, and Iftikhar Ahmed
National University of Science and Technology, Pakistan

Abstract—Remediation and management of Chromium (Cr) contaminated soils for safe usage has been a serious challenge. The aim of present work was to isolate and identify Cr tolerant bacterial strains and assessing their plant growth promoting potential under controlled conditions. Soil samples were collected from Gujrat District, Pakistan, and analyzed for Cr content and bacteria isolation. In-vitro screening was done for chromium tolerance and plant growth-promoting (PGP) abilities. The tolerant isolates which also exhibited PGP abilities were used as inoculants in germination and pot trial experiment. The isolates A5 and A6, identified as Pseudomonas plecoglossicida and Staphylococci saprophyticus through 16S rRNA gene sequencing, were found to be tolerant up to 700 mg L-1 of Cr (VI). Both were effective in solubilizing phosphate but only A5 (Pseudomonas plecoglossicida) was able to produce indole acetic acid. A5 also increased the percentage of seed germination from 17 to 46% and spinach plant's biomass by 44% with respect to the control. Keeping in view the results obtained, A5 (Pseudomonas plecoglossicida) appeared as the best species that was able to tolerate Cr stress and promote plant growth. Further, it can be developed as a bio-inoculant for non-food agricultural applications for remediation of Cr contaminated soils.

Session 2

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D0035-A Presentation 1 (13:30~13:45)
Study on a Falling Water Filter in Combined Bio-Ecological Process for Small Scale and Decentralized Water Treatment
Zixuan Yang, Xiwu Lu, Feng Xue
Southeast University, China

Abstract—Currently, traditional process of sewage treatment comes from the city sewage treatment technologies, which require high energy consumption, expensive maintenance charge and act an incongruous role in the rural area. In order to reduce energy consumption and improve ability of oxygenation, a falling water driving rotating biological contactor had been designed to apply in the anaerobic / anoxic / oxic /constructed wetland proposed by the research group of Southeast University, for rural pollution treatment. This process features with simple operation, low energy consumption, good treatment effect, recyclable nitrogen and phosphorus resources, etc.

The purpose of this research was to carry out experimental study on the falling water filter in combined bio-ecological process and assess its efficiency, feasibility and suitability for small scale and decentralized water treatment and explore the better structure, treatment effects and operating parameters. The best structure is 0.5 r/min in rotating speed, 300L/(h•m) in flow rate per unit and 0.7m in drop height. In same inflow, the oxygenation ability of falling water filter is stronger than the tradition ones.The optimized and controlled parameter is hydraulic retention time (HRT). Under the optimized conditions, the dissolved oxygen content in the three rotating biological contactor were 1.72、3.57、4.77mg/L which are suitable to meet the oxygen demand for nitrification bacteria. In contrast, the energy provided only a small pump which is less than 0.1 kWh/m3, and the average COD、TN、NH4+-N removal efficiency in filters reached at 62.3%, 92.6%, 91.5%. The falling water filter was proved to be an efficient and energy-saving aerobic unit, which is suitable for small scale and decentralized water treatment.

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D0044-A Presentation 2 (13:45~14:00)
•OH mineralization of norfloxacin during the treatment of algae bloom water based on a drinking water treatment system with a capacity of 12,000 t per day
Yixuan Yu, Mindong Bai, Zhixin Ji
Dalian Maritime University, China

Abstract—The accumulation of antibiotics in river watersheds and lakes would induce spread of antibiotic resistance genes in drinking water. For the mineralization of norfloxacin (NFX), •OH equipment was installed in a drinking water treatment system with a capacity of 12,000 t per day. The •OH was produced by strong ionization discharge combined with water jet cavitation. During the transfer of algae bloom water, in only 20 s, a dose of 1.0 mg L-1 and 0.5 mg L-1 •OH completely degraded the NFX after coagulation sedimentation and sand filtration, respectively. Based on the analysis of intermediates, the •OH completely mineralizes NFX into CO2 and H2O by breaking the C-F bond and opening the piperizine, nalidixic, and benzene rings. All algae bloom was inactivated by disinfection with 0.5 mg L-1 •OH; the 106 drinking water quality indexes satisfied the Chinese Standards; and disinfection by-products, such as bromate was not formed. Based on NaClO disinfection, the total THM content increased to 190 μg L-1, which is 2.4 times higher than the concentration limit regulated by United States Environmental Protection Agency (80 μg L-1). Advanced •OH oxidation based on strong ionization discharge can be used to completely mineralize antibiotics during drinking water treatment.

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D0045-A Presentation 3 (14:00~14:15)
Removal of 2-methylisoborneol and geosmin by hydroxyl radicals based on a strong ionization discharge: performance, mechanism and pathways
Zhixin Ji, Mindong Bai
Dalian Maritime University, China

Abstract—Due to the increased intensity and frequency of cyanobacterial blooms, taste and odor (T&O) causing compounds, 2-methylisoborneol (2-MIB) and geosmin (GSM), have become a cause for great concern in drinking water treatment plants (DWTPs). The removal efficiency, intermediate by-products, and degradation pathways of 2-MIB and GSM in synthetic water by hydroxyl radical (•OH) were studied, where •OH was produced by a strong ionization discharge combined with a water jet cavitation effect. Results show that the removal rate for 2-MIB and GSM with initial concentration of 1000 ng/L could reach 99.4% and 99.8% within 6.0 s, while the total reactive oxidant (TRO) dose were 3.8 and 3.5 mg/L, respectively. After •OH treatment, the concentration of 2-MIB and GSM in water was lower than 10 ng/L (lower than the human olfactory threshold). The degradation by-products of 2-MIB and GSM were identified by gas chromatography–mass spectrometry and possible degradation pathways for the •OH of 2-MIB and GSM were proposed. By analyzing the intermediates produced in the oxidative degradation process, it was found that the bridge ring structure of 2-MIB and the double loop structure of GSM could be destroyed by •OH and finally mineralized to CO2 and H2O..

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D0059-A Presentation 4 (14:15~14:30)
Reduction crystallization of heavy metals from acid treated phosphogypsum effluent utilizing hydrazine as a reducing reagent
T Mashifana and N Sithole
University of Johannesburg, South Africa

Abstract—Phosphogypsum is a by-product generated from phosphoric acid production processes. Due to the negative impact posed to the environment by the material, a chemical treatment process was developed to reduce the hazardous constituents in the material and render the final product useful for other applications. The treatment of phosphogypsum produced an effluent laden with contaminants such as copper, iron, manganese and thallium. This study was conducted to investigate the use of hydrazine as a reducing agent to remove and reduce Cu, Fe, Mn and TI from effluent, applying a reduction crystallization process. Nickel powder a base substrate was utilised as a seeding material. A feasibility study was carried out to test the efficiency and find the optimum operating conditions for the process. The predominant detected components in the feedstock were 71% Fe, 14% Tl, 5.1% Mn, 4.12% Cu and 2.4% Zn. The results obtained indicate that hydrazine can effectively remove up to 99.8% of metals from the effluent at the optimum pH of 10.5. Growth of the nickel powder particles was evident indicating a reduction and adsorption of contaminants on the surface of the powder. The treated solution was within South African acceptable limits for effluent discharge, which stipulates a concentration of 20 mg/l of copper, iron, manganese and thulium.

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D0009 Presentation 5 (14:30~14:45)
Significance of Algae in eliminating and deactivating pathological index Organisms in Wastewater Stabilization Pond Systems
Fadwa Ali Hussein Al-Tameemi ,Thura Awad Kadhim
AL-Yarmouk University College, Iraq

Abstract—Wastewater stabilization ponds (WSPs) are an economical alternative to conventional wastewater treatment technologies. They are commonly favored by small and rural communities. Due to long hydraulic retention time required by the treatment in these systems, algal activity is often expected during summer season. This study investigated the effects of algal growth on the removal and inactivation of pathogenic indicator organisms in WSP systems. Two predominant algae species (Mougeotia sp. and Nostochopsis sp) that were found in Iraq (Alkhademiyah sewage station in Baghdad) WSP were able to increase both pH and DO. The highest inactivation rates of both E. coli and total coliforms (TC) were observed at pH 10.6 compared to other pH (5.1, 8.2, 8.4, 10.6) investigated in the bench-scale experiments. Both high (20mg/L) and low DO (1 mg/L) levels can facilitate the removal and inactivation of both E. coli and TC. Enterococci were significantly reduced at both intermediate (8.6 mg/L) and high (20 mg/L) DO concentrations. Therefore, the presence of algae can potentially promote the removal of E. coli, TC and Enterococci. Much higher inactivation of E. coli, TC and Enterococci at a higher temperature (20 ℃) than at a lower temperature (4 ℃) indicates temperature is one the most important removal factor. Two potential/additional indicator organisms (Enterococci and Clostridium perfringens (C. perfringens)) exhibited different inactivation trends than the traditional indicators (E. coli and TC) under the same pH and DO conditions. C. perfringens were tolerant to all the tested pH, DO and temperature conditions. Their resistance to environmental stresses may pose potential health risk. Hence, both Enterococci and C. perfringens could be potentially used as indictor organisms to predict the overall level of pathogens in treated wastewater.

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D2024 Presentation 6 (14:45~15:00)
A microsystem approach to measure the oxygen consumption of bacteria. Towards a precise evaluation of the BOD parameter of wastewater.
L.Recoules, S.Jouanneau, G.Thouand, AM Gue and **A.Boukabache**
LAAS-CNRS, Universit éde Toulouse, UPS, Toulouse, France

Abstract—The quantity of organic pollutants present in wastewater is classically evaluated by the measure of the quantity of dissolved oxygen during five days; it is regulated towards the so-known BOD5 parameter (Biological Oxygen Demand). This work constitutes the first step of an overall strategy targeting to improve the monitoring of BOD5. We focused on the development of a microsystem approach allowing monitoring the O2 consumption induced by the biodegradation process of organic matter. To evaluate the organic pollutants concentration, we used Escherichia coli as bacterial indicator, confined in a PDMS-glass chip. Their metabolic activity in presence of organic molecules is measured towards their oxygen consumption. These measurements are ensured by optical sensors present in each of the five instrumented chambers of the chip. The principal results show that the microsystem approach is suitable to measure simultaneously different concentrations of organic load, and that it is possible to reduce the time analysis. By examining the O2 diffusion towards the walls of the device, we analyse the different part of the experimental results; it allows predicting, in the future, a precise evaluation of the BOD value in a time period of some hours..

Session 2

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:15

Venue: 78-344

7 presentations-Topic: "Wastewater Treatment and Water Quality Analysis"

Session Chair: Prof. Rodney Stewart

D2025 Presentation 7 (15:00~15:15)
Application of ANN for Water Quality Index.
Rajiv Gupta, A N Singh, Anupam Singhal
Dept. of Civil Engineering, BITS-Pilani, Rajasthan, India

Abstract—Attempt has been made to create a Water Quality Index (WQI) based on artificial neural network (ANN) and globally accepted parameters. Several methods to measure WQI are available in the research and ambiguity problems exist where all the sub-indices of WQI are acceptable but overall index is not acceptable. In this study, we have tried to develop the WQI based on the WHO (world Health Organization) parameters (Dissolved Oxygen, pH, Turbidity, E. Coli and Electric Conductivity). The results also reveal changes in ANN based result from various input neural network model and its parameters. Even within same model, changes occur with variation in parameter. Based on the statistical parameter of regression value, the parameter and network model would be selected. With the dataset created for this study have shown the Cascade network is best for predicting the WQI.

Session 3

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D0043 Presentation 1 (13:30~13:45)
Rapid Oil Spill Simulation within Ghana's Coastal Waters
Derrick Martin Adjei Sowa
The University of Adelaide, Australia

Abstract—Given the adverse externalities of hydrocarbon operations, particularly the impacts of oil spills – environmental, political, cultural and socio-economic – the hypothetical simulations of oil spills enhances the study and appreciation of the trajectory and fate of spilled oil in the marine environment; so as to plan timely and cost effective clean-up responses and management strategies. This paper therefore presents the results of a rapid hypothetical simulation of oil spills in Ghana's coastal waters, and the clean-up technique(s) most applicable in the area. Using MIKE 21, tidal elevations were used as forcing to run the hydrodynamic model, after which a series of hypothetical simulations were conducted with the worst case scenario divulging both the trajectories of the oil slicks and the potential areas to be impacted. The simulation results closely matched the results highlighted in the Phase-1-Development EIA report of the Jubilee Field. Following the simulation, an assessment of the most viable clean-up technique was conducted. Given the geophysical state of the coastal system and the met-ocean conditions, the mechanical recovery method, complemented by bioremediation, is most applicable due to its marginal environmental impacts.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D1003-A Presentation 2 (13:45~14:00)
Serum Concentrations of Polyfluorinated Chemicals and Their Association with Reproductive Outcomes among Couples Undergoing in Vitro Fertilization.
Xueqian Ma, Yinghui Ye
Zhejiang University School of Medicine, Hangzhou 310006, China

Abstract—Polyfluorinated chemicals(PFCs) are a series of organic compounds in our daily life and might influence the fertility of animals, but researches about their reproductive toxicity on human are limited. Our team intended to determine whether PFCs were associated with in vitro fertilization(IVF) outcomes. We enrolled 100 couples undergoing IVF treatment in our reproductive center and measured serum concentrations of 10 different kinds of PFCs. IVF outcomes were assessed by fertilization rate, good-quality embryo rate and pregnancy rate. Consequently, perfluorooctanoic acid(PFOA) got the highest concentration, followed by perfluorooctane sulfonate(PFOS), in both sex. In male, increased PFOA and perfluorooctane sulfonamide(PFOSA) were associated with decreased sperm counts. In female, patients with higher PFOA and perfluorohexane sulfonic acid(PFHxS) were more likely to have decreased numbers of retrieved and matured oocytes. After IVF treatment, we found that couples with higher male PFOA got lower possibilities of good-quality embryo rates, suggesting that PFCs may affect early embryo development via spermatozoa. Female patients with higher PFOS were associated with decreased clinical pregnancy rates, indicating that negative effect of female PFOS on IVF outcomes were probably mediated through endometrium. Our results suggested that PFCs may impair the fertility in both sex and negatively impact the IVF outcomes.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D0052-A Presentation 3 (14:00~14:15)
Developing Sustainable School Guidelines: The Case of Egypt
Sara Harb, Salah El-Haggar, Hani Sewilam
American University in Cairo Egypt

Abstract—Educational reform has been a concerning matter to the Egyptian government since the 20th century. In order to address the educational problems, several initiatives have instigated a quantitative expansion approach, rather than a qualitative one. Existing building assessment methods convey sustainability principles to building design. However, they do not consider the school design as an active pedagogical tool for sustainable education and development. In addition they do not integrate other imperative parameters necessary for the effective learning and development of students. The developed guideline is divided into two school rating systems; new and existing. The guideline is further divided into three main sustainability categories: energy, water, and habitat. The directing parameters of the guideline are based on sustainable building assessment parameters, Egypt's pressing social, economic and environmental concerns, pedagogy of educational environments, students' social, psychological, and developmental needs, in order to develop a holistic framework

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D2011 Presentation 4 (14:15~14:30)
How is the energy performance of buildings assessed in Australia? -A comparison between four evaluation systems
R Chang, Q Wang and Z Ding
University of Cambridge, UK

Abstract —Buildings consume a large amount of energy in Australia. To assess the sustainability performance, including energy performance, of buildings, Australia has developed several evaluation systems with the main ones being Green Star, NABERS, NatHERS and BASIX. Industry practitioners have a certain level of freedom to choose from these evaluation systems to evaluate the sustainability performance of their buildings. However, there is a lack of systemic comparison among these evaluation systems in general, and between the ways that the energy performance of buildings is assessed by these systems in specific. This study provides a systemic comparison between these four main evaluation systems regarding their approaches to assess the energy performance of buildings in Australia. The results show that these systems use different assessing methodologies, namely indicator-based or simulation-based methods, to assess different types of buildings based on data from different sources. These differences reveal the possibility of merging these existing systems to propose a new system that could better assess the energy performance of buildings in Australia.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D2003-A Presentation 5 (14:30~14:45)
Irrigation Potential for sub-alpine agriculture. Implications for climate change adaptation and rural sustainable development
Edward Cornwell, Victor Sposito, Robert Faggian
Deakin University, Melbourne, Victoria, Australia

Abstract—Current climate change impacts over agriculture suggest increasingly constrained options for water and land use allocation. Because of that, systems adaptation becomes a necessary element for rural sustainable development, especially in those sensitive regions such as the sub-alpine systems (in this study, the Australian Alps and the Chilean Dry Andes). After building and utilising a daily-distributed hydrological model, several crop-specific irrigation potential scenarios are generated for both orographic-dissimilar case-study catchments to explore adaptation context under different agricultural expansion and water storage capacity configurations. Projections consider four IPCC-AR5 climatic models under two CO2 emission pathways (RCP 8.5/2.6). Results indicate that water balance will evolve from surplus (baseline) to deficit (2000 to 2100) condition, also characterised by substantial uncertainty and long-persistent droughts. Outcomes suggest, first, agriculture sustainability will require significant improvement to ensure optimal water-land management. Second, mountain hydrological processes favour downstream agricultural adaptation capacity, increasing those positive feedbacks along the 21st century. Third, adaptation pathways derived from incremental actions and transformational plans will evolve differently for both flatter and steeper systems. The latter suggests the need for a broader scope when understanding regional adaptation knowledge transfer and thus, facilitate the adaptation process in similar sub-alpine agricultural systems.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D2005 Presentation 6 (14:45~15:00)
Effect of blue light on human eye: Advances to counter its impact
Devanshi M Dalal, Atanu Samanta and Mahesh K Dalal
Nagar School of Optometry, Gujarat University, Ahmedabad, India

Abstract—Light is fundamental for human vision. Abundance of light is useful for sustaining comfortable human life. Good blue light (blue-turquoise part) is essential for overall well being. However in modern time, due to various causes like pollution, modern gadgets like smart phone etc. existence of harmful light like blue-violet light has increased. Blue-violet light is harmful to retinal cells. Blue-violet light causes long term damage to our eyes as it can accelerate onset of AMD (Age related Macular Degeneration). To protect or shield human eye against blue-violet light wearing of lenses with blue-violet light protection is suggested. The present paper reviews the effect of blue light blocking spectacle lenses on visual performance, macular health and the sleep wake cycle and recent advances in the field.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D2021 Presentation 7 (15:00~15:15)
Impact of waste water treatment plant on receiving River: A case study of Mvudi River, Thohoyandou, South Africa.
Olujimi Osidele, Damilola Aderomola, Lateef Adewale
Department of Geography & GIS, University of Venda, Thohoyandou, South Africa

Abstract—Inadequately treated wastewater negatively affects the receiving environment. Furthermore, it harbours high loads of microbial pathogens, heavy metals and organic matter and has the potential to lead to the transmission of water and vector-borne diseases. Furthermore, leads to the development of eutrophic and algal blooms which ultimately results in water with bad taste and odour. The study was carried out from March to August 2016 where water samples were collected at four different measurement points and reflected areas of different activities along the Mvudi River. Physio-chemical parameters that were measured on site were temperature, pH, EC, Suspended Solids (SS), Free.Cl, Orthophosphate (P), Fluoride (F), COD, NH_3, and NO_3. Concentrations of COD in the sample 1, sample 2, sample 3 and sample 4 were higher than recommended minimum limit. The concentrations of NO_3 in the effluent, up and downstream water samples complied with DWA effluent discharge standard of 15 mg/L except in March. Total coliform counts in the effluent were detected at levels higher than 1000 CFU/100m/L, except in June, and August. Furthermore, the presence of E. coli counts was detected at levels less than 1000 CFU/100m/L in both upstream (sample 4) and downstream (sample 3) water samples. The discharge of effluent with high chemical concentrations, Total coliforms and E. coli counts continuously into a water course is undesirable since it has negative effects on the quality of water in the receiving river and can cause harm to fish and other benthic organisms further downstream. Department of Water & Sanitation in collaboration with Vhembe District Municipality should embark on regular comprehensive monitoring activities of the river to ensure safety of the aquatic environment and human population.

Session 3

Afternoon, December 7, 2018 (Friday)

Time: 13:30~15:30

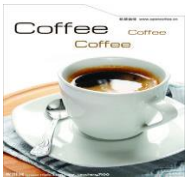
Venue: 78-346

8 presentations-Topic: "Ecological Environment Management and Sustainable Development"

Session Chair: Prof. James T. Anderson

D2017 Presentation 8 (15:15~15:30)
Relationships of Vegetation Indices and Biomass of Mangrove Forest Plantation in Thailand
Weerakaset Suanpaga and Wathinee Suanpaga
Kasetsart University, Bangkok, Thailand

Abstract—The objective of this research was to analyzed the relationship of vegetation index and biomass of mangrove forest plantation in in Don Sak national reserved mangrove forest, Don Sak district, Surat Thani province. The methodology was conducted by analysis relationship between the five vegetation indices, and five reflectances calculated from LANDSAT 8 satellite imagery which has a resolution of 30 meters, leaf area index (LAI) by hemispherical photography, and the data from field biomass survey. The proportional stratified sampling system classified by the age class; tree aged between 1-19 years, 14 age classes, 3 sample plots per age class, plot size 15x15 meters. The diameter and height of all trees in sample plot were collected for biomass calculation by using allometric equation. The result of this study found that the general linear and quadratic relationship of green reflectance (G) and biomass were significant (Biomass = -1318.715*(G) + 129.191, R^2 = 0.702; Biomass = 462.134 – 9,002.43(G) + 43,823.11(G^2) , R^2 = 0.786) Meanwhile, there was no relationship between other vegetative indexes and biomass.



Coffee Break	15:15~15:45

Session 4

Tips: The schedule for each presentation is for reference only. In order not to miss your presentation, we strongly suggest that you attend the whole session.

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D0053 Presentation 1 (15:30~15:45)
The role of stakeholders in managing polythene and plastic waste in coastal cities of Sri Lanka: a case study of the Dehiwala-Mt. Lavinia Municipal Council region
Suresh Kariyawasam, Ayesha Madhuwanthi and Clevo Wilson
SEVANATHA Urban Resource Centre, Sri Lanka

Abstract—High-density urban development with mixed land uses in Sri Lankan coastal cities generate large amounts of plastic and polythene waste (PPW). The limited capacity of city councils, the deficiencies of current waste management practices and poor awareness, a significant proportion of PPW is being released into the environment, which in turn has accumulated in the marine ecosystem through canal networks. This paper analyses the current practices of PPW disposal in one such coastal region based on a sample of 579 households, 182 commercial properties, and 103 institutions. Results indicate that out of 29 tons of PPW generated in the region, around 8% was disposed into the environment in the form of landfill, burning, and discharging into water bodies. Non-parametric correlations indicate a significant correlation between reduction of PPW (waste generators), private waste collection and awareness by local media. Qualitative analysis highlights the existing limitations of current practices of PPW disposal such as non-availability of practical and cost effective alternatives (government and industries), poor awareness of PPW impacts (waste generators, media, the local council, and researchers), negative attitudes of society, law enforcement (national government and local councils) and irregular waste collection of local councils.

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D0061 Presentation 2 (15:45~16:00)
Evaluation of raw and chemically treated waste phosphogypsum and its potential applications
N Sithole and **T Mashifana**
University of Johannesburg, South Africa

Abstract—A million tons of Phosphogypsum (PG) is stacked in the environment every year and is progressively considered an asset. South African construction industry is expanding as a result of infrastructural developments in the country, the reuse of PG in this industry is considered for recycling and reducing the stacks in landfills. Phosphogypsum is known for its limited ability to use in cement industry due to its phosphorus and radionuclides impurities. This study was conducted to reduce these impurities and investigate the probability of PG application in building and construction. Leaching of PG with citric acid was conducted whereby a relative proportion of P2O5 and radionuclides was reduced in the material, constituents which contributes to strengths reduction. Optimum moisture Contents and maximum dry densities were determined for various PG content mix designs in which Lime and Fly Ash were added to stabilise PG material. The composites were compacted at various moisture contents and cured at low and elevated temperatures of at 40 oC and 80 oC for 4 days. The results obtained shows that for unconfined compressive strengths; the composites produced from PG, and cured at high temperature qualified for the use in construction industry

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D3007 Presentation 3 (16:00~16:15)
Using municipal solid waste incineration slag as a purification agent for concentrated leachate
Xinyan Liu, Huijie Lu, Wei Cheng
Beijing Municipal Institute of City Management, Beijing, China.

Abstract—Incineration technology is widely used in waste treatment systems because of its many advantages. The slag that remains when domestic waste is incinerated weighs 20% of the original waste. Slag is mainly disposed of by landfill. In the context of increasingly limited land for landfills, there is an urgent need to use appropriate technology to deal with the large amount of slag generated during waste incineration. Landfill leachate is commonly treated with nanofiltration (NF) and reverse osmosis (RO). The membrane separation process produces concentrated leachate while a supernatant that meets the required standard is produced by NF and RO. The concentrated leachate, with its complex structure and high concentrations of organic matter and salt and resistance to biodegradation, is very difficult to handle in China. As an inexpensive, effective adsorbent, and purification agent, incineration slag can be used to purify the concentrated leachate, which allows us to "use waste to treat waste". To date, few studies have reported the effectiveness of slag for treating concentrated leachate in China. Studies therefore that report how slag has been used to treat concentrated leachate could highlight the environmental purification function of slag..

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D0060 Presentation 4 (16:15~16:30)
Leaching kinetics of gold mine tailings: the removal of manganese and iron by sodium carbonate

T P Mashifana
University of Johannesburg, South Africa

Abstract—South Africa is a mineral-rich country with numerous metals and minerals such as gold, copper, and platinum group metals which are exploited to a significant extent. In this study the leaching of heavy metals from gold tailings was studied using sodium carbonate using gold tailings from Sibanye gold. The effect of the key leaching parameters were studied: solvent concentration, temperature, leaching time and the kinetic models were used. Leaching is a hydrometallurgical process where metals are extracted by chemical dissolution, leaving behind a residue of inert minerals originally present as well as insoluble decomposition products of the reacted mineral. The effect of concentration and temperature was tested and it was found that highest Fe extracted(39%) was at 0.5 M and for Mn (46.3%) was at 0.25 M, both at 25 ℃. it was also found that an increase in metal extraction depends on leaching time. The data obtained was modelled to determine whether the kinetic model follows the chemical controlled process or controlled diffusion process and it was found that the controlled.

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: “Waste Management and Chemical Engineering”

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D3002-A Presentation 5 (16:30~16:45)
Carbon neutral fuel reactor supported by internally produced exothermic energy of the Sabatier reaction: modelling and feasibility study
Oleksandr Pushkarov, Zonghan Xie
School of Mechanical Engineering, The University of Adelaide, Adelaide, SA 5005, Australia

Abstract—As the levels of CO2 rise in our world, we face an ongoing problem with the increase of this greenhouse gas. One way to keep it under control is to harvest and convert it into a fuel using a renewable source of energy. Such process can be based on the Sabatier reaction. However, the main challenge is to build a self-sustaining stable chemical reactor capable of converting a sizeable proportion of CO2 from the input. In this work, through modelling and calculations we showed the feasibility of a self-sustainable carbon neutral Sabatier reactor producing methane fuel. The exothermic heat of the reaction serves as a source of energy to maintain the reactor in a thermal equilibrium at a required temperature. We have shown that the required thickness of fibreglass insulation is in the order of millimetres, and hence is achievable and inexpensive to manufacture. However, we predict that there will exist a cut-off flow rate beyond which the CO2 conversion rate will not increase due to a saturation point for the catalyst. Our future work is aimed at building an experimental prototype to practically demonstrate the feasibility of such a reactor and investigate the limitation of this method..

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D2007 Presentation 6 (16:45~17:00)
Biogas upgrading by CO2 Adsorption using Combination of Natural Zeolite and Biochar from Anaerobically Digested Cow Manure
A Pertiwiningrum, M A Wuri, A W Harto, R Budiarto , N A Fitriyanto, C W Purnomo, W Sunanda
Universitas Gadjah Mada, Yogyakarta, Indonesia

Abstract—Renewable energy technologies encourage the implementation of self-reliant energy supplies in developing countries. One of them is biogas technology as alternative substitute energy for electricity, cooking, mobility and lighting. Biogas primarily consists of methane (CH4). Apart from CH4, all the other contained in biogas are considered as pollutants. Treatment to remove primarily pollutant in biogas, carbon dioxide (CO2), can be done through physical adsorption. In this case study, CO2 adsorption utilized natural zeolite and biochar derived from anaerobically digested cow manure at gas pressure of 5-7 bar and room temperature. Before adsorption, adsorbents were characterized by infra-spectroscopy (IR). The result show that biochar has typical bands of biochar at 1609 and 787 cm-1 expressed C=C and C-C aromatic and 1097 cm-1 expressed C-O. Adsorption of CO2 in biogas using combination of natural zeolite and biochar affected to enrich CH4 composition from 23.50 to 28.32% or the increase in CH4 composition of 20.51%. The results indicated that biochar from anaerobically digested cow manure can be used as effective adsorbent for biogas upgrading.

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D1008 Presentation 7 (17:00~17:15)
Assessing the Surface Water Quality of Three Lakes in Ucchali Wetlands Complex Using GIS and WQI
Sheikh Saeed Ahmad, Arooba Zia
Fatima Jinnah Women University, Pakistan

Abstract—Ucchali Wetlands Complex, an internationally important Ramsar site, plays a diverse, distinctive and dynamic role in maintaining the overall health of the ecosystem. This wetland system includes three independent lakes (Ucchali, Khabeki and Jahlar) which directly support the ecosystem functions for humans and wildlife. Despite this the environmentally vulnerable system of wetlands points the need for innovative approach to assess its environmental variables and their impact on the overall status of wetland. Approach of incorporating mathematical computation in GIS was employed in a comprehensive manner to interpolate area so that overall health of the area could be visually demarcated. For reliable estimation of water quality multiple parameters were assembled into single unit for easy classification and interpretation. The Weighted Arithmetic Water Quality Index (WAWQI) used, classified Khabeki under good quality lake while Ucchali and Jahlar Lakes had poor to unfit water. These results interpreted; human induced pollution load and natural climatic conditions as main contributors of exerting pressure on lakes existence.

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D1021 Presentation 8 (17:15~17:30)
Aerosol formation in ethanolamines mixtures based post combustion CO2 capture plants
Ablay Saparov, Dhawal Shah, and Mehdi Torkmahalleh
Nazarbayev University, Kazakhstan

Abstract—Global warming is considered as one of the most important environmental issue facing the humanity. Greenhouse gases emitted from a variety of sources, such as power plants, make huge contribution on it. The current technology for post-combustion CO2 capturing heavily relies on absorption by amine solvents. However, the process is not sustainable due to loss of the solvent during the operation. Aerosol formation, overlooked until recently, is now considered as the main trigger to the solvent loss. Using the Molecular dynamic simulation software, aerosol formation was analyzed, quantitative and qualitative, with three different amine solvents (monoethanolamine, methyl di-ethanolamine, and a mixture of the two solvents). The results show conditions favoring the aerosol formation, and that the rate of formation is high for monoethanolamine and the mixture of solvents as compared to methyl di-ethanolamine.

Session 4

Afternoon, December 7, 2018 (Friday)

Time: 15:30~17:45

Venue: 78-343

9 presentations-Topic: "Waste Management and Chemical Engineering"

Session Chair: Prof. Jojo Panakal John and Assoc. Prof. Boukabache Ali

D1024 Presentation 9 (17:30~17:45)
Effect of Rice Straw to Sewage Sludge Ratio on Biogas Production via Anaerobic Co-digestion
C.T. Ogbonna
University of Tsukuba. Japan

Abstract—Anaerobic digestion (AD) is a mature biotechnology that can produce biogas from organic wastes, it is a promising energy source with high environmental friendliness. Anaerobic co-digestion of feedstocks has synergic effects. This study investigates the effect of feedstock ratio on the anaerobic co-digestion of RS and SS, which has not been explored. RS was collected from a rice farm, and SS from a wastewater treatment plant, Ibaraki, Japan. Batch wet AD tests were conducted in an incubator at 37 ±2 oC using different RS/SS (1:4, 2:3, 3:2, 4:1) in R1-R4 and single AD of SS (C1) and RS (C2) as controls. Volume and duration were 200 ml and 30 days. The TS, VS and pH of feedstocks were analyzed (standard methods). Biogas production was obtained by gas syringe and gas composition was quantified using a gas chromatography R3 (RS/SS=3:2) achieved the highest methane production of 113.57 ml/g-VS. This amounts to 1.8 times and 1.1 times that from C2 and C1 respectively. R4 produced the maximum cumulative biogas (268.07 ml/g-VS), followed by R3 (258.63 ml/g-VS). The optimum RS/SS is in R3 while lower biogas production from C2 (173 ml/g-VS) reflects the high lignin content of RS. Co-digestion had a synergic effect on biogasification of rice straw and sludge, possibly due to a balanced C/N ratio and resultant higher microbial activity, which is beneficial for anaerobic co-digestion in practice.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0010-A Presentation 1 (15:15-17:45)
Development of the electrolytic carbon dioxide mineralization system using a nickel as sacrificing electrode

Jane Chung
Korea Advanced Institute Science and Technology (KAIST), Republic of Korea

Abstract—The electrolytic carbon dioxide (CO2) mineralization system was suggested for mitigating total amount of emissions within the exhaust gases. The water reduction producing hydroxyl ions was occurred at the system for capturing CO2 to carbonate ions. Also, the counter cations that combine with carbonate ions and converse it to minerals could be supplied by electrical migration. To develop the electrical efficiency, the counter oxidizing reaction using a nickel sacrificing electrode was suggested for lowering an overpotential, so that the 3.5 times higher current density with a faradaic efficiency (FE) of 90% was obtained. This approach has strong advantage in minimizing the scale of system when applying industry. But, using nickel as a sacrificing electrode had a fatal problem in that it produces secondary pollutants. To solve this, the principle of redox flow battery (RFB) was employed in regenerating nickel, so that recovery efficiency of 73.2% with a FE of 44.5% was achieved, and it made possible to reuse in CO2 mineralization system. In this systematic RFB based electrolytic CO2 mineralization process, hydrogen gas, which is produced at a high purity, has the potential to be used as an anode fuel in the electrolytic system for overcoming the additional energy consumption.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0011-A Presentation 2 (15:15-17:45)
Sulfite/Ferric EDTA Fuel Cell for Mitigating Air Pollution
Seonjeong Cheon, Kwiyong Kim, Jong-In Han
Korea Advanced Institute Science and Technology (KAIST), Republic of Korea

Abstract—Around the world, air pollution is getting serious every year and takes a staggering toll. Among the various primary air pollutants, sulfur dioxide (SO2) and nitrogen oxides (NOx) are the most prominent gases emitted from burning fossil fuels. Although these gases have a potential to be utilized, currently they are subjected only to be diminished. Sulfite (SO32-) and ferric ethylenediaminetetraacetic acid (Fe(III)EDTA) could be used as reducing agent and oxidizing agent in the electrochemical cell respectively and generate electric energy through the redox coupled reaction, simultaneously converting SO32- to harmless SO42- and Fe(III)EDTA into Fe(II)EDTA which is capable of binding nitric oxide (NO). In this study, this concept of the fuel cell was examined, varying the operating parameters such as reactant concentration, pH of the reservoir and temperature and testing its durability for 30 hours. The highest performance in terms of maximum power density turned out to be 7.51 mW cm-2 at 80 and the fuel cell resulted in a stable operation for 30 hours. This fuel cell is expected to alleviate air pollution by treating both SO2 and NO along with coproduct generation of electrical energy.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0012 Presentation 3 (15:15-17:45)
Deforestation effects on land surface energy coupling: a data-driven perspective
Y. Zhu, R. H. Zong, and T. Y. Zhang
Beijing University of Posts and Telecommunications, China

Abstract—Deforestation dramatically alters land surface properties and functions through multiple biogeophysical and biogeochemical pathways. However, a quantitative identification of how deforestation affects local energy-water-vegetation coupling is still challenging. In this study we employed information theory and transfer entropy framework to identify the overall feedback pattern of land surface water-energy-vegetation coupling, using high frequency eddy covariance measurements at forested versus deforested sites. We found that deforestation strengthened the directional influence of atmospheric demand on land surface water flux, and more importantly, deforestation broke the coupling between vegetation activities and local precipitation, which led to a less efficient ecosystem to recycle and maintain water within this system.ution by treating both SO2 and NO along with coproduct generation of electrical energy.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0013 Presentation 4 (15:15-17:45)
Non-linear pattern analysis of El Niño's impact on tropical precipitation
X L Yu and S R Zhang
Beijing University of Posts and Telecommunications, China

Abstract—Climate system is complicated and highly nonlinear, and a certain condition occurs over a small region could potentially propagate through space to affect remote regions. However, diagnosing such remote relationships is challenging due to the non-linearity of the climate system itself. In this study, we analyzed the relationship between Pacific Sea Surface Temperatures (SST) anomaly that indicates El Niño dynamics and Amazon basin local precipitation. We overcame the traditional difficulty of establishing reliable climate relationship with a simple linear assumption, by employing the statistical framework of mutual information. We effectively revealed a strong relationship between El Niño's and tropical precipitation as well as the spatial distribution of such relationship..

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0014 Presentation 5 (15:15-17:45)
Effect of wet flue gas desulfurization on PM2.5 emission from coal-fired boilers
Sen Yao, Shuiyuan Cheng, Hanyu Zhang
Beijing University of Technology, Beijing 100124, China

Abstract—In this study, the characteristics of fine particles before and after wet flue gas desulfurization (WFGD) system in three coal-fired heating boilers in northern China were investigated by using a dilution-based emission sampling experimental system. The influences of WFGD process on the mass and number concentrations as well as the chemical composition of fine particles were analyzed. The removal efficiency of desulfurization processes on particulate matter are 30.06%~56.25% for three study units , respectively. The WFGD have a great influence on particulate matter mass concentration size distribution and number concentration size distribution. A significant increase in the number and mass concentration of particles in the size range of 0.094-0.946 μm was observed. The water-soluble ion content accounts a very large proportion of PM2.5 mass, after WFGD, its proportion in PM2.5 increased from 28.39%~41.08% to 48.96%~61.21% at outlet. During desulfurizing process, the cation component of desulfurizer agent and the proportion of SO42- were dramatically increased. The percentage of TC (OC+EC) has negative relation with boiler tonnage. The desulfurizing process also drastically increased the proportion of cation component (Ca2+ for unit A, Mg2+ for unit B, and Na+ for unit C) and the proportion of SO42- in PM2.5, and it increased the CE/AE values of PM2.5 from 0.82~0.98 to 0.93~1.27 for the three study units..

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0015 Presentation 6 (15:15-17:45)
Characteristics and classification of continuous PM2.5 pollution episodes in Beijing during 2013-2015
Xiaoqi Wang, Wei Wei, Shuiyuan Cheng, Hanyu Zhang
Beijing University of Technology, Beijing 100124, China

Abstract—In order to investigate the characteristics of PM2.5 pollution episodes in Beijing, the information of its air pollution occurred from 2013 to 2015 was collected. A total of 34 PM2.5 pollution episodes with each lasting for at least two days occurred during the study period and they were mainly formed in winter. These episodes were associated with lower wind speed and visibility as well as higher relative humidity, indicating that they belonged to heavy pollution under static stability. The PM2.5 pollution episode was classified into two categories according to the back trajectory analysis and meteorological background field. The first category, accounting for 22 times among all the pollution episodes, was due to air mass transport from Beijing's southern regions with north-south direction pressure gradient and sparse isopiestic. The transport of northwestern air masses accompanied with a large area of uniform pressure field led to the second category of PM2.5 pollution episode. A typical case study was selected for each category to investigate the sub-region contribution to Beijing's PM2.5 pollution, and the results indicated that local emission source contribution increased significantly during the accumulation phase of the first category of episode, but decreased significantly during the second category, with an average contribution of 47.3% and 77.1% during the entire pollution period of each category, respectively. These illustrated that local emission was the dominant source for Beijing's PM2.5 pollution when the air masses mainly came from its northwest direction, but the regional contribution was more important when southern air masses transport was prevailing. Two red alerts of air pollution occurred in December 2015 were also analyzed based on the episode classification, and it was found that the emission control measures in Beijing worked more obviously when its pollution belonged to the second category.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0016 Presentation 7 (15:15-17:45)
A framework for investigating the air quality variation characteristics based on the regular monitoring data: case study for Beijing during 2013-2016
Jixian Cui, Jianlei Lang
Beijing University of Technology, Beijing 100124, China

Abstract—How to effectively use monitoring data to provide more scientific support for the air pollution mitigation policy making has become a difficult problem. In this study, an evaluation method to investigate air quality variation characteristics was developed based on the measurement data. The annual/inter-annual air quality variation and the contributions for different factors (i.e., seasons, pollution periods and airflow directions) were investigated and examined in Beijing from 2013 to 2016. The results showed that the annual average concentrations of PM2.5, SO2, NO2 and CO displayed obvious downward trend from 2013 to 2016, with the annual decline rates of 7.5%, 28.6%, 4.6% and 15.5%, respectively. Among all the seasons, the annual mean concentrations in winter contributed the most fractions (25.8%~46.4%) to the annual average ones, while the change of that in summer contributed largest to the inter-annual mean variation of PM2.5 (49.3%) and NO2 (53.8%). Under pollution periods, S-1 (PM2.5, 0~75μg/m3) increasing with 8.9% from 2013 to 2016 had become the largest contributor (28.8% in 2016) and had a negative impact on the inter-annual mean variation of PM2.5; S-4 (PM2.5, 150~250 μg/m3) and S-5 (PM2.5, ≥250 μg/m3) contributed most to the inter-annual mean variation of PM2.5, with the value of 44.7% and 39.5%, respectively. Additionally, south airflow contributed most to the mean concentration reductions of PM2.5, SO2, NO2 and CO from 2013 to 2016, with the contribution ratios of 143.3%, 72.0%, 55.5% and 190.3%, respectively, whereas the west airflow had negative contributions to the mean concentration reductions. The framework proposed in this study is helpful for further analysis and utilization of the large amounts of monitoring data; and the analysis results obtained can provide scientific supports for the adjustment or justification of the air pollution mitigation policy.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0017 Presentation 8 (15:15-17:45)
Forest fire modeling and factorial examination of climate control
W. Y. Yang, N. Y. Zhu, and Z. S. Liu
Shenyang Aerospace University, China

Abstract—Forest fires generate a wide range of toxic and greenhouse gases that not only threaten human health but also warm up our climate system. The prediction of forest fire occurrence is challenging due to the complex nature of forest fire dynamics. In this study, we employed advanced data-driven machine learning techniques to first model the forest fire occurrence using only a small set of climate observations and then used a factorial experiment to show the individual importance and potential interactive controlling from climate drivers on the forest fire. Our results showed that 1) “deep” learning was a powerful concept to effectively capture the complex non-linear relationship between climate drivers and forest fire; 2) relative humidity rather than direct precipitation was a more important predictor of the forest fire. This work not only improved our predictability of forest fires occurrence but also shed light on process-based fire model development

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D0028 Presentation 9 (15:15-17:45)
A review- bioremediation of oil sludge contaminated soil
Riju Chandra Saha, Auchib Reza, Muhammad Sakib Hasan and Piash Saha
Memorial University of Newfoundland, Canada

Abstract—Petroleum oil as a vast source of energy widely used in the whole world in several sectors especially in industry and transportation. The leakage or contamination of oil from pipeline, tank, and industry as a form of oil sludge with soil can produce major environmental and health hazard. Bioremediation is one of the most economical and environmentally safe technology to prevent this contamination though it takes longer time. This paper reviews the basic processes involved in bioremediation, types and the factors affecting it. This study includes some previously adopted different bioremediation methods varies with different process material such as refinery treatment sludge, sewage sludge, microbial organism, bulking agents and different chemical additives. The comparison of these methods is presented in respect of the removal efficiency of an entire process as well as the TPH (Total Petroleum Hydrocarbon), aliphatic, aromatic, resins, asphaltene fraction of oil sludge within the different period of time.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D1005 Presentation 10 (15:15-17:45)
Implementation of solidification/stabilization process to reduce hazardous impurities and stabilize soil matrices.
Auchib Reza, Saifa Anzum, Riju Chandra Saha, Sudipta Chakraborty and Md. Habibur Rahman
Memorial University of Newfoundland, St. John's, Newfoundland, Canada

Abstract—A wide variety of technologies is available for the treatment of contaminated soil in both the vadose zone (originating above the water table) and saturated zone (originating below the water table). Several processes involve immobilizing soil contaminants by physically, chemically or biologically. Among them, a wide range of wastes, both solids and liquids, are being treated by "solidification / stabilization" (S/S). In solidification, by adding binding reagents, physical state of the waste being changed by encapsulating a waste to form a solid material from liquid as well as to restrict contaminant migration to leaching by decreasing the exposed surface area. Whereas stabilization through chemical reactions immobilizes the hazardous materials by reducing them to less soluble or toxic form. Characteristics of different types of reagents/additives of S/S technology both from inorganic and organic origin are presented in this paper. In-situ and ex-situ application of S/S technology and their advantages-disadvantages are discussed with basic approaches. Finally, introducing with internal and external factors influencing the long-term durability of S/S treated materials as well as monitoring & treatment management of it after processing are briefly presented.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D1009 Presentation 11 (15:15-17:45)
Assessment of carbon dynamics in Ecuadorian forests through the Mathematical Spatial Model of Global Carbon Cycle and the Normalized Differential Vegetation Index (NDVI)
Silvia Alejandra Llerena Gordillo
People's Friendship University of Russia, Russia

Abstract—Conservation and sustainable development of forests are mitigation mechanisms against climate change due to the forest carbon sink capacity. Therefore, biomass estimation allows to assess forest productivity and control carbon budgets. In Ecuador, biomass and carbon sequestration studies are scarce. Thus, we estimated and forecasted changes in biomass of Ecuadorian forests through the Mathematical Spatial Model of Global Carbon Cycle and the Normalized Differential Vegetation Index. The mathematical model describes the processes of growth and decay of vegetation in terms of carbon exchange between the atmosphere, plants and soil under anthropogenic impacts. The vegetation map and the biomass of 2017 (4,86 Gt) were developed with remote sensing methodology in ENVI 5.3 and ArcGIS 10.3 programs. The observed biomass decrease between 2000 and 2010 was due to the high deforestation rate. Thanks to conservation and reforestation policies and the compensatory effect between the atmosphere and forests, a biomass increase is expected until 2060. According to the vegetation map, Amazon region has a better plant vigor, followed by Andean and Coast regions, where scattered vegetation predominates. This information is useful for planning environmental practices such as forest conservation and reforestation in order to increase carbon storage.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D2018 Presentation 12 (15:15-17:45)
The Synthesis of Nanoparticles based on Fe-Mn Oxide using Chemical Precipitation Method
Seungjin Oh, Minah Oh, Jae-Seop Lee, Jai-Young Lee
The University of Seoul, Seoul, Republic of Korea

Abstract—Synthetic nanoparticles are being studied for potential use in many applications in diverse fields, such as medical diagnostics, therapy, structural materials, environmental applications, etc. Some examples include the optical properties of metallic nanoparticles, magnetic properties of iron oxide nanoparticles, optical properties of semiconductor nanocrystals (quantum dots), etc. In recent years, iron based nanoscale particles have enticed great interest for water treatment and environmental remediation. The purpose of this study investigated the characteristics (particle size, compound properties, specific surface area, etc.) of nanoparticles by synthesizing Fe-Mn oxide by chemical precipitation method. The method of nanoparticles synthesis were Chemical Precipitation Method (CPM). In this study four different characterization methods that are commonly applied to characterize the nanoparticles either in dried from solution are analysed. Namely, field emission scanning eletron microscope (Fe-SEM), X-ray diffractiometry (XRD), X-ray fluorescence (XRF), specific surface area (BET) are analysed. As a result, nanoparticles based on Fe/Mn oxide was analyzed as MnFe2O4. The chemical composition of MnO and Fe2O3 were about 99 % or more. The specific surface area was 142.20 m2/g, the average pore size was 22 nm, the average porosity was 0.006 cm3/g, and the average particle size was 42 nm. Fe-SEM images showed a uniform nano-sized spherical image with a diameters in th range of about 45 to 50 nm, confirming the presence of Fe-Mn nanoparticles.

Poster Session

Afternoon, December 7, 2018 (Friday)

Time: 15:15-17:45

Venue: 78-344/78-346

D2020-A Presentation 13 (15:15-17:45)
The Adsorption of Oxyanion as Arsenate and Chromate using Nano Scale Fe-Mn oxide
Minah Oh, Seungjin Oh, Jae-Soep Lee, Jai-Young Lee
Dept. of Environmental Engineering, University of Seoul, Seoul, South Korea.

Abstract—The nano scale Fe-Mn binary oxide were synthesized with chemical precipitation and stabilized using organic stabilizer as starch or carboxymethyl cellulose (CMC). The nanoparticles were also characterized and tested with respect to adsorption of arsenate and chromate from groundwater. While stabilized nanoparticles showed rapid sorption kinetics, starch stabilized Fe-Mn oxide offered the greatest capacity for arsenate and chromate. The adsorption reached equilibrium in 10 hours and starch stabilized Fe-Mn oxide nanoparticles were adsorbed about 91% of arsenate and 94% of chromate. The Langmuir maximum capacity was determined to be 98 mg/g of arsenate and 107 mg/g of chromate with starch stabilized Fe-Mn nanoparticles, respectively. The high uptakes of arsenate and chromate were observed over the typical groundwater pH range 5-8. This study will continue to apply to the heavy metal contaminated soil and groundwater, and be expected to be a potential in-situ technology to remediate..

Dinner	**18:00**

One Day Visit

December 8, 2018 (Saturday) 9:00~17:00

(Tip: Please arrive at "The University of Queensland" at 8:45 a.m. The following places are for references, and the final schedule should be adjusted to the actual notice.)

1. **(8:45) Gathering : The University of Queensland**
2. **9:20~10:30: South Bank Parklands**

South Bank Parklands are located at South Bank in Brisbane, Queensland, Australia. The parkland, on the transformed site of Brisbane's World Expo 88, was officially opened to the public on 20 June 1992.

The South Bank Parklands are located on the southern bank of the Brisbane River, at South Bank, directly opposite the City. The parklands are connected to the City by the Victoria Bridge at the northern end, and to Gardens Point by the Goodwill Bridge at the southern end.

South Bank and its parklands are one of Brisbane's most important cultural precincts and they regularly host large scale festivals and events. Approximately 11,000,000 people visit South Bank Parklands each year.

3. **10:50~12:00: Brisbane Botanic Gardens, Mount Coot-tha**

The **Brisbane Botanic Gardens** (formerly the Mount Coot-tha Botanic Gardens) are located 7 kilometres (4.3 mi) from the Brisbane CBD in Toowong, Queensland, Australia, at the foot of Brisbane's tallest mountain, Mount Coot-tha.

The gardens, which were originally called the Mount Coot-tha Botanic Gardens and which cover 52 hectares, were established by the Brisbane City Council in 1970, and officially opened in 1976 The gardens are the second botanical gardens established in Brisbane. The original gardens, now known as the City Botanic Gardens are located in the Brisbane CBD at Gardens Point. The new gardens were developed by the City Council because the original city site could not be expanded and was flood prone.

The Mount Coot-tha Library at the gardens opened in 1975.

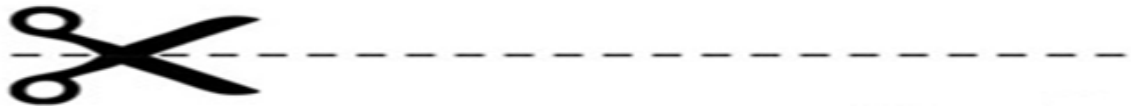
4. **12:00~13:00 Lunch time**
5. **13:30~17:00: Lone Pine Koala Sanctuary**

Lone Pine Koala Sanctuary is an 18-hectare (44-acre) Koala Sanctuary in the Brisbane suburb of Fig Tree Pocket in Queensland, Australia.
Founded in 1927, it is the world's oldest and largest koala sanctuary.
There is an entrance to the sanctuary from a car park, and also an entrance to the sanctuary from the Brisbane River. One can arrive by private car or taxi, a journey of approximately 20 minutes from the city. One can also catch a Brisbane Transport bus, or arrive by ferry from the Queensland Cultural Centre pontoon, a journey of approximately 1½ hours.

6. 17:00~Back to The University of Queensland

Note

Note



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Thank you for taking time to participate in this conference evaluation. Your comments will enable us to execute future conferences better and tailor them to your needs! More conference information could be found in http://www.cbees.org/list-15-1.html