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Recycling and Waste Management

September 11- 12, 2017 Singapore

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Keynote Forum

(Day 1)

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Ann T W Yu, Int J Waste Resour 2017, 7:4 (Suppl)
DOI: 10.4172/2252-5211-C1-007

Ann T W Yu

Hong Kong Polytechnic University, Hong Kong

Study on the potential of onsite generation of electricity from discharged urine in high-rise residential buildings

This project explores the potential for producing electricity from discharged urine in the daily operation of high-rise residential buildings. The majority of the population in metropolitan cities lives in high-rise residential buildings. High-rise buildings consume large amounts of energy in daily operation and release considerable amounts of waste including human urine into the environment. Untreated urine contains polluting organic compounds and requires energy-consuming treatment prior to discharge into waterways. Hydrogen, which is a clean source of energy, is considered by scientists as a promising fuel for future. Hydrogen and urea are produced in electrolysis of urine. The generated hydrogen gas can be utilized to generate electricity for building operations. Ohio University in the USA has developed Ammonia GreenBox®, which can extract hydrogen gas directly from urine by electrochemical oxidation using an economical catalyst. Electricity is produced from the electrolysis of hydrogen gas in a hydrogen fuel cell. The simple and convenient hydrogen extraction process is suitable to be applied in high-rise developments. Production of electricity from urine can reduce power supply from the grid system and subsequently reduce building management cost.

Biography

Ann T W Yu has a BSc degree in Building from University of Brighton, UK and MSc degree in Construction Management from City University of Hong Kong. She has obtained her PhD from the Department of Building and Real Estate, The Hong Kong Polytechnic University in 2007. She has started her profession as an Assistant Architect and worked for a number of different professional firms including architectural firms, quantity surveying practice as well as the Hong Kong Housing Authority. She was appointed as an Assistant Professor in Value Management and Construction Management by the Department of Building and Real Estate of The Hong Kong Polytechnic University in 2007. She has a strong track record and has published extensively on the broad theme of project management in leading construction management journals and international conference proceedings.

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Ameer A Al-Haddad, Int J Waste Resour 2017, 7:4 (Suppl)
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Ameer A Al-Haddad

Kuwait University, Kuwait

Efficient separation of dilute oil contaminations from wastewater by functionalized magnetic nanoparticles

There are several industries producing large quantities of dilute oily-wastewater for which the oil separation is challenging. Current technologies to separate the oil contaminants are compositional dependent, energy and material demanding and expensive. They require large buffering tanks because of low selectivity and frequent process maintenance in the case of membrane-based separation technologies. These challenges are intensified for large wastewater throughput and for conditions where the oil is in the form of stable emulsions with a high viscosity and of comparable density to the water phase (e.g., heavy oil-water mixture). Moreover, the presence of surfactants and solid contaminations add complexity to the challenge. We had proposed a methodology to use magnetic nanoparticles (MNPs), dispersing them in the aqueous phase to encapsulate the oil droplets and to separate them using a magnet. The tailored wettability of nanoparticles provides dispersibility of nanoparticles in the aqueous phase and will allow them to accumulate on the interface of oil droplets with water (or inside the oil droplets). The magnetic force between modified MNPs and a magnet accelerates the oil separation which decreases the energy requirements for such separation process. Experiments were conducted by preparing 1% oil in aqueous phase solution of 0.3% SDS. The mean size distribution of emulsions after preparation is measured by DLS at about 155 nm, which grows to 214 nm after one week. The emulsions tend to grow initially but stabilized after about 15 hours. The emulsions were created by first homogenizing the oil, water and surfactant mixture in high shear mixer followed by ultrasonication. The size distribution of emulsion with this method was unimodal. Then we used Fe^3O^4 magnetic nanoparticles (MNP) in hexane and also Fe^3O^4 with different coatings for the separation process.

Biography

Ameer A Al-Haddad has been teaching Chemical Engineering courses for past 30 years in Kuwait University, Kuwait. He is actively involved in various research fields mainly environmental engineering, land and water pollution, chemical warfare and polymer kinetics. He has published more than 40 papers in various research journals.

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Debashis Chanda, Int J Waste Resour 2017, 7:4 (Suppl)
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Debashis Chanda

University of Central Florida, USA

Multi-spectral infrared spectroscopy for the detection and separation of recyclable plastics from municipal solid waste

The work aims to construct a prototype of polymer resin identification and sorting system based on mid-infrared (MIR) reflection spectroscopy. The MIR reflectance spectrum contains the chemical information of the material. This fingerprint, in contrast to the popular near-infrared (NIR) spectroscopy, contains much more molecular vibrational resonance information, which we will use to construct a multi-spectral and multi-dimensional library of all the plastics commonly encountered in the municipal solid waste stream. The main component of the system is the spectroscopic optical reading system. With this element, the reflection spectrum is measured to retrieve the chemical information of the sample. This important component must be carefully designed to ensure the acquisition of a high signal to noise ratio needed to accurately identify plastics under field-type working conditions. We designed and customized a commercial MIR spectrometer and a high power IR source. These units are manipulated by a control system using lab view-based or customized software, capable of synchronizing the steps required to identify and separate plastics, which include capture of the spectra, identification of the polymer resin, tracking of the sample position as it travels on the conveyor belt and making a decision based on statistical uncertainties to prompt a command at the separation stage. The reported multi-spectral and multi-dimensional fingerprint library can be used to identify almost all widely used plastic resin groups with almost 100% accuracy for the first time, as shown in our recent work.

Biography

Debashis Chanda is an Assistant Professor jointly appointed with NanoScience Technology Center and College of Optics and Photonics (CREOL), UCF since 2012. He has received his PhD from University of Toronto. His PhD work was recognized in the form of several awards, including prestigious National Sciences and Engineering Research Council (NSERC) Fellowship. He has completed his Post-doctoral Research with Prof. John A. Rogers at Beckman Institute, University of Illinois at Urbana-Champaign. He is a recipient of the 2012 DOE Energy Frontier Research Center (EFRC) Solar Energy Future Direction Innovation Proposal Award, 2013 NSF Summer Institute Fellowship and International Displaying Future Award-2016 by Merck, Germany.

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Lutfor Rahman, Int J Waste Resour 2017, 7:4 (Suppl)
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Lutfor Rahman

Independent University Bangladesh, Bangladesh

Two new approaches to management of solid tannery waste

Disposal of huge amounts of solid tannery waste is a formidable problem. In Bangladesh, the solid tannery waste has been traditionally disposed off through landfills. Animal feed manufacturers somehow discovered the potential of these wastes to be used in feeds because of their protein content. However, the possible transfer of the toxicity of this waste to common food items like chicken, eggs and fish gave a scare after the publication of some research articles by a number of local scientists. This created a hue and cry and eventually led to the ban on the use of tannery waste in poultry feed. The tannery industries will now have to dump these wastes in properly-constructed expensive landfills. It is unfortunate that such a protein-rich resource is being dumped rather than being utilized. This has prompted a group of scientists of the University of Northampton, England to come forward with an elaborate procedure of removing chromium altogether from the solid waste before using it in the poultry feed. We are proposing an alternative idea in which the formation of highly toxic Cr(VI) will be prevented by taking proper steps at different stages of production of leather and feed. It is estimated that the amount of Cr(III) that enters chicken, eggs and fish through the feed would cause no health risk to consumers. The second approach may be appropriate for Bangladesh. The dumping of solid waste in landfills is not practicable and not in conformity with the present-day idea of industrial symbiosis.

Biography

Lutfor Rahman has obtained his PhD in 1969 at the University of Cambridge under the supervision of Late Professor J W Linnett FRS. He was awarded a Commonwealth Academic Staff Fellowship in 1974 to pursue Postdoctoral research in UK. He has been a Full Professor since 1980. In addition to academic jobs he has held administrative positions like Chairman of a Department, Dean of a Faculty, Pro-Vice Chancellor and Vice Chancellor of a University. Basically a Physical Chemist, his research interests include kinetics, catalysis and environmental chemistry.

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A K M Maksud, Int J Waste Resour 2017, 7:4 (Suppl)
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A K M Maksud

Grambangla Unnayan Committee, Bangladesh

Contribution of the waste pickers of Dhaka city in recycling and waste management

Waste pickers of Dhaka City collect wastes from households, streets, dustbins, dump sites and sell those to the recycling chain. It is a self-employment opportunity for the urban poor. According to an estimate of Grambangla Unnayan Committee there are 400,000 waste pickers in Bangladesh. Dhaka, a city of around 18 million people and 360 km2 area generates more than 10,000 tons of solid waste every day. The rate of per capita solid waste generation is 0.56 kg. About 15% of the total generated waste is being recycled by the waste pickers. Government sources mentioned that only in Dhaka city, 120,000 poor people are engaged in recycling and reusing wastes and from that business, the country earns approximately US$ 0.2 billion per year. Waste pickers also work with more than 12,000 push vans for collecting kitchen and other inorganic wastes from the household level. Waste pickers' efforts help create thousands of jobs in recycling industry and reduce the use of virgin resources. Bangladesh earns millions of dollars from exporting recycled plastic bottles. Using plastic and rubber wastes now more than 1000 factories are in production and creating jobs and saving national import expenses. Recycling and reusing of garment factories' wastes created hundreds of new shops, factories and about 150,000 new jobs. Waste pickers contribute free labor for waste collection, recycling and mitigation of climate change effects, but their contribution is invisible in official statistics and they are excluded from the national social security system.

Biography

A K M Maksud has completed his MSS degree in Sociology from the University of Dhaka and is a student of LLB from the University of London. He has worked as Team Leader for more than 50 social research studies for Government, UN agencies and International NGOs. For the last 19 years, he has been working as the Chief Executive of Grambangla Unnayan Committee (GUC), a nationally reputed NGO.

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Padma Singh

Gurukul Kangri University, India

Screening of bacteria for bioplastic production

About 140 million tons of plastic are consumed every year worldwide, which necessitates the processing of approximately 150 million tons of fossil fuels and directly causes immense amounts of waste that can take thousands of years to naturally deteriorate, if it degrades at all. Bacteria have the ability to produce bioplastics in the form of polyhydroxyalkanoates (PHAs) and they are capable of producing PHA from various carbon sources ranging from inexpensive, complex waste effluents to alkanes, fatty acids, plant oils and as well as simple carbohydrates. The major barrier to wide acceptance of bioplastic is the high cost, particularly carbonaceous raw materials (40%) and polymer recovery (26%). Therefore, the aim of the present study is to focusing on identification of alternative cost effective substrate for the production of PHA. Isolation of bacterial strains for the screening of PHA producing ability carried out by using different oils as carbon source. The samples were collected from edible and lubricating oil contaminated soil from garage and workshop. Isolation of bacterial strain was performed by serial dilution, spread plate and enrichment technique. Screening was carried out by the Nile Blue A and Sudan Black B staining. The total number of colony forming unit was 134×10^5 to 3×10^8 (Edible oil) and 75×10^5 to 26×10^8 (Lubricating oil). Out of 21 isolates from edible oil and lubricating oil, 2 bacterial strain (E.O 1 and E.O 4) were fluoresce on plate with Nile blue A indicates the positive result and show characteristic granule with Sudan Black B, indicating the presence of PHAs. Bacterial strains were identified as *Pseudomonas* sp., (edible oil), -rods and Bacillus sp. (Lubricating oil), +rods. Production of PHA through these strains will be carried out to get the sufficient amount of bioplastic.

Biography

Padma Singh is a Professor and Head of the Department of Microbiology, Girls Campus, Gurukul Kangri University, India. She has obtained her MSc degree (Gold Medal) and PhD from Jiwaji University, Gwalior (MP). She has published more than 80 research papers and review articles in various national and international journals. She has been honored with National APSI Award and Gold Medal in 2005-06 for organizing APSI national conference. She is a Member of various academic professional bodies like AMI, IBS, ISCA, DUBS, APSI, and was awarded FAPSI and FBS. Her major research includes antimicrobial potential interest of medicinal plant, biodeterioration, bioremediation and biodegradation.

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