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Scientific Tracks & Abstracts
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The effect of plastic waste sorting quality on recycled polypropylene performance

Belyamani Imane, Barbier D, Laanaya A, Vauloup J, Janeau L and **Cauret L**
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Post-consumer waste electrical and electronic equipment (WEEE) is becoming a significant source of plastic wastes because of the short useful life of electrical and electronic equipments, and also their increased production as a consequence of the fast technological innovation and market growth. Recycling plastics from WEEE is an important waste management strategy; however, plastic waste sorting is a real challenge and a critical step. In fact, the sorting quality of recyclable plastics influences not only the mechanical and physicochemical properties of the final recycled materials, but also may causes various toxic volatile organic compounds (VOCs) to be released during melt processing stages. Indeed, during the injection molding of WEEE recycled polypropylene (PPrec), employees from our collaborator plant facility noticed that some PPrec batches release undesirable odors. Investigation on PPrec performance and VOCs composition as function of waste sorting quality revealed surprising and interesting results. Inodorous PPrec batches, resulting from a high quality waste sorting, showed better tensile strength, Izod and Charpy properties as compared to the odorous batches (coming from a bad sorting) for which the char formation was found to be more important. The char formation data agreed very well with the X-ray fluorescence results displaying the presence of 0.1790 wt.% of bromine element in odorous batches versus 0.0362 wt.% only in inodorous ones, which signifies a high concentration of brominated components in the odorous batches. On the other hand, in contrast to inodorous PPrec and a commercial virgin PP, a laboratory scale heating system coupled to Fourier transform infrared spectroscopy (FTIR) suggested that the released VOCs from odorous PPrec pellets contain potential bisphenol-derived compounds. Thus emerged the hypothesis that compounds such as tetrabromobisphenol and brominated epoxy resins, which are highly used as flame retardants, could be responsible for the odorous VOCs released from odorous PPrec during injection molding.

Speaker Biography

Belyamani Imane is currently an assistant professor at the plastics engineering institute of Alençon (ISPA) located in Alençon/France. She previously worked as a research associate, at the school of polymers and high performance materials at the University of Southern Mississippi/USA, and as a postdoctoral fellow at Rouen University, France where she contributed to the development of the CARMAT artificial heart. She received her Ph.D in Chemistry and Material Science from Jean Monnet University in Saint-Etienne, France in 2011. Her research interests include plastic recycling, biopolymers and bio-composites, and fire retardants.

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Separate collection of plastic packages in Helsinki metropolitan area Finland

Kouvo Petri and **Kainulainen Aino**
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The separate collection system for recyclable wastes in the Helsinki Metropolitan region was ranked second best in a recent study comparing recycling schemes of European capitals (European Commission 2015). The collection system includes paper, cardboard, glass, metals and bio waste. Residual waste is collected and used in energy production. The collection system excluding paper is managed by the Helsinki Region Environmental Services HSY, a public organization owned by four municipalities (Helsinki, Espoo, Kauniainen and Vantaa). Paper collection is handled by the producer responsibility scheme.

The efficiency of the collection system in the Helsinki region relies on a good coverage of door-to-door-collection. All properties with 10 or more dwelling units are required to source separate bio waste and cardboard. This covers about 75 % of the population of the area. The obligation is extended to glass and metal in properties with 20 or more dwelling units. Other success factors include public awareness campaigns and a fee system that encourages recycling.

The separate collection of plastic packaging in Finland begun in 2016 within the producer responsibility scheme. HSY is supplementing the national bring point system with door-to-door-collection. Pilot operations begun in the spring 2016 and has been continuing since then. Currently HSY is considering new regional waste management regulations for source separation of plastic packages for big apartment buildings.

This paper describes the results of plastic packages separate collection piloting, the key figures of quantity and quality of the collected plastic waste as well as results of plastic packaging waste LCA calculations and description of the plastic waste processing.

Speaker Biography

Kouvo Petri has published technical articles and other technical reports. His PhD work investigated the modelling on heavy metal emissions during the co-combustion of biomass, peat and wastes. In current position as a director of the Waste Management Division of the Helsinki Regional Environmental Services Authority he is responsible for the waste management of nearly one million people and several commercial properties living and operation in the metropolitan area. In addition, Kouvo works as an associate professor at the Lappeenranta University of Technology, Finland. Education: Doctor of Technology, Lappeenranta University of Technology; Environmental Studies, University of Turku; Masters in Science of Energy Engineering, Lappeenranta University of Technology, Profession. Current: Director, Helsinki Region Environmental Services, Professor in Heat and Environmental Technology, Technology Manager, Environmental Technologies, Fortum Oyj; Development Manager, Electric Power Research Institute, California, USA, 1993-1995. Others: Chairman of the Board of Finish Solid Waste Association and Member of the Board of ISWA (2010-2012).

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Understanding the fragmentation of plastic debris in the environment

Alexandra ter Halle
National Centre for Scientific Research, France

Over 322 million tons of plastic have been produced worldwide in 2015. Plastic inputs into the ocean was estimated at 8 million metric tons in 2010. Most concerning is the estimation for 2025 that could reach 150 million metric tons if the effort to develop collection, sorting and reprocessing of recyclable plastics is not prosecuted. Plastic debris is abundant and widespread in the environment. Marine plastic pollution has been recently recognized as a global environmental threat 2, 3. The scientific community has been able to record the breadth of this pollution worldwide but the adverse consequences on ecosystems and human health is not fully understood. There are still fundamental knowledge gaps in the transformation and fate of plastic debris in the aquatic or marine environment. Understanding the fragmentation of plastic debris is an essential step in order to apprehend in witch way very small plastic particles are formed (micrometric and nanometric). The results presented are based on a detailed physicochemical characterization of microplastics (300 µm – 5 mm) collected at the surface of the North Atlantic accumulation zone. The result implies that smaller fragments are formed and underline the need to develop reliable sampling and detection methods for very small plastic particles in environmental samples. The French project Expedition 7th Continent will be also presented. It gather scientific studies together with political and societal actions. Controlling plastic pollution involves promoting recycling and the circular economy. These measures must be accompanied simultaneously by a change in our consumption behavior, through education and citizen awareness, because the health of the sea and the oceans depends on each of us. The accumulation of waste in the sea is a global problem that requires comprehensive and coordinated solutions.

Speaker Biography

Alexandra ter Halle is a full time researcher since 2004. First she was part of the Laboratoire de Photochimie Moléculaire et Macromoléculaire (LPMM, UMR 6505 CNRS-Université Blaise Pascal, Aubière) and since September 2011 she joined the laboratoire des IMRCP (Université Paul Sabatier, Toulouse). After studying at the Ecole Normale Supérieur de Lyon from 1993 to 1997 she graduated her PhD in organic chemistry in 2000 et the Université Claude Bernard de Lyon. During 7 years in Clermont Ferrand her researches were focused on the fate of organic contaminants under irradiation. She has initiated and coordinated different projects (project ANR ECOPHYTO, FUI PHYTOMAR, and industrial partnership with Syngenta). At the IMRCP she is studying green materials for use in environmental chemistry. She is the author of about 46 publications and 6 patents.

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Recycle the present, save the future

Anagha Sabnis
University of Mumbai, India

Although plastic polymers require greater processing as compared to many other recyclables, plastic recycling has become an increasingly important sector of recycling and waste management. Plastic recycling is the process of recovering different types of plastic material in order to reprocess them into varied other products, unlike their original form. An item made out of plastic is recycled into a different product, which usually cannot be recycled again. Recycling plastic saves twice as much energy as burning it in an incinerator, saves carbon dioxide, land filling and incineration. Polyethylene terepthalate (PET) and Polyurethane are among the most widely used polymers in wide variety of applications all over the globe. Recycling of these offers numerous products which have potential to be utilized in various industries including construction, insulation, coatings, composites etc to name a few.

Speaker Biography

Anagha Sabnis has received her PhD in Paints Technology from University Department of Chemical Technology, University of Mumbai, in 2006. She worked in a reputed MNC for 2 and half years, before joining the same institute in 2008 as an Assistant Professor of Paint Technology in the Department of Polymer & Surface Engineering. Presently her research group consists of 4 PhD and 30 master students. Her research interests include polymer synthesis from renewable resources, water based binders, coatings, chemical recycling of polymer waste for coating and allied applications etc. She has over 30 publications that have been cited over 300 times, and her publication H-index is 10 and she has been serving as technical reviewer for reputed Journals in the field of polymer and coatings.

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The circular economy model application for metals recovery from e-waste: Fenix horizon 2020 European project

Francesco Veglió and **Ionela Birloaga**
University of L'Aquila, Italy

The e-waste recycling is a worldwide concern by both environmental and economic reasons. This is due to their hazardous content which can posse the ambient and respectively human life but in the same time, by the valorization of its content in a sustainable manner, this waste can became an important secondary resource for manufacturing on new products. The "Reduce, Reuse, Recycle" paradigm which is the base of circular economy principle, has been considered as a base in the realization of Fenix (Future business models for the Efficient recovery of Natural and Industrial secondary resources in eXtended supply chains contexts) Horizon 2020 European Project. Within this project, considering our already achieved experience in the field of e-waste (in particular, waste printed circuit boards) by hydrometallurgical methods and the experience of the other 9 partners, experts in various institutions and fields (SME's for e-waste collection and recycling, research centers for materials preparation and characterization and also in designing of new products), sustainable technologies for in a closed loop way will be developed.

Speaker Biography

Francesco Veglio, Full Professor in Chemical Engineering at L'Aquila University, Italy. Authors of more than 170 papers on international journals, more than 60 monographic publications and 130 communication to Congresses, extended abstract, poster and 3 patents in development of hydrometallurgical processes and industrial wastewater treatment. Member of the Editorial Board of Hydrometallurgy (Elsevier), Journal of Waste Management (Hindawi) and Editor in chief International Journal of Non Ferrous Metallurgy

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Identifying and maximizing the opportunities to recover value from electronic waste

Jacquetta Lee
University of Surrey, UK

There is significant value in waste electronic devices, but to date, this has not been fully realized. Large amounts of electronic equipment is shipped abroad, and is subsequently lost to the reuse/recycle/recover opportunities in the original country of use. Even if the products remain in the country where they are originally bought and used, much never makes it to the recycling loops. Mobile phones in particular are prey to 'hibernation' that reduces the reuse options and ultimately reduces the value of the phone.

There are many different definitions of value, ranging from the purely financial to scarce materials to embodied energy. Electronic products exhibit different value profile depending on whether they are new, old, or somewhere in between. These values are dependent not only on the design of the product itself, but also on the surrounding 'landscape'. This landscape includes legislation, geographical location, and local market conditions. In essence, determining the right waste strategy for electronic good requires a dynamic and flexible system that will not look the same in all regions of the world, or even within a countries borders.

This presentation will suggest a method to combine the relevant local conditions with the key decision points in the 'disposal' of a phone ; reuse, recovery of components, and recovery of materials. This approach is dynamic in nature, and will support the creation of appropriate waste systems that maximize the value from the waste streams whilst minimizing associated negative effects.

Speaker Biography

Lee has a MEng in Mechanical Engineering and Materials and holds a PhD in Environmental Systems Analysis from Cranfield University (1996). She is currently the Executive Secretary for the International Society for Industrial Ecology. She has over 25 years of experience across a diverse range of industrial sectors including aerospace, electronics, construction, and is leading research into reducing uncertainty in early design decision making within aerospace, and improving resource efficiency in the electronics industry. She has a holistic approach to sustainability systems analysis, incorporating environmental and social aspects from both academic and industrial perspectives. As Director of the Practitioner Doctorate in Sustainability Program, she is responsible for engaging major industry leaders and high caliber postgraduate researchers to work collaboratively on specific research briefs designed to resolve current sustainability issues within industry. This innovative program offers a unparalleled opportunity, uniting academia and industry to develop solutions that will have enduring value for individual organization, industry and governance.

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Energy recovery and utilization from waste printed circuit boards

Maria Holuszko[1], Amit Kumar[1] and **Travis Janke[2]**
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Electronic waste is one the fastest growing waste streams in the world and printed circuit boards (PCB) are the most valuable fraction of this stream due to the presence of gold, silver, copper, and palladium. Printed circuit boards consist of approximately 30% metal and 70% non-metals. The non-metal fraction is composed of 60-65% fiberglass and 35-40% organics, in the form of surface-mount plastics and epoxy resins in the printed circuit board laminates. The organics in the non-metal fraction provide a potential alternative source of energy, but hazardous flame retardants contained in the epoxy resins and the presence of residual metals create challenges for utilizing this material for energy recovery.This research provides an evaluation regarding the energy content of printed circuit boards. Density-based separation processes were used to separate the various components of the boards to increase the energy content in specific density fraction while reducing the metal content. The content of the hazardous flame retardants and residual metals was analyzed to evaluate the harmful effect of emissions produced from utilizing the non-metal fraction as an alternative feed stock in waste-to-energy applications.

Speaker Biography

Maria Holuszko has more than 25 years of experience in Mineral and Coal Processing Engineering working with industry, academia, and government. Her first position was at the University of Alberta, followed by the Alberta Research Council. In the 1990s she held a senior Licensed Scientist positon at the British Columbia Ministry of Energy in Victoria, B.C., and she was engaged in consulting work for the mining industry before she decided to pursue her PhD studies at UBC. After completing her PhD degree in 2006, she moved to Australia to work at the Julius Kruttschnitt Mineral Research Centre, the center of excellence for mineral processing at the University of Queensland. In 2011, she returned to work for the industry as a Senior Research Engineer at Teck Resources until she joined the UBC Mining Engineering department as Assistant Professor in 2014.

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Nondestructive nuclear measurement of radioactive waste

Bertrand Perot
The French Alternative Energies and Atomic Energy Commission, France

A wide range of nuclear nondestructive measurements are carried out by CEA to achieve the most complete characterization of radioactive waste packages. High-energy photon imaging (radiography, tomography) allows determining the main properties of the packages, such as the density, position and shape of the waste inside the container, the quality of coating or blocking materials (resin, bitumen, hydraulic binder…), the presence of internal shields, structures, cracks, voids, defects, liquids, forbidden materials, etc. Radiological assessment is then performed using the widespread gamma-ray spectroscopy, which allows characterizing a broad range of radioactive and nuclear materials, but also passive neutron coincidence counting and active neutron interrogation with the differential die-away technique to measure nuclear materials. In view to assess the latter in the largest and densest packages, active photon interrogation with high-energy photons (above the photofission threshold of ~ 6 MeV) is a promising technique currently under development at CEA. Prompt gamma neutron activation analysis is also being studied to detect toxic chemicals, or elements influencing the above measurements, such as neutron moderators or absorbers. The latter technique could also be used in the future to assess valuable materials in nonnuclear waste, such as precious metals (gold, platinum…) or rare earth elements in electronic waste.

Speaker Biography

Bertrand Perot was graduated in 1992 from the Physics Engineers School of Grenoble, France, and he obtained a PhD from Grenoble University in 1996. He worked for a few years at AREVA in the field of nuclear process control, mainly for AREVA La Hague reprocessing plant (Northwestern France). Then he joined CEA Cadarache (in South France) to developed nondestructive measurement methods for the nuclear fuel cycle, especially radioactive waste characterization and for homeland security through European projects. He obtained in 2012 the University accreditation to supervise PhD studies (the so-called "HDR") and he was appointed CEA International Expert in 2014. He has about 100 publications or communications and his H-index is 10.

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Co-gasification of high ash coal and high ash biomass in downdraft gasifier

Sonal K Thengane, Ankita Gupta and **Sanjay M Mahajani**
Indian Institute of Technology Bombay, India

The thermo chemical process of gasification has the potential to produce heat and electricity from different feedstocks such as coal and biomass. In Indian context, biomass gasification has received significant interest in recent years as an alternative to coal gasification owing to the problems encountered due to high ash content (> 30 %) in Indian coal. Co-gasification offers environmental and technical benefits over individual feed gasification and has been explored as a preferable option for various biomass and coal mixtures. The present paper investigates the effect of mixtures of high ash coal (35 - 40 %) and high ash biomass (e.g. garden waste pellets with 10 % ash) in different proportions on the composition of syngas in a fixed bed downdraft reactor of 5 kg/h capacity. The feedstock mixtures having composition (by weight) of 100 % coal, 25 % coal – 75 % pellets, 50 % coal – 50 % pellets, 75 % coal - 25 % pellets and 100 % pellets are prepared. Air is used as a gasifying agent and the grate is rotated every 20 minutes to ensure smooth operation. The feedstock mixtures are characterized and the producer gas is analyzed for its composition, tar and particulates. The catalytic effect induced by the inorganic content in garden waste pellets on co-gasification is studied. The issue of clinker formation that is common in gasification of high ash containing feedstock is also addressed. The co-gasification of coal and biomass shows the synergistic effect in terms of increase in release of total volatiles and decrease in char yield and emissions. The mixture with higher percentage of coal generated more clinker due to ash fusion at higher temperatures. The mixture with higher percentage of biomass increased the conversion to gas on a carbon basis, and decreased the conversions to char and tar. The results of the present study would successfully establish the optimum operating conditions for stable co-gasification operation for high ash coal and high ash biomass.

Speaker Biography

Sonal Thengane is a Post Doctoral Fellow at Tata Centre for Technology and Design, IIT Bombay, working on the project on biomass gasification with major focus on utilizing garden waste and agro residue for community level cooking. The project is supervised by Prof. Sanjay Mahajani, IIT Bombay in collaboration with Prof. Ahmed Ghoniem, MIT USA. The process involves pelletisation of processed garden waste / agro residue followed by its gasification to obtain producer gas that could partially replace LPG consumption. Sonal has obtained his Ph.D. from IITB-Monash Research Academy working on a project funded by Orica Mining Services, Australia in the field of thermochemical water splitting for ammonia and nitric acid production. His research interests are waste to energy, thermochemical conversion processes, chemical looping, process modeling and thermodynamic analysis. He is actively involved in establishing an integrated waste management facility at IIT Bombay with the objective of making the campus a zero waste campus..

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Degradation of five representative PPCPs by *Chlamydomonas sp.Tai-03*

Chuan Chen, Peng Xie, Shi-Shin Ho, Zi-Feng Zhang, Xi-Jun Xu and **Nan-Qi Ren**
Harbin Institute of Technology, China

Pharmaceuticals and Personal Care Products (PPCPs) are one of the most popular emerging pollutants. PPCPs represent a large range of micro-pollutants, including antibiotics, anti-inflammatory drugs, lipid-lowering drugs, musk and hormones. PPCPs possess the features of high persistence, bioaccumulation and low bioavailability, therefore resulting in the long-term exposure to human, as well as aquatic and terrestrial organisms. Based on the source investigation, most of PPCPs are from domestic wastewater, however, the urban wastewater treatment plant (WWTP) can not guarantee the effective removal of PPCPs. In recent years, several researchers already demonstrated microalgae has good capability of the degradation of organic pollutants. Thus, the present work focused on the degradation of five typical PPCPs (Bisphenol A, Tetracycline, Ciprofloxacin, Sulfadiazine and Sulfamethoxazole) and biofuel production by Chlamydomonas sp.Tai-03. The concentration of those PPCPs for batch tests was set at 1, 5 and 10 ppm, respectively. The result showed that Tai-03 could completely remove Bisphenol A, Tetracycline and Ciprofloxacin at 10 ppm in 145h, 170h and 120h, respectively. The removal percentage of sulfadiazine and sulfamethoxazole was both approximately 50% and 20% regardless with the concentrations used. Furthermore, We also studied the effect of photodegradation, hydrolysis and adsorption on the removal of PPCPs. The photodegradation of bisphenol A, tetracycline, ciprofloxacin, sulfadiazine and sulfamethoxazole were 13.3%, 21.8%, 17.3%, 34.4% and 1.4%, respectively. Hydrolysis rate of tetracycline, ciprofloxacin and sulfadiazine was 48.9%, 9.8% and 2.5%, respectively. The hydrolysis of the other two PPCPs and adsorption capacity was both almost none. According to the analysis of five PPCPs' degradation intermediate products, open-loop reaction occurred in Bisphenol A, Tetracycline and Ciprofloxacin, chain-breaking reaction occurred in sulfadiazine and sulfamethoxazole. These findings indicate micro-algea could be an efficient way to achieve the effective degradation of these five PPCPs.

Speaker Biography

Chuan Chen's research interests focus on novel technologies of biological treatment for refractory industrial waste waters, the integrated technology of simultaneous removal of sulfur, nitrogen and carbon containing pollutants and sulfur reclamation, the environmental behaviour and bio conversion of emerging pollutants (PPCPs) in urban water system, microbial mediated corrosion control in oil field, etc. Chuan Chen participated for more than 10 projects, got 1 second-rank national Award of Science and Technology and 1 first-rank provincial Award of Technology Invention, has published over 50 SCI-indexed papers and 10 patents.

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Multi-effect distillation: A key component for a circular economy approach in industrial waste waters – A preliminary techno-economic assessment

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Most industrial processes make use of a considerable amount of water and energy while releasing waste heat and waste water solutions (also called brines). A circular economy approach can be applied to the industrial brines to recover some of the valuable main components contained in the brines and to exploit the waste heat generated by the industrial process itself. Our work is focused on the investigation of possible combinations of waste water treatment processes, in order to maximize the purity of the recovered materials and to minimize the energy requirement as well as the eventual environmental impacts of the brines. This work reports a detailed techno-economical investigation of the Multi-Effect Distillation process and its possible employment in a waste water treatment chain. A new flexible techno-economic model for the MED process was implemented in Python, which takes into account different flow arrangements and layouts (parallel cross, forward feed, with or without the TVC). A particular attention was paid on the influence of important variable and of their estimation (such as the pressure losses and the Boiling Point Elevation) with respect to the global outputs. This analysis highlighted how the pressure losses plays a fundamental role in the definition of the heat exchanger areas and, then, of the capital costs of the plant. The influence of several input parameters, e.g. the number of effects, the composition of the brine and the distillate flow rate, was analyzed both from the technical and the economical point of view. Finally, starting from real examples of industrial brines, we were able to identify the optimum sizes and process parameters which minimize the water production costs, for a required amount of produced pure water and for a certain brine composition.

Speaker Biography

Marina Micari studied Chemical Engineering at the University of Palermo and obtained her degree (cum Laude) in 2016 with a diploma thesis titled “Closed Loop Reverse Electrodialysis: Experiments and Mathematical Modelling”. After that she worked as a researcher of the University of Palermo in the EU-funded project RED-Heat-to-Power. Her activities have been –towards development and optimization of a mathematical model, describing the Reverse Electrodialysis apparatus, as well as the analysis of the integrated system composed by Reverse Electrodialysis and Multiple Effect Distillation and the one composed by Reverse Electrodialysis and Membrane Distillation. She joined DLR, Stuttgart in June 2017 and started her PhD within the framework of the ZERO BRINE project.

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Current state and trend of waste and recycling in Japan

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This report statistically introduces current state and recent trend regarding resource circulation, industrial and municipal wastes and recycling of Japan. In Japan, the ratio of the total amount of recirculated resources to the national resource input is 15.8% in FY 2014. This ratio has been increasing continuously over the past 20 years mainly due to steady progress in the industrial waste recycling and to gradual shrunk of the domestic natural resource input. Of the total 255Mt of domestic recirculated resources, 55% is the amount of resources recycled from industrial and municipal wastes. The remaining 45% covers used paper, ferrous/non-ferrous scrap, steel making slag, black liquor etc. which are not classified as waste. Japanese total waste volume in FY 2014 is 437 Mt, accounting for 90.4% for industrial waste and 9.6% for municipal waste. The amount of resources regenerated from these wastes is equivalent to 50% of the total waste volume. The final landfill amount to all waste is only 3.4%. The Japanese Home Appliances Recycling Act imposes recycling obligation on manufacturers and distributors of four types of used household appliances (air-conditioners, TVs, refrigerators, washing-machines). In FY 2015, totally 11,000,000 units were recycled by the manufacturers. However, this number is considered to be only half of the actual used appliances, and the other half may go to some illegal pass route. The recycling rates by legal procedure of manufacturers were all very high, 93% of air-conditioners, 89% of LCD TVs, 82% of refrigerators, and 90% of washing-machines. In order to expand recycling to all other small household appliances, the Small Home Appliances Recycling Act was enforced in 2013. The main focus is to promote recovery of precious/rare metals. These small appliances are collected by municipalities and handed to recyclers certified by the government. In FY 2015, the recyclers gathered 67kt nationwide, which was only about 1/10 of the final expected amount.

Speaker Biography

Takashi Amemiya received M.S. degree and Ph.D. degree from the University of Tokyo. In 1978, he joined Toshiba Corporation where he engaged in for 30 years in research and development work such as fuel cell systems, material and/or energy recycling systems for industrial wastes and E-wastes. In 2013, He was appointed as a professor at Nippon Institute of Technology, Japan, and is doing research achievements in the field of material and resource circulation engineering for the application in environmental area.

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Stainless steel slag waste as a replacement for cement in mortars

Francisco Agrela, Julia Rosales and **Manuel Cabrera**
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Huge quantities of stainless Steel Slags are produced in several European Production Plants of this type of steel. Normally, these waste are moved to dumpfields, and minimum percentages are recycled. In the University of Cordoba the group of Construction Engineering have studied during last three years the feasibility of replacing cement by stainless steel slag waste and improving the mechanical properties of the slag waste by using different types of treatments.

The application of stainless steel slag waste could reduce the use of raw materials for manufacturing cement and provides a profit from the large amount of waste generated.

In these studies, we analyzed the cementation and pozzolanic reaction characteristics of stainless steel slag waste to evaluate its strength activity index and its environmental impact. The cement was replaced with different substitution percentages of untreated stainless steel slag waste and slag waste that was processed through crushing, burning and both treatment to determine the optimum replacement ratio according to its mechanical properties.

We determined that replacing cement with stainless steel slag waste for the manufacture of mortar could improve the mechanical properties up to a certain degree of substitution. This use can provide some value to the large amount of waste produced and reduce the consumption of raw materials.

Speaker Biography

Francisco Agrela is an Assistant Professor of Civil Engineering at the University of Cordoba, Spain. He received his Doctorate in 2003 from the University of Cordoba. He is the author of over 40 research articles in peer-reviewed journals. He has published a chapter in the Handbook of Recycled Concrete and Demolition Waste (Woodhead). He collaborates with several journals as reviewer, like Construction and Building Materials, Waste Management, Materials and Design, Resources, Conservation and Recycling, etc. He belongs to the RAC committee of RILEM and AFN-20 of TRB. He has visited and collaborated with several Universities like TU Delft, University Polytechnic of Hong Kong, University of Granada, IST of Lisbon, etc.

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Best practices of community based solid waste management in Panga, Kirtipur, Kathmandu, Nepal

Nabin Bikash Maharjan
Blue Waste to Value, Nepal

Municipal solid waste management continues to be a major challenge for local governments in both urban and rural areas across the world, and one of the key issues is their financial constraints associated with the management as a whole in developing and under developed countries like Nepal. In contrast to the problems, recently a best practices on community based solid waste management model were implemented through the active participation of existing and non-existing stakeholders. This basic level of community interventions and adoption ability of the people living in the community assisted the team to come up with the stress-free, expedient and sustainable management system with the use of low resources, efforts and smooth regulations. Community interventions on adopting the source segregation, applied polluter's pay principle (PPP), re-processing and recycling has helped significantly reduce the waste generation in the source and also help to minimise it going to the landfill. The ultimate products that are produced from the management is being recycled, reused and thus recovered withdrawing the optimum financials that covers the regular cash flow deficits of this small and medium scale enterprise (SMEs). This has entirely proved to manage Solid Waste efficiently.

Speaker Biography

Nabin Bikash Maharjan is a CEO of Blue Waste to Value Pvt. Ltd. And he has been working in Solid Waste Management since 1996 based in Kathmandu, a capital city of Nepal. He has experienced in research on integrated solid waste management in households, community, municipalities. He had also served as a project coordinator of "Poverty Reduction of Informal Waste Workers in Solid Waste Management Sector (PRISM) from Centre for Integrated Urban Development (CIUD) in a project funded by the European Union and Practical Action. He has developed the several vessels composting models for the households in Kathmandu.

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Aerobic and anaerobic digestion of agricultural wastes as sustainable recycling technologies: Benefit & comparison of the end products for fertilizer purpose

Muscolo Adele, Panuccio Maria Rosaria, Teresa Papalia, Giovanna Settineri, Federico Romeo Carmelo Mallamaci and **Emilio Attinà**
Mediterranea University of Reggio Calabria, Italy

Agricultural waste removal has become an ecological problem, brought to light as a result of an increase in public health concerns and environmental awareness. Aerobic and anaerobic treatments of agricultural wastes appear to be the most promising approaches for reducing agricultural wastes going to landfills while producing environmental and socio-economic benefit. In view of the above considerations, the objective of this study was to analyze the chemical characteristics of two composts and two digestates and to compare their effects on soil chemical, and biochemical properties and on crop productivity and quality to determine their suitability as fertilizer. Results evidenced that waste characteristics influenced the chemical properties of the compost much more than composting process. The obtained composts had a positive effects on soil, increasing organic matter (SOM), nutrients, microbial biomass (MBC), bacterial and fungal population. The best result on soil, was obtained by using the compost produced with a mix of broadleaf vegetables. Regarding crop productivity, the data showed a specificity between crop and type of compost used. Digestates positively affected soil chemical and biochemical parameters depending on the type of fraction and on the concentration used. The digestates were less effective than compost in inducing crop productivity and quality. In conclusion, the agronomic quality of compost and digestate is strictly dependent on percentage and type of feed stocks used in the aerobic or anaerobic process. The results confirm that compost and digestate offer important soil improvements that are mutually beneficial rather than alternative, even if the compost is better than digestate in inducing crop productivity and quality.

Speaker Biography

Muscolo Adele graduated in Biological Sciences (MSc), has completed her PhD in Food Science at the age of 26 years at the Policlinic Federico II University of Naples, Italy. In 1988 she started is professional carrier as researcher at Mediterranea University of Reggio Calabria where she is still working as Full Professor in soil chemistry and ecology. Since 1990 she is reviewer for International Scientific Journals and since 2008 she is evaluator of projects for European Community, International Funding Research Agencies and Italian and Foreign Research Ministries. She is examiner of international PhD dissertation. She has over 180 papers in international journals with IF. Citations: 1597 H index: 21. She has been serving as an editorial board member of many International Journals. She is Associate Editor for JFR.

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Societal harm arising from environmental toxicity

Aijuka Nicholas,
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Many societies in Uganda are increasingly suffering the repercussions that have been arising from rampant air pollution, increase in contamination of water and the land for tilling with many refuses full of toxins from manufacturing plants..

In the rural set up of the countryside, many of the natives have quite often blamed it on government for lack of strict laws and penalties on the perpetuators of environmental laws which has consequently led to high health problems like the airborne diseases because of polluted air, low fertility rate of the soils which has adverse impacts on production levels yet Agriculture is the biggest income earner for many homesteads in Uganda.

Generally, this paper exudes the environmental toxicity and the harm it has caused to the society. This is through getting to the directly implicated societies like those in Hima kasese where there have been clear indicators of what this paper seeks to bring to light and what other civil society organizations have been able to assess with help of the community members.

The unbelievable challenges faced during the execution of the sustainable programmes and public sensitization are to be put to light in this paper with the collection of evidence and the law enforcement procedures.

Speaker Biography

Aijuka Nicholas is a final year student of Bachelor's of Science in Civil Engineering at Makerere University Kampala Uganda in the department of Civil and environmental Engineering. I have been focusing on environmental field throughout my course of study and I have authored articles for some international waste Journals (Ref. DOI: 10.4172/2252-5211.1000287).I have participated IN THE 22ND AND 23RD Africa oil week in 2015 and 2016 respectively in Cape Town South Africa under young professionals; I have also participated in the 79th EAGE conference in Paris 2017 under young professionals as well. I have participated in the 2017 Annual Conference of the International Network of Environmental Forensics in Beijing china where I co-authored with a colleague on a joint presentation that was exuding on the deforestation in Uganda.

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